



NetClock® 9400 Series™

Time and Frequency Synchronization System

QuickStart Guide

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Introduction

Applications such as emergency communications centers require reliable timing to accurately synchronize networks, systems, and devices and to log events with legally traceable time. Spectracom’s NetClock 9400 Series is ideally suited for delivering worldwide, split-second timing to mission critical systems.




NOTE: If you are setting up a NetClock Model 9489, special installation steps are required. For details, refer to the Section in this document titled “*NetClock Model 9489 Setup*”.



About This Document

This *QuickStart Guide* contains information and instructions that can be used to get your NetClock 9400 Series product up and running quickly by helping complete initial setup steps and common post-installation configuration tasks.

Safety

Before beginning, carefully read the following important safety statements. Always ensure that you adhere to any and all applicable safety warnings, guidelines, or precautions during installation and operation of your product.

	<p>WARNING</p> <p><i>Installation of this product is to be done by authorized service personnel only. This product is not to be installed by the user/operator.</i></p> <p><i>Installation of the equipment must comply with local and national electrical codes.</i> DO NOT OPERATE THIS EQUIPMENT WITH THE COVER OR BLANK PLATES COVERING UNUSED OPTION CARD SLOTS REMOVED.</p>
	<p>CAUTION</p> <p><i>Electronic equipment is sensitive to Electrostatic Discharge (ESD). Observe all ESD precautions and safeguards when handling Spectracom equipment.</i></p>
	<p>WARNING</p> <p><i>The interior of this equipment does not have any user serviceable parts. Contact Spectracom Technical Support if this equipment needs to be serviced.</i></p> <p><i>This unit will contain more than one power source if both the AC and DC power options are present. Turning off the rear panel power switch will not remove all power sources.</i></p> <p><i>Ensure all power sources are removed from the unit prior to installing any option cards by removing both the AC and DC power cords connected to the equipment.</i></p>

	<p><i>Never remove the cover or blank option card plates with power applied to this equipment.</i></p> <p><i>This equipment has Double Pole/Neutral Line Fusing on AC power.</i></p>
	<p>WARNING</p> <p><i>This equipment must be earth grounded. Never defeat the ground connector or operate the equipment in the absence of a suitably installed earth ground connection. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.</i></p> <p><i>The AC and DC power connectors of this equipment have a connection to the earthed conductor of the AC and DC supply earthing conductor through the AC and DC power cords. The AC source outlet must contain a protective earthing connection.</i></p> <p><i>This equipment shall be connected directly to the AC power outlet earthing pin or DC supply system earthing electrode conductor.</i></p> <p><i>This equipment shall be located in the same immediate area (such as, adjacent cabinets) as any other equipment that has a connection to the earthing conductor of the same AC or DC supply circuit earthing conductor, and also the point of earthing of the AC or DC system. The AC or DC system shall not be earthed elsewhere.</i></p> <p><i>The DC supply source is to be located within the same premises as this equipment.</i></p> <p><i>Switches or other disconnection devices shall not be in the earthed circuit conductor between the AC and DC source and the point of the connection of the earthing electrode conductor to NetClock's AC and DC input power connectors earthing pin.</i></p>
	<p>CAUTION</p> <p><i>For continued protection against risk of fire, replace fuses only with same type and rating of fuse.</i></p> <p><i>Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.</i></p>

Installation

NOTE: There are some commonly desired product configuration scenarios after physical installation (for example: applying local time to the product front panel display, instead of UTC time). For additional information, refer to the Section of the *NetClock 9400 Series Instruction Manual* titled “**Common Post-Installation Configuration Scenarios**”.

