

INSTALLING/TROUBLESHOOTING SPECTRACOM TIMEVIEW DIGITAL DISPLAY CLOCKS (MODELS TV230, TV400, TV210W AND TV400W)

When Spectracom Model TimeView® digital display clocks are operating normally, all six digits will be present with the correct time displayed and no portion of the display will be flashing. There are a few factors that can affect the normal operation of the display clocks. These factors can cause the hours value to be incorrect, the seconds portion of the display to flash every second, the main portions of the display (hours, minutes and seconds) to sequence in a pattern or the digits to be erratic or dim/no longer displayed (causing a blank screen).

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SECTION 1: TIMEVIEW IS SHOWING THE INCORRECT HOURS VALUE

Once the display clock has synchronized to a Spectracom NetClock via RS-485 data, the seconds will no longer be flashing. The minutes and seconds values will also be correct. However, depending on the current configuration of the NetClock’s RS-485 Remote port, the hour’s value may be ahead of the current local time by several hours.

The default settings for the NetClock’s RS-485 Remote output port is to output UTC time with no Time Zone offset or Daylight Saving Time correction applied (the provided RS-485 output is not local time by factory default). Depending on the US Time Zone that you are located in, this displayed time may be ahead of local time by 4 to 8 hours. In order for the display clock to show the correct local time (Such as Eastern, Central, Mountain or Pacific) the Time Zone offset and whether or not the NetClock should apply automatic DST adjustment (as applicable for your location) needs to be configured in the NetClock Remote port that is providing the RS-485 data to the TimeView display clock.

Refer to the applicable NetClock instruction manual for information on how to configure the Remote port to output local time instead of UTC time. In Model 918x, 928x and 938x series NetClocks, this will be accomplished by creating a “Local System Clock” and then referencing the assigned name of this local clock in the “System Clock” drop-down in the appropriate Interface (or Interface Setup)/ Remote output port configuration page of the NetClock’s web browser.

Figure 1 illustrates how to configure the Local System Clock. In this example, the Local Clock has been named “Eastern”. So, “Eastern” would be selected in the “System Clock” drop-down in the NetClock’s

Interface/Remote output page of the browser to output Eastern time to the display clock(s) and other devices connected to the same Remote port.

