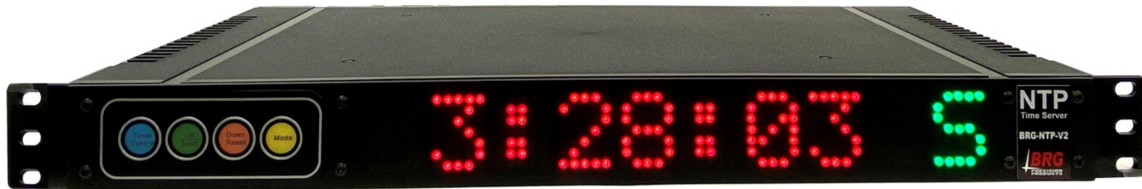


# ***BRG NTP100B Time Server*** Stratum 1 GPS Synchronized Time Server ***USER MANUAL***



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## 1 Introduction

The BRG Network Time Server is a simple to use GPS based time server that will supply accurate Stratum 1 time for all computers and time keeping devices on the network. The BRG time server incorporates the proven TimeMachines NTP engine to provide accurate and reliable time. By placing a time server on the local network, NTP time packets are provided, without requiring systems to go to the Internet to obtain time synchronization. The system uses an active GPS antenna to maintain the current time as broadcast by United States GPS satellites. With this device installed on your local network, there is no longer the worry that if the Internet connection goes down, time synchronization is lost across the network.

The rack mount device can be placed anywhere within the network layout. The built in high sensitivity GPS receiver is able to lock on to multiple satellites, in some cases, from within many buildings or from a window location. The dome outdoor antenna includes 25 feet of antenna cable, plus another 100 foot extension cable for a total length of 125 feet. Additional cable may be added as needed.

Setup and use of this time server is straightforward. Simply connect both the included power supply and the GPS antenna to the base unit and then connect the base unit to the local network. Go to a computer on the network and browse to the device at its default address to enter the software setup within the control box. Set parameters to match your network and the system will start to send out time packets to any device on the system that asks for an update from it. Multiple servers may be setup to provide redundancy and more capacity.

When paired with our digital Power over Ethernet (PoE) clocks, synchronized time is assured no matter the state of your network, or the state of the internet time server the clocks are pointed to. Accuracy is also improved because the network delay of the internet is highly variable, while the local LAN connection is likely sub-millisecond delay.

BRG NTP time servers are suited to any application where coordination of events at multiple locations is required. Without coordinated network time, searching for problems across multiple system logs becomes much more difficult. Education, industrial facilities, military installations, public safety command rooms, government, broadcasting, and hospitals are all candidates for synchronized time systems.

## 2 Installation

### 2.1 Location

To receive GPS signals, the Time Server's antenna must be located in a location where it can “see” the sky. Both indoor and outdoor antennas are included. The GPS module itself is highly sensitive and able to “see” the GPS satellite signals from within many structures. Multi-Story or metal structures may block the GPS signals such that the antenna must be located elsewhere. In these cases, the GPS antenna may be located in a window. The Time Server unit can be located anywhere on the network. All that is required is power and a wired network connection. In the worst case, an outdoor antenna may be required.

## 2.2 Connections



Time Server Rear View

### 2.2.1 Antenna



The outdoor dome GPS antenna is connected through the SMA connector on the rear of the Time Server. The outdoor antenna uses an SMA to BNC adapter to match the outdoor antenna cable. The antenna includes 25' cable with a BNC connector. If the antenna cable is extended, the cable connections must be located indoors or otherwise protected from the elements. The BNC connectors are not waterproof. The swivel mount allows the antenna to be mounted in a variety of locations. For best reception, mount the antenna in a location that has a wide view of the sky.

### 2.2.2 Power

A UL Listed 5 volt DC power supply is supplied with the unit. Connect one end to a standard United States 110-120 Volt outlet and the barrel connector to the rear of the Time Server. The time server will begin trying to find the GPS satellites. On power-up, synchronization to the GPS satellites will take several minutes. No battery backup of position is provided to allow for a warm start so the Time Server is always starting from scratch in determining its location to achieve GPS lock. The time server maintains time during power loss, but the LED display will blank and the NTP time server engine is shut down.

### 2.2.3 Network

Connect the 10/100 RJ45 port on the back of the Time Server to a network connection. Verify that the network settings are correct for your system. See the configuration section of this manual for more information on doing this.