Unpacking

- A. Unpack and inspect the unit and accessories (retain all original packaging for use in return shipments if necessary). **Note:** any options on the original purchase order have been preinstalled. The following items are included with your NetClock:
- Unit
 - AC Power Cord (if equipped)
 - Rack Mount Kit
 - QuickStart Guide
 - Purchased Optional Equipment

NetClock 9400 Series Front and Rear Panels

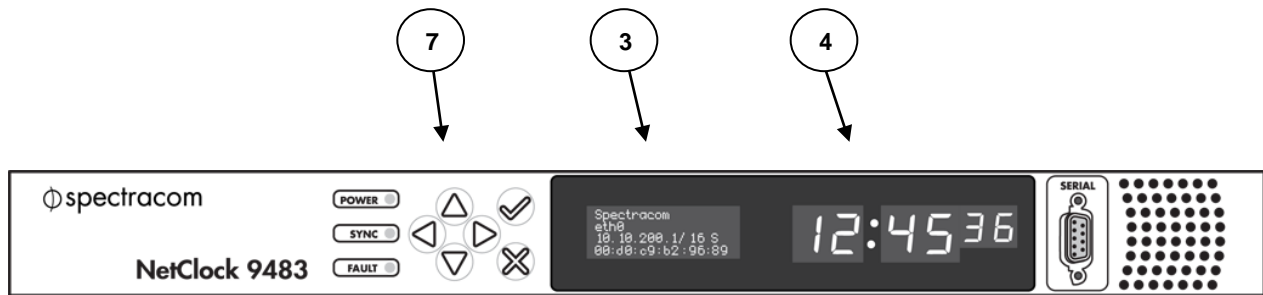


Figure 1-1: NetClock 9483 Front Panel

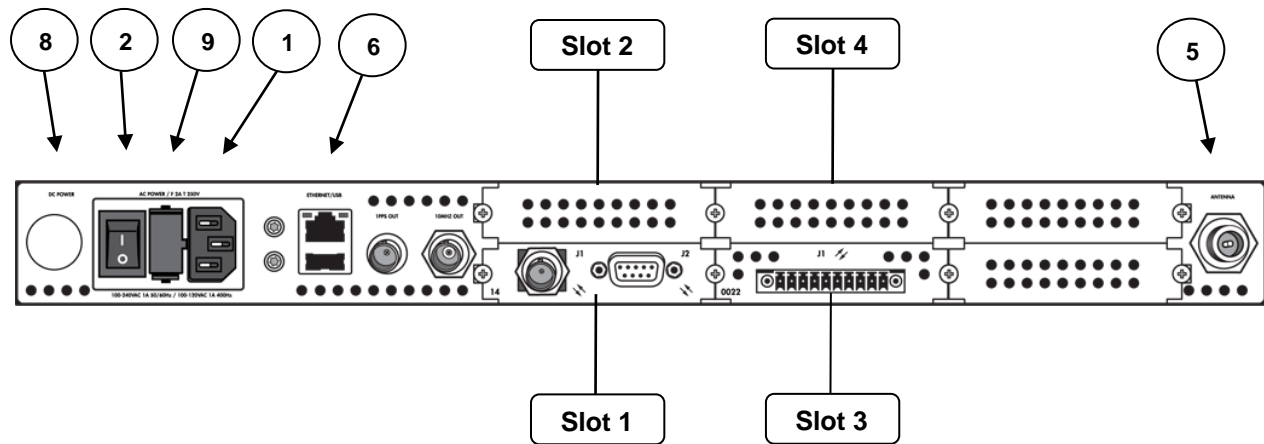


Figure 1-2: NetClock 9483 Rear Panel

NOTE: Base NetClock Model 9483 units include AC input power, Ethernet and USB ports, 1PPS and 10 MHz outputs, IRIG & ASCII RS-232 output, ASCII RS-485 and relay / alarm outputs, and GPS reference. Additional options may also be chosen (such as different oscillator types, or option module cards that add enhanced functionality to the base NetClock unit).

B. If installing the unit in a rack, install the rack-mount ears on the two sides of the front panel and mount the unit in a standard 19 inch rack cabinet. The unit is intended to be installed in the upright orientation only. The unit should be mounted so the front panel interface keys are to the left of the display area. Detailed rack mounting instructions are available in the *NetClock 9400 Series Instruction Manual*.

C. Connect the AC power cord to the AC input **[Figure 1-2 (1)]** on the rear panel and AC power source outlet. If rear panel DC port **[Figure 1-2 (8)]** is available, connect DC power if desired.