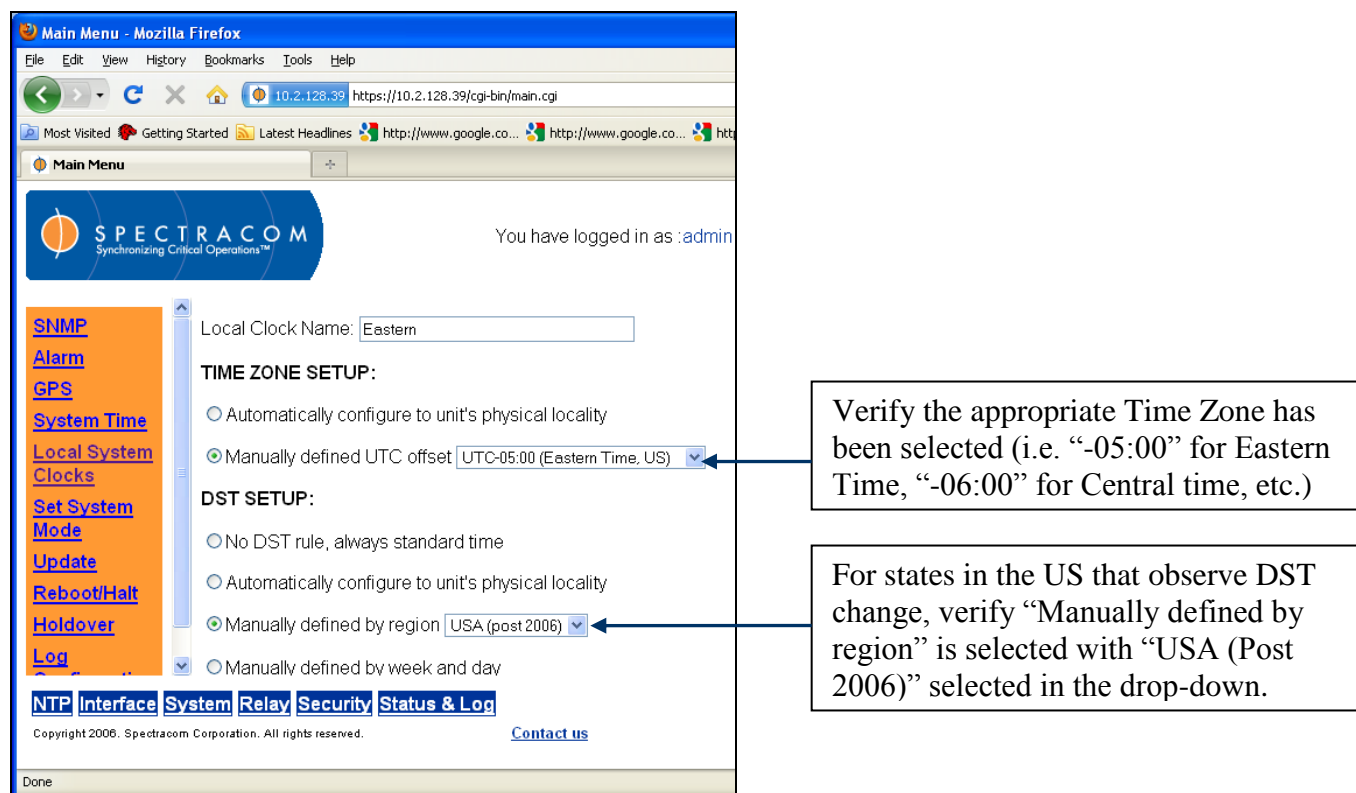


Figure 1: Configuration of the System/Local System Clocks page of the web browser

Note: If an Ethernet Time Server, Model 9388, 9288 or 9188 is also connected to the same NetClock Remote port as the display clock(s), Format 0 has to be the selected Data Format for that particular Remote port. The Ethernet time servers can accept Data Formats 0 or 2, as configured in the Ethernet Time Server. Changing the Remote port from Format 2 to 0 to sync a display clock will cause the Ethernet Time Server(s) to lose sync if it's configured to receive Format 2, instead of "0". In this case the Ethernet time server will need to be reconfigured to accept Format 0, and the Format 0 year value stored in the time server will also need to be verified.

A better solution is if the NetClock has two Remote output ports, and the other port is available; connect the Ethernet Time Server to one Remote port configured as Format 2 output and the TimeView display clock(s) on the other port that is configured as Format 0 output.

If the hour's value was correct until shortly before or after a Daylight Saving Time change (such as in March or November), the Remote port of the NetClock that is providing RS-485 data to the display clock may have its DST rules incorrectly configured (causing the NetClock to adjust for DST at the incorrect time/date). On web-based NetClocks, such as the Model 9100, 9200 and 9300 series, the DST configuration is in the "Local System Clock" configuration. For more information on proper NetClock DST configuration, please refer to: http://www.spectracomcorp.com/portals/0/support/pdf/DST_Rule_Change.pdf

SECTION 2: TIMEVIEW IS DISPLAYING FLASHING SECONDS

After the TimeView display clocks have been correctly connected to the NetClock's Remote RS-485 port, and as long as certain conditions have been met, the display clocks will synchronize to the Spectracom NetClock in about 1 or 2 seconds (as indicated by a solid time display with the second's portion of the display no longer flashing). The flashing seconds is used as a remote indication that the display clock can't sync to the NetClock, or the NetClock is not synced to its external reference (GPS, IRIG, modem, etc).