## 2.2.4 Front Panel Display and Control

The front panel of the Time Server includes an LED alphanumeric display and four control buttons. When the time server is first powered on, hours, minutes and seconds will appear on the display. A green “S” sync indicator will display when the time server is locked and sync’d to the GPS time signal. If the GPS signal is lost, the “S” will turn off.



## 3 Configuration

### 3.1 Web Page

Default password is 'tmachine'

### 3.2 Default IP address is 192.168.1.15

All Time Server parameters are accessed on the configuration web page. The page can be accessed by pointing any web browser at the IP address of the Time Server. The initial IP address is 192.168.1.15 from the factory.

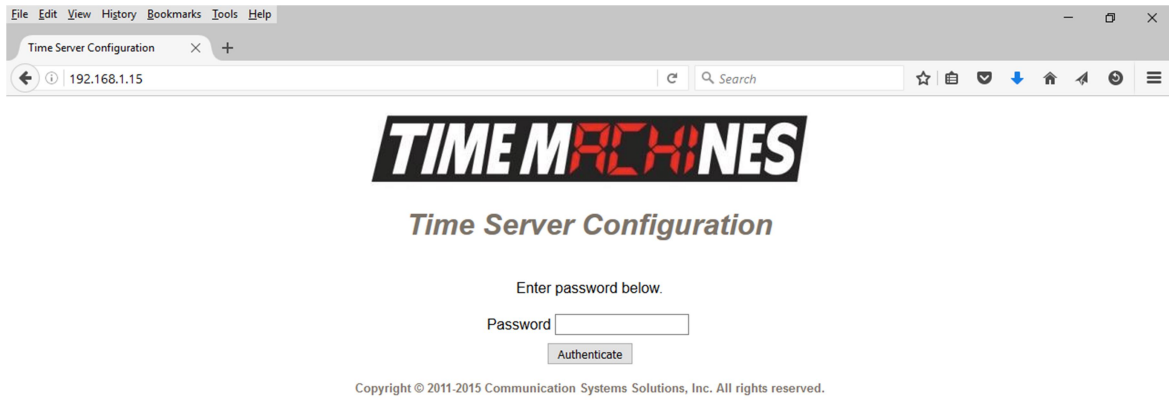
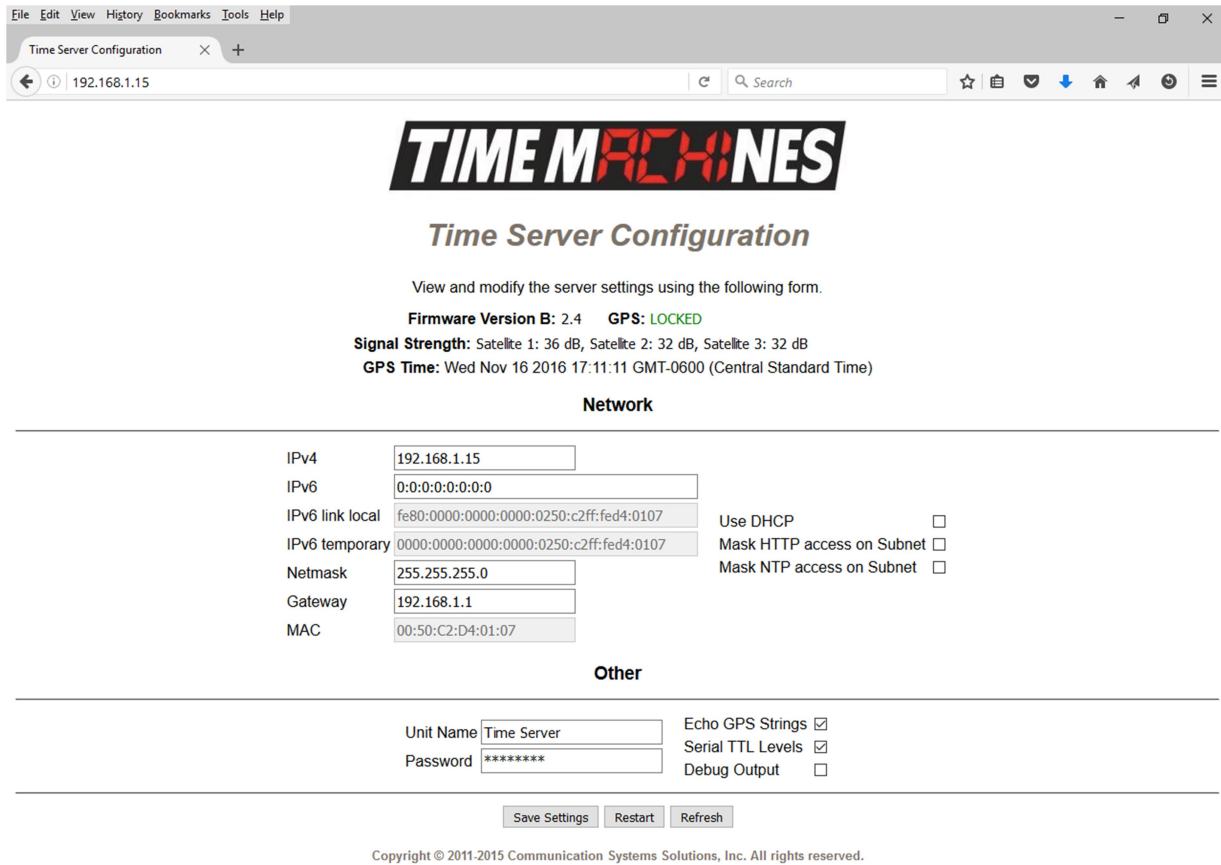