NOTE: DC power is an option chosen at time of purchase. Different DC power input options are available. Review the DC power requirement chosen prior to connecting DC power. Detailed AC and DC power connection instructions are available in the *NetClock 9400 Series Instruction Manual*.

- D. Turn rear panel power switch **[Figure 1-2 (2)]** on and observe the Power LED illuminates and the LCD display **[Figure 1-1 (3)]** illuminates and displays the current settings after approximately 2 minutes.
- E. Obtain the following network information from your network administrator before continuing:

Is DHCP enabled?	Yes / No (if yes, continue to step G.)
Available IP Address	
Subnet mask	
Gateway Address	

Available IP Address: This is the unique address assigned to the NetClock unit by the network administrator. The default static IP address of the NetClock is **10.10.201.1**.


Gateway IP Address: The gateway/router address is needed if communication to the NetClock is made outside the local network. By default, the gateway is disabled.

Subnet Mask: The subnet mask defines the number of bits taken from the IP address that are used in the network portion. The number of network bits used in the net mask can range from 8 to 30 bits.


- F. If your network does not support DHCP, use the front panel **[Figure 1-1 (7)]** to input the static IP, subnet mask, and gateway values.

Disable DHCP Using Front Panel

NOTE: To select a menu item, press the  key after highlighting it using the arrow keys.

- Press the  key.
- Using the arrow keys, navigate and select the DHCP option (**Home ▶ Netv4 ▶ DHCP**).
- The display will show O=On and N=On.

NOTE: The O data is the current setting and the N data is the new setting. You can only change the N setting in all menus.

- Select N=On and press the down arrow to change the selection to N=Off.
- Press the  key once to enter the setting, then a second time to apply the new setting.

Enter IP Address and Subnet Mask

- Still on the **Home ▶ Netv4** menu, select the **IP Addr** option (**Home ▶ Netv4 ▶ IP Addr**).
- Change N=000.000.000.001/16 to assign the static IP address and subnet mask.
- Press the **✓** key once to enter the setting, then a second time to apply the new setting.

Network Bits	Equivalent Netmask	Network Bits	Equivalent Netmask
30	255.255.255.252	18	255.255.192.0
29	255.255.255.248	17	255.255.128.0
28	255.255.255.240	16	255.255.0.0
27	255.255.255.224	15	255.254.0.0
26	255.255.255.192	14	255.252.0.0
25	255.255.255.128	13	255.248.0.0
24	255.255.255.0	12	255.240.0.0
23	255.255.254.0	11	255.224.0.0
22	255.255.252.0	10	255.192.0.0
21	255.255.248.0	9	255.128.0.0
20	255.255.240.0	8	255.0.0.0
19	255.255.224.0		

Enter Gateway Address

- Still on the **Home ▶ Netv4** menu, select the **Gateway** option (**Home ▶ Netv4 ▶ Gateway**).
- Change the N=Off to N=On.
- Press the **✓** key once to enter the setting, then a second time to apply the new setting.
- The display will change, allowing you to input an address at N=000.000.000.001. Enter the gateway address here.
- Press the **✓** key once to enter the setting, then a second time to apply the new setting.
- After all addresses are entered, press the **X** key three times to return to the main display. It should resemble the following example:

```
Spectracom
eth0
192.168.100.12/12 S
DG4=01:23:45:67:89:ab
```

Where the 3rd line is the IP address and Subnet Mask you entered and DG4 is the MAC address.

NOTE: The remainder of the initial configuration will be performed using the product web interface.

- G.** Determine whether configuration will be done from a computer attached to the network, or from a computer connected directly to the NetClock unit. For management from a computer attached to the network, connect a standard Ethernet cable to the Ethernet port **[Figure 1-2 (6)]** on the NetClock rear panel. For management from a standalone computer, connect a crossover cable between the computer and the Ethernet port **[Figure 1-2 (6)]** on the NetClock rear panel. Verify the green link light on the Ethernet port is illuminated.

NOTE: Typical installations include GPS. If GPS will not be used, continue with step **J**.