Depending on the Model of the TimeView display clock, the potential condition that can cause the flashing seconds to occur varies slightly:

- With the newer Models TV210W and TV400W digital display clocks, the flashing seconds are used as a remote indication that the display clock can't sync to the NetClock because either the NetClock is not synchronized (to its external reference) or because the TimeView display is unable to either receive or understand the once-per-second RS-485 data stream from the NetClock's Remote output port.
- On the earlier Models TV230 (Model 8175) and TV400 (Model 8177) digital display clocks, the display clocks will only flash the seconds portion if the NetClock is not in Sync with its external reference (if these displays clocks are not receiving RS-485 data from the NetClock, they will instead sequence through the hours portion only, then the minutes portion only and then the seconds portion only, as described in
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- **SECTION 3: TIMEVIEW DISPLAY IS SEQUENCING THROUGH HOURS/MINUTES/SECONDS (OR THE SECONDS ARE FLASHING EVEN THOUGH THE NETCLOCK IS SYNCED AS VERIFIED IN SECTION 2) of this document).**

Note: If you are uncertain which Model TimeView that you have, besides the Serial Number tag located on the back of the display, the easiest way to identify the Model Number of the display clock is both the Models TV230 (Model 8175) and TV400 (Model 8177) have a row of 10 DIP switches (in addition to the Mode and Set switches) located on the back panel. The Model TV210W (Model 9175) and TV400W (Model 9177) do not have any DIP switches located on the rear panel (they just have the Mode and Set switches present).

In order to prevent the second's portion of the display from flashing, the NetClock (or Ethernet Time server) that is providing RS-485 time data to the display clock must be synchronized to its external time reference (i.e. GPS, IRIG, RS-485 data or modem). Verify that the NetClock's front panel "Sync" or "Time Sync" light is green. If it is not green, the NetClock is not in Sync with its primary reference and so the display clock won't be able to sync to the NetClock. (The times of both devices will match, but the seconds on the display clock will continue to blink, as the display clock will still match the time if it is able to read the RS-485 time code data). If the display is receiving time code data from an unsynchronized NetClock, a sync status character in the time code data stream causes the seconds to flash on the display until the NetClock is back in sync with its reference.

To troubleshoot a Spectracom WWVB-based NetClock/2 that has a red Time Sync light, please refer to: http://www.spectracomcorp.com/portals/0/support/pdf/netclock2_reception.pdf

To troubleshoot a Spectracom GPS-based NetClock that does not have a green Sync/Time Sync light, please refer to the second section of the webpage (labeled as “**GPS reception**”) at:

<http://www.spectracomcorp.com/Support/Library/ApplicationNotes/tabid/77/Default.aspx>

With the Models TV210W and TV400W display clocks, if the NetClock has been verified as being synchronized (the NetClock has a solid green Sync or time Sync light) yet the seconds portion of the display continues to flash every second, please refer to

SECTION 3: TIMEVIEW DISPLAY IS SEQUENCING THROUGH HOURS/MINUTES/SECONDS (OR THE SECONDS ARE FLASHING EVEN THOUGH THE NETCLOCK IS SYNCED AS VERIFIED IN SECTION 2) for further troubleshooting assistance.

SECTION 3: TIMEVIEW DISPLAY IS SEQUENCING THROUGH HOURS/MINUTES/SECONDS (OR THE SECONDS ARE FLASHING EVEN THOUGH THE NETCLOCK IS SYNCED AS VERIFIED IN SECTION 2)

Along as certain conditions have been met, the TimeView display clocks will synchronize to the Spectracom NetClock in about 1 or 2 seconds (as indicated by a solid display and the second’s portion of the display no longer flashing).

- On the older Models TV230 (Model 8175) and TV400 (Model 8177) display clocks, the TimeView clock will continue to sequence a display of hours portion only, then minutes portion only and then seconds portion only, if the display clock is not receiving RS-485 data from the NetClock.
- On the newer Models TV210W and TV400W, even if the NetClock is synchronized, the seconds will continue to flash if the display clock is not receiving valid RS-485 data from the NetClock.

A few factors can prevent a TimeView display clock from being able to receive RS-485 data from the NetClock. These include wiring/termination issues with the RS-485 bus or output Data Format configuration of the NetClock’s RS-485 Remote output port.