Illustration 1: Password Page

Default password is 'tmachine'



File Edit View History Bookmarks Tools Help

Time Server Configuration

192.168.1.15

# TIME MACHINES

## Time Server Configuration

View and modify the server settings using the following form.

**Firmware Version B:** 2.4    **GPS:** LOCKED

**Signal Strength:** Satellite 1: 36 dB, Satellite 2: 32 dB, Satellite 3: 32 dB

**GPS Time:** Wed Nov 16 2016 17:11:11 GMT-0600 (Central Standard Time)

### Network

IPv4: 192.168.1.15

IPv6: 0:0:0:0:0:0

IPv6 link local: fe80:0000:0000:0000:0250:c2ff:fed4:0107

IPv6 temporary: 0000:0000:0000:0000:0250:c2ff:fed4:0107

Netmask: 255.255.255.0

Gateway: 192.168.1.1

MAC: 00:50:C2:D4:01:07

Use DHCP:

Mask HTTP access on Subnet:

Mask NTP access on Subnet:

### Other

Unit Name: Time Server

Password: \*\*\*\*\*

Echo GPS Strings:

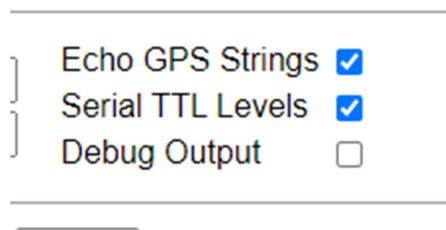
Serial TTL Levels:

Debug Output:

Save Settings   Restart   Refresh

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Illustration 2: Parameters Page



Echo GPS Strings

Serial TTL Levels

Debug Output

## The time server must

### 3.2.1 Network Setup

By default the network parameters are setup to static address 192.168.1.15. The Time Server is able to use DHCP, but the rest of the network will need to be able to automatically adjust to its IP address should it change. This would involve setup with DHCP and DNS systems. Usually,



static setup is recommended. Addresses in the Network section must be entered in IPv4, dotted quad, format.

**All of these parameters require a restart for changes to take effect.**

### 3.2.2 GPS Lock, Signal, and Current Time Information

At the top of the Time Server Configuration page is status information about the software version in the Time Server and from the GPS module in the Time Server. The Firmware Version is displayed and should be known before calling for support. The “GPS:” label will state whether the GPS is locked to satellite signals or not. A “LOCKED” status in green letters is required for operation. The “Signal Strength” line will give the signal strength of the top three satellites being received. The possible range is from 0 to 99dB SNR. The time server will use as many satellites as it can receive for the greatest possible accuracy. The current time is also displayed at the top of the web page. The time zone is determined automatically from the browser settings. The time is updated when the page is loaded (and GPS is locked) and thereafter is dependent on the system clock of the web browser. Over time this value will drift based on the characteristics of the HW clock in the browser hardware. Refreshing the page will update the time.

### 3.2.3 Use DHCP

Checking this option will tell the Time Server to ignore the other IP address settings and request an IP address from the network's DHCP server at startup.

### 3.2.4 IPv4 Address

If the DHCP option is not being used, then the IP address of the unit set to by entering a standard IPv4 dotted quad in this field. 192.168.1.15 or 10.10.0.96 are examples of acceptable formats for this field.

