



NTP Time Server User's Manual

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1. Overview

The NetBurner NTP Time Server is a device that helps to maintain an accurate clock on devices in your local network. If timing is important in your application, an NTP server is a necessity. The NetBurner NTP Time Server uses a GPS signal receiver to set its clock from GPS satellites. A list of features and functions of the device is below:

- Web page configuration
- NTP time server
- GPS receiver
- GPS antenna
- 10/100 Ethernet
- DHCP and Static IP addressing
- 3.3VDC input power @ 250mA max

2. IPSetup Software Utility

Setup and configuration of your NetBurner NTP Time Server requires the IPSetup.exe Windows PC utility available for download at www.netburner.com, in the Support > Public Downloads section.

3. Initial Configuration


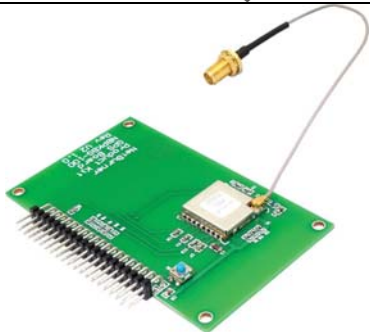

Before you can begin using your NetBurner NTP Time Server, three areas of configuration are required. You must set up and plug in the hardware, set up the network IP settings, and set up and verify the web page settings.

1. Hardware configuration
2. Network configuration
3. Operational configuration

3.1 Hardware Configuration

The NTP Time Server uses the NetBurner PK70 device with a GPS Blade Board attachment.

Table 1. NTP Time Server Parts List

NBPK70EX-100CR	PK70 Embedded Control Device	
NBPKGPS-100CR	GPS Blade Board w/ Interface SMA to U.FL Cable	
GPS-00464	Antenna GPS 3v Magnetic Mount SMA	

To begin using the NTP Time Server, you must plug in the antenna and Ethernet cable, and then the power supply. If indoors, place the antenna as close to a window or external wall as possible. Without a clear line of sight of the sky, the NTP Time Server may not be able to get a GPS signal.

Figure 1. GPS Antenna and GPS Connector



Once the antenna has been plugged into the module, plug in an Ethernet cable. The Ethernet should be visible to your local network that you intend to synchronize to your NTP Time Server. Plug in the power supply to turn on the device.

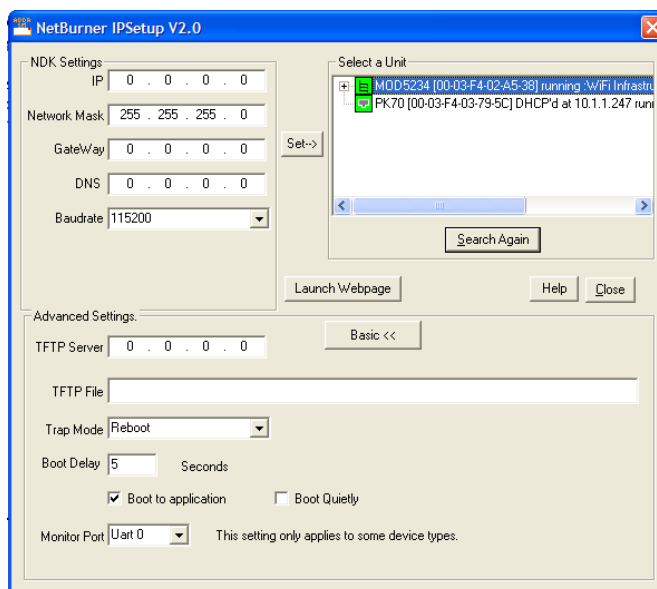
3.2 Network Configuration

1. To begin configuration, run IPSetup. If not already installed, this program is downloadable from the NTP Time Server's product page at www.netburner.com. To view the advance settings, click on the Advanced button (the button name will change to Basic).
2. Locate your NTP Time Server in the "Select a Unit" pane by matching its MAC address. The MAC address is located on the bottom of your NTP Time Server. If your NTP Time Server device does not appear in the list box, verify the power, speed, and link LEDs are illuminated, and click the Search Again button. If you have multiple NetBurner devices, make sure you selected your NTP Time Server in the "Select a Unit" pane (as shown in the screen shot) before you input your information. If you are still unable to see your NTP Time Server, remove power, correct any cabling errors, reapply power, and click the Search Again button. Note: IP Setup uses a UDP broadcast protocol and may not operate through a router.