- H.** Install the GPS antenna, surge suppressor, antenna cabling, and GPS preamplifier if required (see Antenna Installation Reference shipped with Model 8225 Antenna).
- I.** Install the GPS antenna, surge suppressor, antenna cabling, and GPS preamplifier if required (see Antenna Installation Reference shipped with Model 8225 Antenna).
- J.** Connect to the NetClock unit using a web browser (such as Mozilla Firefox or Internet Explorer) by entering the static IP address or the IP address assigned by DHCP to the NetClock into your browser's address bar. You can now use a web browser to configure the NetClock unit via the product web interface.

NOTE: The default username and password are:

Username: spadmin Password: admin123

- K.** Verify the NetClock front panel Sync lamp is green. If using GPS, verify that GPS is the sync source by viewing the **Selected Time Reference Source** in the table under **Time and Frequency Status**. The Selected Time Reference Source for GPS is gps0. Initial synchronization may take up to 35 minutes (approximately) when used in the default stationary GPS operating mode.
- L.** Connect the NetClock to wall display clocks and other peripheral devices as needed.

NOTE: For details on specific configurations and options, refer to the *NetClock Instruction Manual*.

- M.** Unless you are using DNS in conjunction with DHCP (with the client configured using the NTP server's hostname instead of IP address), DHCP must be disabled and the IP address must be changed to a static address once the NetClock is properly configured. Failure to do this will result in a loss of time synchronization if the DHCP server assigns a new IP address to the NetClock. Verify your setup before synchronizing the network PCs via NTP.
- N.** Synchronize the network PCs via NTP using the Ethernet port as desired. For a detailed description of synchronizing Windows PCs, configuration and troubleshooting documents are available from the **Support Library** section of the Spectracom website at www.spectracomcorp.com.

- O.** Review your security configuration settings (refer to the *NetClock Instruction Manual* for additional details.)

- P.** During the initial configuration process, it may be necessary to power down or restart the unit. In this case, a **'halt'** command should be issued prior to removing power from the unit. Failure to do so may cause the NetClock unit to take longer to boot on the next power up cycle. After the **'halt'** command is issued via the NetClock web interface or front panel, wait until the LCD reads **'Power off NetClock'** before removing power.

NetClock Model 9489 Setup

NOTE: By default, DHCP is disabled on the NetClock 9489 unit, and it ships with a default IP address of 10.10.201.1. As the NetClock 9489 does not include a front panel LED or LCD that can display status information, it is important to read the following sections carefully in order to successfully determine or configure a NetClock 9489's network settings. This can be achieved via one of the following methods:

- Configuration via serial cable connection
- Configuration via crossover cable
- Configuring a temporary IP address remotely

Network Configuration using Serial Cable Connection

Connect a serial cable from your PC to the input on the front panel of the NetClock 9489. Open a terminal emulator program (such as HyperTerminal, or equivalent), and use the following values to establish a connection to the NetClock:

- **Bits per second:** 9600
- **Data bits:** 8
- **Parity:** None
- **Stop bits:** 1
- **Flow control:** None

Once a serial connection has been established, log in to the NetClock as an administrator. Once logged in, you may use the command line interface commands to configure network settings.

To setup a static IP address, netmask, and gateway, perform the following steps:

1. Enter "**ip4set 0 address mask**" using your static IP4 address and net mask
2. Enter "**gw4set 0 gw_address**" using your gateway address **gw_address**.

For additional details regarding available commands, refer to the NetClock 9400 Instruction Manual section titled: "*NetClock 9400 Series Commands*". Once you've determined or set the IP address, you can then also login to the product web interface by entering the IP address into a web browser's address bar and logging into the NetClock as an administrator.

Network Configuration using a Crossover Cable

Turn on the NetClock 9489 with NO crossover cable plugged into the Ethernet port (note: once you apply power, it may take up to two minutes for the system to fully boot).

Configure your PC's network interface card (NIC) with an IP address on the same network as the NetClock 9489's default IP address (10.10.201.1). For example, configure the IP address of your PC's network interface card as 10.10.201.10, with a subnet mask of 255.255.255.0.