### 3.2.5 IPv6 Address

This is the 128 bit IPv6 address of the device either statically entered or determined by DHCP. The first 64 bits indicate the network address and the last 64 bits are user defined for their network. Please note that a user should still setup the device as initially using IPv4. They can then set an IPv6 address and/or view the IPv6 temporary. The web page can be accessed using an IPv4 and/or IPv6. The time server will respond to Ping, Ping6, rdate and rdate -6.

### 3.2.6 IPv6 Link Local

This address is only valid for communications within the network segment (link) and is required for stateless address auto-configuration. Neighbor Discovery Protocol is part of the IPv6 protocol and uses stateless address auto-configuration. This address begins with prefix fe80::/64. The last

64-bits are based on the MAC address of the time server. This address is unique to each time server and not modifiable.

### **3.2.7 IPv6 Temporary**

This is a default address based on the network address and the MAC address. The time server uses Neighbor Discovery Protocol to find the network address. The last 64-bits are based on the time server's MAC address. This address is unique to each time server and not modifiable. The time server will default to this address to serve time if the IPv6 address has not been set, otherwise the modifiable IPv6 address is used to serve time.

### **3.2.8 Mask HTTP access on Subnet**

This checkbox will enable HTTP (web browser) access only on the time server's configured subnet. This has the effect that the time server will only respond to requests for the web page if they come from the same subnet as the time server is configured on. This is a security feature to limit the access to the configuration of the device only to the local subnet.

### **3.2.9 Mask NTP access on Subnet**

This checkbox will enable NTP access only on the time server's configured subnet. This allows the time server to ignore requests for time from all devices that are not on the same subnet and provides a measure of security and protection from denial of service attacks.

### **3.2.10 Netmask**

The Netmask entry determines what addresses are on the local network and what addresses are reached through the Gateway. Typical Netmasks are 255.255.0.0 or 255.255.255.0. Consult the network administrator for more information on who this entry should be set.

### **3.2.11 Gateway**

The Gateway IP address is used when a destination address is determined to not be on the local network. Consult the network administrator for this setting.

### **3.2.12 MAC**

This is an information only field and displays the MAC address of the Time Server.

### **3.2.13 Echo GPS Strings Checkbox**

**This box must be checked at all times.**

Checking this option will tell the unit to copy all received data from the GPS module's serial port to the serial port on the back of the Time Server. The copied strings are the standard NMEA GPS data strings.

### 3.2.14 Serial TTL Level Outputs Checkbox

**This box must be checked at all times.**

Checking this option will enable the TTL level outputs of the serial port. These are found on Pins 7, 8, and 1. To receive the actual NMEA strings, the “Echo GPS Strings Checkbox” must be checked. Pin 7 is the data from the GPS module, Pin 8 is data that will be sent to the GPS module through the RS-232C port echo'd at TTL level. The data pins are duplicates of the RS-232C data found on Pins 2 and 3, but are provided before conversion to RS-232C levels. Pin 1 is the 1 PPS output. The 1 PPS output is a very narrow signal on the order of 1 uS in width, active high.

### 3.2.15 Debug Output Checkbox

The debug output checkbox will tell the unit to output debug and operational information to the serial port.

### 3.2.16 Unit Name

This can be any alpha numeric name up to 20 characters long.

### 3.2.17 Password

The password field displays the current password. To change it, enter a new password, push Save and then Reboot for it to take effect. Time Server passwords are limited to 12 characters.

**The default password is “tmachine”**

## 3.3 Display Configuration

The time server front panel buttons are used to control and configure only the display and not the time server engine. Display configuration is accomplished by editing parameters using a simple menu system. Only four buttons are used to navigate the menu. The Mode button enters the Menu. The Up and Down buttons move up and down through the menu items, and are used to change parameter values. The TC button is used to save any changes and exit the menu system.

Pressing the blue TC button is used to save changes and exit the menu system.

Menu Operation - To access the menu, press and hold the Mode button. If the display blinks, then continue to hold the mode button until the blinking stops. A “1” should then display. Using the Up and Down buttons, select the desired menu item. Press the Mode button again to display the parameter. For menu items above 19, press Mode again to access the menu’s second level. When a one appears, indicating the second level menu, press the Up or Down buttons to select the desired menu item, then press Mode to display the parameter value. Press the Up or Down buttons to change the parameter value. Once the parameter value is changed, press Mode to back out of the item and move to another item, or press the TC button to save and exit the menu system. Pressing the TC button at any time will save your changes and exit the menu system.