FIREWALLS: IPSetup uses UDP and TCP port number 20034. If your computer's firewall is blocking this port number, you will need to either disable the firewall, or add a rule to the firewall to allow communication on this port number.

3. If your network supports DHCP (factory default): The assigned IP Address will appear in the "Select a Unit" pane. Write down this address. If your network does not support DHCP, configure the IP Address and Network Mask fields as shown in the screen shot below. If you need help selecting values, please read the "Selecting an IP Address" section at the end of this guide. After you have entered all of your values, click the Set button in the center of the IP Setup window to configure your NTP Time Server with its new parameters. Note: If you do not click the Set button, your values will not be saved.

Figure 2. IPSetup



3.3 Operational Configuration

Once the network parameters are, you can use the web server interface to modify the settings of your NTP Time Server. To access the web page, click on the Launch Webpage button in IP Setup, or you can open your web browser, and enter the numeric IP Address in the address field (e.g. http://10.1.1.110).

4. Web Page

Once the NTP Time Server has been powered and IP address is configured, no further configuration is required to use the device. If required, some network and password settings can be customized through the web page.

4.1 Configuration Page

The Configuration Page is used to change network and password settings of the device. It also offers a quick view to verify that the NTP Time Server is powered and has a valid GPS link. It does this by broadcasting the current valid time.

Figure 3. Configuration Page

NetBurner NTP Server Configuration

23:05:45 GMT

Network Configuration				Access Configuration	
Device Name (DHCP)	<input type="text" value="NB_NTP-795C"/>			User Name	<input type="text"/>
New Static Settings	Assigned Values	Address Mode		Old Password	<input type="text"/>
IP Address	<input type="text"/>	10.1.1.247	DHCP <input type="button" value="v"/>	New Password	<input type="text"/>
Subnet Mask	<input type="text"/>	255.255.255.0		Repeat New Password	<input type="text"/>
Gateway	<input type="text"/>	10.1.1.1			
DNS Server	<input type="text"/>	66.75.160.15			

The first section of the Configuration page displays the current time broadcasted by the device, if valid. If the time is not valid, the green box will turn red, and a warning indicating Time Not Valid will replace the current time. The time displayed on this web page will usually be ~1-second accuracy, but can vary if you are accessing the device on an outside network. Its accuracy is relative to your local network connections latency to the NTP Time Server.