All versions of the TimeView display clocks need to be connected via a twisted-pair cable to a Remote RS-485 output connector on the back of the NetClock. The cable between the NetClock and the display clock should be pinned as “+Data” to “+Data”, “-Data” to “-Data” and “Ground” to “Ground”. On the back of the display clock, the wires should be connected to the left-most three pins (the right three pins are a driver output from the display clock). The wiring on this connector for the display clock (from left to right) is “+Data”, “-Data” and “G”. Depending on the Model of the NetClock, this order may not be the same order as the pin-outs on the Remote output of the NetClock. For example, on the NetClock Model 8183, the output is in the same order. But on the Models 9383, 9388 and 9389, the order of the pins is reversed, with it being “G”, “-Data”, “+Data” instead (the two outer connectors are reversed). On NetClocks with the reverse configuration, make sure to roll the two outside wires.

The wires inserted into the terminal blocks on the NetClock as well as the display clock(s) should be stripped of insulation so bare wires are inserted into the terminal blocks.

The RS-485 bus, if connected to more than one device, should be in a true-daisy chain connection with no branches to more than one device in the line. Branches in the RS-485 can cause reflections that can result in

flashing seconds. Make sure the only clock on the bus, or the last device on the bus, is terminated into 120 ohms. For more information on RS-485 wiring and termination, please refer to the RS-485 wiring primer located at: http://www.spectracomcorp.com/portals/0/support/pdf/RS-485_wiring_primer.pdf. This document provides additional information about using RS-485 wiring/termination and can help you determine whether RS-485 is being sent to the display clock's input.

The NetClock's Remote port that is connected to the display clock needs to be configured to output Data Formats 0 or 1 (the display clocks cannot sync to Data Format 2 for example). The factory default is Format 0, so unless the NetClock's port has been reconfigured by a user, the default Format is acceptable.

Other abnormal conditions can also prevent the display clock from reading RS-485 data from the NetClock, such as a bad Remote port on the NetClock, a hardware issue with the display clock, a broken wire on the twisted-pair cable, etc. The wiring primer guide mentioned above contains a troubleshooting section which may help. Also, the display clock may have been affected by a power glitch. Try power cycling the display clock and see if the seconds stop blinking within a couple of seconds (the power pack for input power may be located behind the clock, so the clock may need to be removed from the wall to gain access to it). Some Models of the NetClocks provide two (redundant) side-by-side RS-485 output ports. If both RS-485 outputs ports are present, the other RS-485 connector can also be used for validation testing. Another method to test for a broken wire in the RS-485 bus is to temporarily connect the display clock to the back of the NetClock with a short length of wire. If it syncs in this configuration, the display clock is working and a wiring issue exists.

An oscilloscope is the best test device to ensure RS-485 is present into the back of the display clock. However, if one is not available, a multimeter can also be used as a quick-test. To look for RS-485 data on the "+Data" and "-Data" lines, set the meter to measure DC voltage. Starting at the NetClock's Remote output port (with the RS-485 cable disconnected), place the black probe on the round ("G") pin and the red probe on the "+Data" pin. This DC voltage should be around 2 vdc with a distinctive "heartbeat" drop in voltage every second. Due to the frequency response of the meter, the DC voltage will momentarily drop by about 0.1vdc each second.

Then move the red probe over to the "-Data" pin. This voltage should be around 0.5 vdc with a distinctive "heartbeat" drop in voltage (by about 0.1 vdc) every second. If the DC levels on both pins are the same, or if both do not drop in voltage at all, the output port is likely bad. Some NetClocks have two Remote ports. If a second Remote port is present, it can be used as a side-by-side comparison to ensure the test is working properly. The signals on both ports should be similar.

If the signals are present on the NetClock's remote output port, perform this same check on the terminal block input on the back of the first (or only) display clock in the RS-485 bus that isn't syncing. If the data is not present on this terminal block but is present on the cable, a cable issue likely exists. If the data is present on both of the input pins on the back of the display clock, try power cycling the display. If the clock still doesn't sync within just a couple of seconds, a likely hardware issue with the display clock. Contact Tech Support for an RMA number to be assigned. Refer to [Technical Support](#).

SECTION 4: TIMEVIEW HAS MISSING SEGMENTS, ERRATIC DISPLAY OR NO DISPLAY

An erratic, blank or dim display indicates a hardware issue exists, likely related to input DC power (loss or a problem with the RS-485 input from the NetClock is not likely to affect the display clock segments from showing a “normal” time with seconds counting up). This condition can be due to a problem with the TimeView display itself, or it may also indicate a problem with the power pack (wall adapter) that is used to power the TimeView display clock. To resolve the issue, it is necessary to determine whether the issue is with the display clock or with the power pack.