Pressing the Mode button while a parameter value is displayed will back up one level. Press Up or Down to move to the next mode item. Pressing the Down button until mode 0 is reached will exit the menu system. Pressing the TC button also exits the menu system. The menu will timeout and return to normal operation after 60 seconds in inactivity.

A special operation menu is available for restoration and diagnostic purposes. Pressing and holding the mode button will cause either four one’s or four two’ to be displayed. Four one’s means no configuration has been stored in secondary memory. Four two’s means a previous configuration has been stored in secondary memory.

Continuing to hold down the mode button allows shortcut menu operations. The one’s or two will disappear and the display will begin counting up from 0. Special commands will execute if you release the mode button while one of the numbers are displayed. The special commands are:

1=Software reset

2=Restore factory defaults, once the 2 appears, release the mode button and momentarily press the TC button

3=Restore customer defaults from secondary memory (if previously stored) , once the 3 appears, release the mode button and momentarily press the TC button

4=Store customer defaults in secondary memory, once the 4 appears, release the mode button and momentarily press the TC button

First Menu Level Mode Number	Second Menu Level	Value Range	Mode Description and Instructions
0	N/A	00:00 to 23:59	<b><u>Exit Menu System</u></b> Simply press the Up button to advance the time, or the Down button to decrement the time. The longer the buttons are held down, the faster the time will change. Pressing the TC button will also exit the menu system.

First Menu Level Mode Number	Second Menu Level	Value Range	Mode Description and Instructions
21	1	-12 to 12 hours from UTC	<p><b><u>Time Zone Offset</u></b></p> <p>This value determines the number of hours to add or subtract from Universal Coordinated Time. The clock's internal time base is Universal Coordinated Time (UTC, GMT or ZULU). A time zone offset may be applied to each time source. See also Mode 33 for forced half hour and one hour offsets. For accurate time zone information, see <a href="http://www.timeanddate.com">http://www.timeanddate.com</a></p>
23	1	12, 24	<p><b><u>12 or 24 hour display format</u></b></p> <p>This mode selects either 12 or 24 hour display format for each four digit display when displaying real time. (default=12)</p>
24	1	0,10	<p><b><u>Daylight / Standard Time</u></b></p> <p>This mode selects the rules to use when automatically switching between Daylight and Standard time. The rules for various locations are: 0=disable daylight time (default) 10=user defined rule – see also Mode 52 and Mode 45-20, Mode 45-21</p>
33	1	0-5 code	<p><b><u>Force Time Advance</u></b></p> <p>This mode optionally forces a 30 to 60 minute time advance. 0= no advance (default), 1=30 minute advance, 2=60 minute advance, 3=30 minute advance during daylight savings time only, 4=60 minute advance during daylight savings time only, 5=45 minute advance.</p> <p>This is used in areas that have a 30 to 60 minute advance over the area time zone. For example, Mumbai, India's time zone offset is +5:30. To configure the time zone, first set the respective zone to +5 hours using Mode 21. Then set the same respective zone in Mode 33 to 1.</p>
45	20	111 – 3231	<p><b><u>Custom Daylight Saving Rule – Starting Value for Mode 24-n=10</u></b> Default=327 – (Second Sunday in March)</p> <p>Values for rule driven custom daylight saving time for Mode 24-n=10. The format is MMRD, where MM = month (1-12), R = instance of the select day of the week (1-5 5=last instance), D = day of the week (1-7), where 1=Monday and 7=Sunday. For example, the number 357 represents the last Sunday in March, or 1117 represents the First Sunday in November. If the value &gt;2000 then the right two digits represent the day of the month. The left two digits, minus 20, equal the month. For example, March 15th = 2315, April 1st = 2401. The day of the year derived from this rule is stored in Mode 52-1. <b><u>If the DST date is a fixed day (i.e. 15<sup>th</sup> of the month), then set this mode to 0 and enter the Julian day into Mode 52-1 instead.</u></b></p> <p>See also Mode 24-n=10 and Mode 45-21</p>
45	21	111 – 3231	<p><b><u>Custom Daylight Saving Rule – Ending Value for Mode 24-n=10</u></b> Default=1117 – (First Sunday in November)</p>