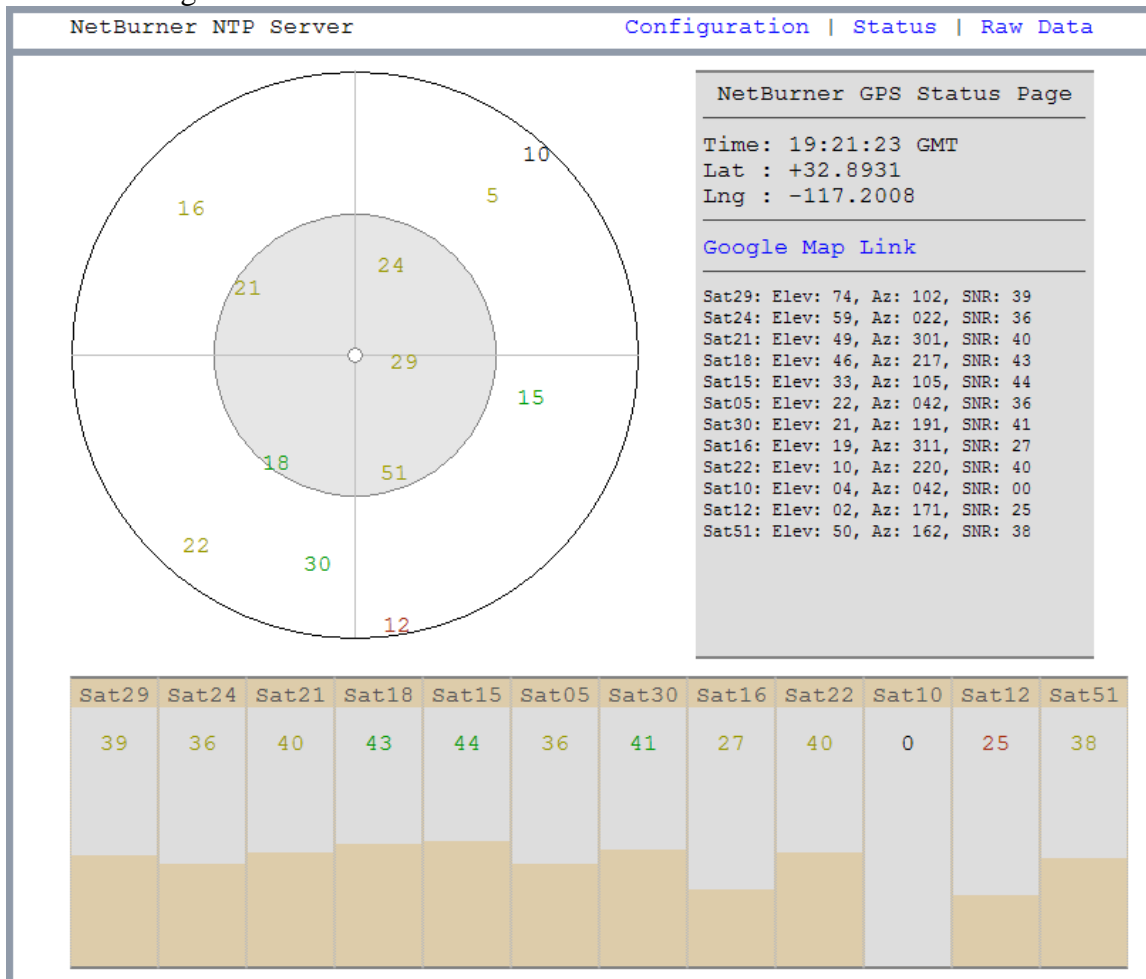
The second section of the Configuration page is used to select DHCP or static IP addressing. If you select DHCP, and you have a DHCP server on your network, the DHCP assigned values will be displayed. To select a static IP address change the Address Mode to Static, and enter your values in the Static Settings fields.

The third section is the password settings for the device. The passwords settings are used to modify an existing password. Only one password is allowed. To clear a password, enter the old password, leaving the new password fields blank and click on submit.

4.2 Status Page

The Status Page updates the current GPS Satellite signal information. It gives a quick view of current satellites in use, device location, and current time.

Figure 4. Status Page



The first section of the Status Page is a graphical representation of the current satellites in use by the NTP Time Server. This representation can be read using three variables, the elevation, the azimuth, and the signal-to-noise ratio. The line going up from the center is 0 degrees, true north, 90 degrees is east, 180 is south, and 270 is west. The elevation can be visualized as the center being straight up, above the receiver, while the outer edges are the horizon around the receiver. The center of the image is 90 degrees, while the outer edges are 0 degrees. Negative elevation numbers are valid, as the signal can bounce off the atmosphere.

The signal strength is how strong of signal the receiver is getting from the satellite. Green (40+) indicates good reception. Yellow (26-40) indicates poor reception. Red (1-25) indicates very poor reception. If the value is black (0), this indicates that the receiver is not getting any reception from the satellite, even though it is in view. Reception is greatly affected by line of sight. If large buildings or trees are between the antenna and the satellite, a connection may not be possible. Three satellite signals must be received simultaneously for the NTP Time Server to set its internal time.

4.3 Data Page

The Data Page is an XML (Extensible Markup Language) file containing the latest readings from the device. This file may be used by external applications to parse and reuse incoming data.