If there is more than one display clock located at the site, try swapping the power pack with another one from a same Model display clock that is operating normally. If the display clock is still erratic, still dim or digits still aren't being displayed with a different power pack, the issue is likely with the display clock. If the symptoms follow the power pack, the power pack is the likely cause of the symptoms.

An analog or digital multimeter can be used to measure the output voltage of the power pack to help determine if the power pack is the cause of the blank display: The different TimeView Models use different power packs. Refer to the appropriate section below for your particular Model:

Models TV210/TV400W display clock:

The power packs (Spectracom P/N s 1001-0000-0701 for the Model TV210 power pack or PS06-0E0J-DT03 for the TV400W power pack) state that the output voltage is +12vdc with this voltage being present whether the power pack is loaded or unloaded. Disconnect the power connector from the back of the display clock. With the power pack still connected to AC power, measure the DC voltage on the power pack connector (The center pin is positive and the outer shell is negative). The measured voltage should be about 12vc. If the voltage is less than about 12vdc, the power pack cannot drive the display clock, so the power pack needs to be replaced.

Model TV400 (Model 8177) display clock:

The power pack (Spectracom P/N T00058) states the voltage is +12vdc output, but this is only with a load on the power pack (unloaded voltage is around 18vdc). The power pack should be measured under the load of the display clock, but can be checked with it disconnected from the clock. If you have a multimeter with sharp ends on the leads, pierce the insulation and measure the DC voltage. It should be around + or -12 vdc (depending on which lead you put in which wire). If you measure less than around 12 vdc, the power pack is bad and needs to be replaced. If the multimeter has dull ends on the leads, disconnect the power connector from the clock and measure the DC voltage on the power pack connector (center pin is negative and outer shell is positive). The voltage needs to be at least 15vdc. If the voltage is less than about 15vdc, the power pack cannot drive the display clock, so it needs to be replaced.

Model TV230 (Model 8175) display clock:

The power pack that was provided with the Model 8175 (P/N T00054) had a 16.5VAC output to the display clock. Set the multimeter to measure AC voltage in order to check the output of this power pack. It should measure about 16.5VAC.

The 16.5VAC power packs are no longer available from Spectracom. However, the Model TV230 can also operate on a DC input as desired. The specific input DC level will determine the brightness of the digits. The minimum input DC voltage is about 15vdc and the maximum should not exceed about 20vdc.

Results of the voltage check:

Power pack has the correct output voltage present

If the power pack is outputting a sufficient voltage as tested above, there is an internal issue with the display clock and it will need to be returned for service. Contact Spectracom Technical Support with the Model and Serial Number for an RMA Number to be assigned.

Power pack has either a low or no output voltage present

If the power pack's output voltage is low or not even present, the power pack is unable to power the display clock. The power packs are covered under a two year warranty. If the display clock is less than two years old (or if you aren't sure of the purchase date), please contact technical support with the Serial Number of the display clock. If the display clock is more than two years old, the power pack is out of warranty. Replacement power packs can be purchased from Spectracom.

To purchase replacement power packs from us, please contact Sales Administration at (585) 321-5843 or via email at smistretta@spectracomcorp.com. The table below indicates the P/N to order a replacement power pack for the TimeView display clocks:

Display Clock Model	Spectracom P/N to order replacement power pack
TV400W (Model 9177)	1122-0000-0701
TV210W (Model 9177)	1001-0000-0701
TV400 (Model 8177)	T00058
TV230 (Model 8175)	Discontinued/No longer available. Contact Tech Support for additional information.

SECTION 5: TECHNICAL SUPPORT

If you have any questions about your Spectracom equipment, please contact Spectracom Technical Support for assistance. Technical Support is available Monday through Friday from 8:00 a.m. to 5:00 p.m. EST. Support is available by phone and through e-mail. Contact Keith Wing at US +1.585.321.5823 or Dave Lorah at US +1.585.321.5824, or via e-mail at techsupport@spectracomcorp.com