First Menu Level Mode Number	Second Menu Level	Value Range	Mode Description and Instructions
			<p>Values for rule driven custom daylight saving time for Mode 24-n=10. The format is MMRD, where MM = month (1-12), R = instance of the select day of the week (1-5 5=last instance), D = day of the week (1-7), where 1=Monday and 7=Sunday. For example, the number 357 represents the last Sunday in March, or 1117 represents the First Sunday in November. If the value &gt;2000 then the right two digits represent the day of the month. The left two digits, minus 20, equal the month. For example, March 15th = 2315, April 1st = 2401. The day of the year derived from this rule is stored in Mode 52-2. <b><u>If the DST date is a fixed day (i.e. 15<sup>th</sup> of the month), then set this mode to 0 and enter the Julian day into Mode 52-2 instead.</u></b></p> <p>See Mode 24-n=10 and Mode 45-20.</p>

## 4 Troubleshooting

### 4.1 GPS Lock

Getting GPS lock on the Time Server is required for it to function. Most GPS lock issues come down to issues with Antenna location, or cabling. If there are problems getting GPS lock (sync indicator “S” does not appear on the display), try moving the antenna outside. If it does, try a window and see if lock is maintained. If that works, move the antenna back to its original location and see if lock is lost. This will help determine where lock can be received and where it cannot. If no lock is achieved outdoors, then something is either wrong with the cabling or the Time Server itself. Contact support.

### 4.2 Finding the IP Address

If the IP address of the Time Server is forgotten, there are a few ways to go about finding its IP address. The first is to use a serial terminal program such as Hyper-Terminal or something similar. Set the communications parameters of the terminal program to 115200,N81. Connect a straight through cable between the computer and the Time Server and cycle power on the Time Server. The IP address is printed during startup. If the Time Server is using DHCP, then it is possible to look up the units IP address on the DHCP server by looking at the list of leases. Look for a MAC address in the lease list that starts with 00:50:C2. This will likely be unique in the DHCP lease list. The IP address associated with this MAC address should be tried. The third possible way to determine the IP address is to simply check several of the devices using the Time Server on the network to see how they are programmed. If they have a specific IP address programmed into them for time keeping, then that may be the Time Server's base IP address. If a domain name has been assigned to the Time Server, doing a command like “ping timeserver.your-company.com” might show the time servers address as well.

## 4.3 Resetting to Factory Defaults

Jumper J8

A: Reset to Factory    B: Normal Operation

Jumper J8 on the inside of the time server is used to reset the units software settings to factory original. This is useful when a password is forgotten or the IP address cannot be determined. To do this, remove the 4 screws from the bottom of the unit. Move J8 to the “A” position and apply power. After a few seconds, remove the power connection, replace J8 to the “B” position and reassemble the unit. It should now have the factory default password and IP address information.

## 5 Specifications

### 5.1 Time Server Features and Specifications

- Receive time information from GPS satellites anywhere on the surface of the earth
- RFC1119/1305 NTP Protocol to serve time (Network Time Protocol)
- RFC1769/2030/4330 SNTP Protocol (Simple Network Time Protocol)
- Server Time Level: Stratum 1
- Server Time Precision: better than 5mS + network jitter.
- 10M/100M adaptive network interface
- Unit is capable of serving 350+ synchronizations per second. That provides support for over 300,000 devices updating every 15 minutes on the network.
- Active GPS outdoor antenna and 125' of antenna cable included.
- Compliant with FCC Part 15, class B for radiated emissions and is a lead free product.
- Power Requirements: less than 4 Watts continuous at 5 volts DC.
- Environmental Requirements: Commercial temperature range, 0-70C, 95% humidity non-condensing. Altitude -304m to 18,000m.
- Networking: Static or DHCP IPv4 addressing. Standard browser interface for setup.
- Serial port supports both RS-232C levels and TTL (+3.3V) outputting standard NMEA information strings, as well as the 1PPS signal at TTL levels.
- LED alphanumeric front panel display with display configuration buttons
- Rear Connections: Power, Cat5 Ethernet, Serial, and GPS antenna via SMA connection.
- Dimensions: 19” (482 mm) W x 1 ¾” (44 mm) H x 8” (203 mm) D

### 5.2 GPS Module Specifications

- Based on SiRF GSC3e Lpx chipset.
- 20 channel low power receiver module
- Sensitivity: -144dBm, C/N0=26dBHz
- GPS Time Precision: <1us, typical +/- 300ns ref UTC.
- Antenna Connection: 1575.42MHz (L1 Band) at a level between -135dBm and -159dBm into 50 Ohm impedance. Maximum input return loss is -9dB.
- TTFF (Time To First Fix): Cold start @-125dBm typically 33 seconds, Re-acquisition (<10s obstruction) typically 1 second