Figure 5. Data Page

```
- <GPS>
  <lat>+32.8931</lat>
  <lng>-117.2008</lng>
  <time>19:21:32</time>
- <SAT>
  <prn>29</prn>
  <elevation>74</elevation>
  <azimuth>102</azimuth>
  <snr>39</snr>
</SAT>
- <SAT>
  <prn>24</prn>
  <elevation>59</elevation>
  <azimuth>22</azimuth>
  <snr>36</snr>
</SAT>
- <SAT>
  <prn>21</prn>
  <elevation>49</elevation>
  <azimuth>301</azimuth>
  <snr>40</snr>
</SAT>
- <SAT>
  <prn>18</prn>
```


The data stream can be parsed by searching for these key elements.

<GPS> → A GPS element, which contains all data associated with the current status
 <lat> → Latitude reading of the NTP Time Server
 <lng> → Longitude reading of the NTP Time Server
 <time> → Current time value
 <SAT> → One Satellite element exists for every satellite device is getting data from
 <prn> → Satellite identification number
 <elevation> → Elevation of satellite from the receiver
 <azimuth> → Directional heading of satellite from the receiver
 <snr> → Signal-to-Noise ratio. Corresponds to received signal strength
 </SAT>
</GPS>

5. LEDs

The NTP Time Server has two LEDs on the side of the unit and a standard Ethernet LED on the back of the unit. The LEDs offer a way to determine the unit's status without checking the web page hosted on the device.

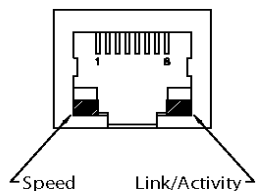
5.1 Panel LEDs

The Panel LED indicates if the NTP Time Server has valid time. If the time is valid, the LED is green. If the time is invalid for any reason, the LED will turn red. If the LED remains red, the NTP Time Server is not able to get a valid time.

5.2 Ethernet LEDs

Power LED: Illuminated while power is applied.
LED1 on RJ-45: Ethernet speed – 10 (off) or 100 (on)
LED2 on RJ-45: Link and data activity

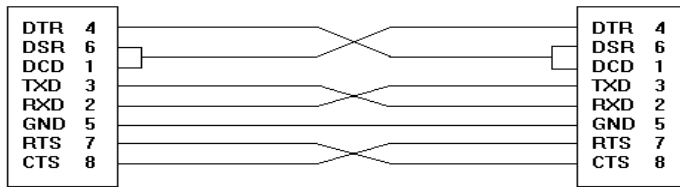
Figure 6. Ethernet LED



6. RS-232 NULL Modem Wiring

The following table and diagram shows how to create a null modem cable/adaptor for RS-232 debug output.

Figure 7. NULL Modem Wiring



7. Network IP Address Configuration

If you are part of an existing network, and are not using DHCP, you need to specify a Static IP Address and Network Mask. IP Addresses are required to route packets from place to place on an Intranet/Internet. If you are on your own LAN there are some standard private address ranges that are commonly used:

- Class A: 10.0.0.0 to 10.255.255.255
- Class B: 172.16.0.0 to 172.31.255.255
- Class C: 192.168.0.0 to 192.168.255.255

8. Web Browsers and Proxy Servers

If you are working on a corporate LAN that uses a proxy server for Internet web browsing, you will need to exclude the IP Address of your NTP Time Server in your web browser's proxy server settings/preferences. Otherwise, an attempt to connect to a web page on the LAN will fail because the proxy server will attempt to route the request outside the LAN. For most web browsers, this can be accomplished in the advanced settings for the proxy server configuration. Set the Network Mask for your host computer's network adapter and your NTP Time Server to 255.255.255.0.

9. Troubleshooting

9.1 *The NTP Time Server cannot get a valid time*

If the NTP Time Server is unable to get a valid time, start by verifying all hardware connections. Power off the device and open the NTP Time Server case.

There are two antenna connectors in the device: A small connector wire, which connects to the GPS chip, and the main antenna, which connects to the small connector wire. Check that the connector is set properly into the GPS chip, and check that the main antenna is screwed tightly in to the connector wire.

If you are not able to get a signal after verifying the hardware, the receiver may not be able to get a signal in its current location. GPS works best with a clear view of the sky. If the antenna is indoors, try moving it to a window. Please note, it may take five or more minutes for the device to adjust and find new satellites after moving the antenna.

Revision History

Revision	Date	Description
1.0		Internal draft
1.1	1/2010	Initial release