Connect a crossover cable from your PC to the Ethernet port of the NetClock unit. Once connected via crossover cable, open a web browser and enter the NetClock's default IP address (10.10.201.1) into

the browser's address bar and login to the NetClock's web interface as an administrator. Once logged in, network settings for the NetClock can be configured from **Network** → **General Setup**.

Network Configuration via Setting a Temporary IP Address Remotely

If your network supports DHCP, your NetClock 9489 may have automatically been assigned an IP address by a DHCP server. In this scenario, you can perform remote commands for initial network setup by using the MAC address information of your NetClock 9489. This method also applies to statically configured IP networks.

NOTE: Before beginning, ensure the following prerequisites are met:

- If it is desired to configure the NetClock 9489 with a static IP address, it must be a unique IP address not already assigned to another device via DHCP, or that has not already been statically assigned to another device.
- Ensure that the operator or administrator's PC and the NetClock 9489 are on the same subnet, and that the `arp` and `ping` commands can be issued from the workstation.

Complete the following steps:

1. From the rear panel of your NetClock 9489, locate the label displaying the MAC address of your unit. Write down or record the MAC address information.
2. Login to the operator's workstation and open a command prompt window.
3. Install the NetClock 9489 on your network and the same subnet as the workstation.
4. Power on the NetClock 9489 (wait for 2 minutes for the system to fully boot).
5. From the command prompt, issue the following commands:

From a Windows Operating System:

NOTE: On Windows operating systems, you will need elevated privileges to execute these commands. This can be accomplished using the "`runas`" command line program, or by holding CTRL + Right-clicking the command prompt icon, and selecting "Run as Administrator".

```
arp -s IP_ADDRESS MAC_ADDRESS  
ping -l 408 IP_ADDRESS
```

Where "`IP_ADDRESS`" is the desired static IP address, and "`MAC_ADDRESS`" MAC address of your NetClock 9489. For example:

```
arp -s 192.168.0.10 00-AA-11-BB-22-CC  
ping -l 408 192.168.0.10
```

From a UNIX or GNU/Linux Operating System:

NOTE: You must have administrative / root privileges to execute these commands.

```
sudo arp -s IP_ADDRESS MAC_ADDRESS
sudo ping -s 408 IP_ADDRESS
```

Where “IP_ADDRESS” is the desired static IP address, and “MAC_ADDRESS” is the MAC address of your NetClock 9489. For example:

```
arp -s 192.168.0.10 00:AA:11:BB:22:CC
ping -s 408 192.168.0.10
```

NOTE: You must complete this process within 5 minutes of the system booting, or else you will need to restart the NetClock system, and then restart from step 4. This is a temporary IP address that will not persist through power cycles.

6. Open a web browser and enter the NetClock’s IP address into the browser’s address bar to access the NetClock web interface. Login as an administrator. Navigate to **Network → General Setup** and set your permanent IP configuration and network settings.

Troubleshooting

This section covers common issues or problems that may occur during installation, configuration and operation of your product.

Power

Two field replaceable fuses rated at 2 amps, fast blow, high interrupt, 250V (F 2A H 250V) [**Figure 1-2 (9)**] are available for AC power. In the event the unit does not power up with AC power, these fuses should be tested. Remove AC power by disconnecting the AC power cord before testing fuses.

No Network Connection

- If there is no network connection, verify steps **E - G**.
- Attempt to ping the IP address of the NetClock from a computer on the network.
- Verify that a proper IP address, subnet mask, and gateway values have been assigned to the NetClock, or if using DHCP, try to use a static IP address on the network.

NetClock Does not Sync with GPS

For troubleshooting problems with GPS reception, please visit the Spectracom website at www.spectracomcorp.com. From the main site navigation menu, select **Support → FAQs and Troubleshooting** and refer to the *GPS Reception Troubleshooting* document.

Technical and Customer Support

If you have any technical issues, questions, or require further assistance regarding the usage of your product, please contact Spectracom Technical Support via one of our regional service and support centers.

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