### 5.3 Antenna Specifications

- Active dome antenna with swivel mount.
- Size: 3.5" (89 mm) diameter x 8" (203 mm) high
- Amplifier: LNA +20dB Noise: 1.5dB VSWR: 2.0 Voltage: 2.7-6.0V.
- Cable: RG58, BNC male.
- Environmental: -40 to +85C
- Waterproof to IPx6

(Specifications are subject to change without notice)



## 6 Warranty Agreement

# Warranty Agreement

### *BRG Precision Products One Year Warranty*

#### **1. Term of Coverage**

Coverage will be for 1 year. Claims must be made during the Warranty Period. This Agreement is not renewable. The warranty becomes null and void if complete payment is not made within the terms specified under Terms of Payment.

#### **2. Warranty**

BRG Precision Products, Inc. warrants the Product against defects in workmanship and materials during the Coverage Period.

#### **3. Coverage**

BRG Precision Products, Inc. will, at its option, repair or replace the defective Product free of charge, provided that you notify BRG Precision Products, Inc. of the Product defect within the Coverage Period, and provided that BRG Precision Products, Inc. through inspection establishes the existence of such a defect and that it is covered by this Agreement. BRG Precision Products, Inc. will, at its option, use new and/or reconditioned parts in performing warranty repair and building replacement products. BRG Precision Products, Inc. reserves the right to use parts or products of original or improved design in the repair or replacement. If BRG Precision Products, Inc. repairs or replaces a Product, the warranty continues for the remaining portion of the Coverage Period without extension. All replaced Products and all parts removed from repaired Products become the property of BRG Precision Products, Inc. BRG Precision Products, Inc. covers both parts and labor necessary to repair the Product, and return shipment to the Customer via a BRG Precision Products, Inc.-selected non-expedited surface freight within the contiguous United States and Canada. Alaska and Hawaii return shipments to the Customer are via non-expedited air freight.

#### **4. What Is Not Covered**

This Agreement does not cover costs related to the removal, installation, or field troubleshooting of the Product under the terms of the Agreement if, and not limited to:

- a) the Product has been misused, neglected, improperly installed, physically damaged or altered, either internally or externally, or damaged from improper use or use in an unsuitable environment;
- b) the Product has been subjected to fire, splashed water (unless specifically ordered to be water resistant), submersion into any liquid, generalized corrosion, biological infestations, or high input voltage including lighting strikes and generators operating outside the limits of their Product specifications;
- c) repairs have been done to it other than by BRG Precision Products, Inc. or its authorized service centers, or as assigned by BRG Precision Products;
- d) the Product is used as a component part of a Product expressly warranted by another manufacturer;
- e) the Product's original identification (trade-mark, serial number) markings have been defaced, altered, or removed;
- f) the Product is located outside of the United States and Canada;
- g) the customer has misrepresented the Product information provided to BRG Precision Products, Inc. in order to receive coverage under the terms of this Agreement. This Agreement does not warrant uninterrupted or error-free operation of the Product;
- h) Product malfunction or damage resulting from electromagnetic or solar radiation;
- i) Shipping charges to the factory more than 30 days after first receiving the product;
- j) Undesirable operation resulting from changes to public law after the product was purchased, such as changing the dates for daylight saving time.

k) Normal wear and tear relating to the non-operating functions of the equipment such as discoloration from direct sunlight, heat, etc.

#### **5. Disclaimer and Limitation of Liability**

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#### **7. Cancellation**

You may cancel this Agreement by providing to BRG Precision Products, Inc. written notice of your wish to cancel.

#### **8. Insurance**

This Agreement is not a contract of insurance.

#### **9. Amendment and Waiver**

No amendment, supplement, consent or waiver, express or implied, to or of any provision of this Agreement will be effective unless in writing signed by the parties hereto and then only in the specific instance and for the specific purpose given.

#### **10. Assignment**

The Customer may assign or transfer this Agreement provided BRG Precision Products, Inc. is advised by the Customer in writing of such assignment and the new system owner's information.

#### **11. Governing Law**

This Agreement will be governed by and interpreted exclusively in accordance with the laws of the State of Kansas, without reference to provisions concerning conflicts of laws. The provisions of the United Nations Convention on Contracts for the Sale of Goods are hereby excluded.

#### **12. Arbitration**

Any controversy or claim arising out of or relating to this Agreement, or the breach of it, shall be settled by arbitration in accordance with the relevant rules of the American Arbitration Association, and judgment on the award rendered by the arbitrator may be entered in any court having jurisdiction thereof. The place of arbitration shall be Wichita, Kansas, United States of America. There shall be one arbitrator.

**13. Severability**

If any provision of this Agreement is found by any court or arbitrator to be invalid, illegal or unenforceable, the validity, legality and enforceability of the remaining provisions will not be affected thereby.

**14. Entire Agreement**

This Agreement constitutes the entire contract between the parties concerning the subject matter of this Agreement and supersedes all marketing brochures and other expectations, understandings, communications, representations and agreements, whether verbal or written, between the parties. THIS AGREEMENT GIVES YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

## 7 Payments and Returns

Once a return authorization number is obtained, ship the products to:

### **BRG Precision Products**

**Attn: RA# xxxxxxx (where xxxxxxx is the authorization number provided)**  
**600 N. River Street**  
**Derby, KS 67037**

### **Optional Extended Warranty:**

A two-year extended warranty is available. The extended warranty must be purchased before the end of the standard warranty. The two-year extended warranty costs 20% of the product purchase price.

### **Optional Advanced Replacement Service ("Hot Swap"):**

For critical applications, BRG Precision Products recommends purchasing a complete backup product. If a backup product is too expensive or the application is only semi-critical, BRG Precision Products recommends the optional Replacement Service ("Hot Swap")

This service allows the customer to receive a replacement product right away to replace a defective product that is covered under warranty. BRG Precision Products will pay for ground shipping to send the replacement product. The customer is responsible for expedited shipping charges over the cost of ground shipping. The customer is responsible for shipping charges to return the defective product. The Replacement Service is only available for shipments to the U.S. and Canada.

When the customer receives the replacement product, the defective product must be returned to the factory within 30 days. The invoice for the replacement product will then be voided; otherwise, the full invoice amount for the replacement product is due. This service is only available in conjunction with warranty repairs.

This replacement service may be purchased for 10% of the products purchase price at the time of the initial purchase. The replacement service may also be purchased after the initial product purchase and before the standard warranty expires for 15% of the product purchase price. The term of this service ends when the warranty expires. This service may be repurchased for 10% of the product purchase price when a two-year extended warranty is purchased. The product replacement service is only available on selected models.

### **30 Day Return Policy:**

No returns will be accepted without prior written authorization of BRG. Incorrect merchandise received will receive prompt re-shipment of correct items. Incorrect merchandise, other than custom items, may be returned, shipped prepaid, and will be exchanged on an equivalent basis.

Merchandise, other than custom items, that cannot be used may be returned at a 25% restocking charge if items are shipped prepaid in the original boxes. Carrier is responsible for parts damaged in shipment. The customer should have driver sign for damaged carton on delivery receipt and make a claim with the freight company. Please insist that the carrier's representative conduct an inspection, and retain all packing materials for the inspector. Please report promptly for immediate follow-up on short shipments. No action arising from any sale by BRG may be brought by a customer more than one year after the date of shipment.

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**Terms of Payment:**

New accounts require prepayment. International orders require prepayment by Telegraphic Transfer (bank wire). For established customers, payment is due in full within 30 days from invoice date. Other payment methods include Visa, Mastercard, American Express, Discover, Novus (Domestic Only). Add 4% for ground shipping in the U.S. and Canada. Domestic shipping is prepaid for U.S. Government orders. Other shipping methods are available. All past due accounts will be subject to a finance charge of 1.5% per month. BRG may cancel or delay future deliveries if customer fails to make prompt payment or if customer's financial condition warrant such action in BRG's opinion. BRG is not responsible for delays. The customer will be contacted and given the choice of receiving a partial shipment or waiting for the full shipment. The firmware license may be suspended, limiting functionality of the equipment, if payment is not received within 90 days.

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**Pricing:**

BRG Precision Products reserves the right to change prices without prior notification. Prices do not include taxes and BRG reserves the right to arrange for insurance on all orders.

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The courts of Sedgwick County, Kansas will have exclusive jurisdiction and venue over any disputes arising from any sale by BRG and customer and Buyer consent to personal jurisdiction of the federal and state courts located in Sedgwick County, Kansas. If legal action is brought by BRG for the collection of any amount owed or due to any other dispute, the prevailing party will be entitled to recover its reasonable attorneys' fees and costs incurred. These items constitute the entire agreement between BRG and customer, regardless of any additional or conflicting terms on customer's purchase order or other documentation, which are objected to, or any prior discussions or usages of trade. All sales by BRG are made only on the terms and conditions contained herein.