

**RG-2100 Series Redundant GPS Reference
Frequency Generator**

User Manual

P/N: 900000135 REV B

**For Brandywine Communications products with
the following Part Numbers:
001-0218, 001-0230, 001-0232**

Revision	Date	Comments	ECO Number
-	07-03-2013	Initial Release	N/A
A	02-24-2017	Added RG-2100 to manual	N/A
B	02-25-2020	Changed baud rate from 9600 baud to 115,200 baud	ECO11226

Safety Warnings



WARNING:

This unit contains lethal AC voltages. Disconnect the unit from the AC supply before removing the cover.



WARNING:

This unit contains dual power supplies. Isolate BOTH power supplies from AC Power before removing the top cover.



WARNING:

The lightning flash with an arrowhead inside of an equilateral triangle is intended to alert the user to the presence of un-insulated “dangerous voltage” within the product’s enclosure. The “dangerous voltage” may be of sufficient magnitude to constitute a risk of electrical shock to people. Do not attempt to repair the unit without first unplugging it.



CAUTION:

The exclamation point inside of an equilateral triangle is intended to alert the user to the presence of important operation and maintenance instructions in the user guide. This unit should only be repaired by qualified personnel. Several board assemblies contain static sensitive devices. Appropriate procedures must be used when handling these board assemblies.

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Figure 1 - RG-2111 Front View

1 Introduction

The RG-2100 Series is a redundant reference frequency generator that uses Global Positioning System (GPS) to continuously calibrate two internal low phase noise OCXO's, providing an accurate, stable frequency reference. The RG-2100 Series contains two GPS Disciplined Modules, each providing a set of 3 low phase noise 10 MHz sine waves, 1PPS, monitor and control interface to a user interface output panel. If a failure is sensed in one module the unit will switch outputs to the other GPS Disciplined Module to provide continuous service. These outputs are accurate daily to 1×10^{-12} when slaved to an internal GPS tracking receiver's time. Dual redundant hot swappable power supplies make the RG-2100 series perfect for military communications, telecommunications and satcom telecommunications.

The RG-2100 series is also able to slave to an external 1PPS signal to steer and hold an internal oscillator and clock system precisely in time. The oscillator maintains its high accuracy of time and frequency information even if no satellites can be tracked. The unit comes equipped with optional dual network ports, which support NTP timeserver and SNMP v1 functionality. A serial data port is provided to report time, date, position, GPS satellite health and signal strength.

2 Specifications

Inputs

- Qty 1 External 1PPS Reference Signal Input
 - 0 to +5 Vdc 50 Ohm, BNC-F
 - Feeds both modules in parallel
- Qty 2 External GPS Antenna Inputs:
 - Module A: BNC-F
 - Module B: BNC-F
- Qty 2 AC Power PSM IEC320 connectors with on/off switch and fuse

Internal Oscillators supported

- High stability OCXO (std)
 - 5×10^{-9} 0-50 deg/1x10⁻¹⁰/day aging

Accuracy (std HSOCXO)

- Time Accuracy GPS <30ns
 - Ext 1PPS <30ns
- Holdover <1us/hr

Network Interface (RG2111 only)

Interface Type	10BaseT
Protocols	TCP/IP, UDP, NTPv3, SNMP v1

Outputs

- 1PPS Reference Signal Output
- 0 to +5 Vdc 50 Ohm impedance, BNC-F
- 10 MHz Reference Signal Output, 50 Ohm impedance, BNC-F (3)
- Control/ Alarm Interface for GPS Modules. DB9-F (2)

GPS Receiver

- Satellite Signal: GPS L1 1575.42 MHz
 - Satellite Code: C/A code 1.023 MHz
 - Position Accuracy : <5 m, 1-sigma, <10 m, 2 sigma
 - TTFF, Hot (w/ current almanac, position, time and ephemeris) : <30 sec
 - TTFF, Warm (w/ current almanac, position, time): <80 sec
 - TTFF, Cold (No stored information): <120 sec
 - Sensitivity: -173dBw Acquisition, -185dBw Tracking
- The GPS receiver sources up to 80mA current at 3.3 VDC nominal for active antenna

Power Supplies

- Dual Hot Swappable Power Supplies
- Dual AC supplies are standard

Monitor & Control

Individual Monitor and Control (M&C) interfaces are provided for each internal module independently.

M&C interface: RS-232C. This interface includes fault indication for each DOM module independently. Fault messages include the following:

- Output signal level detection
- Dual Power Supply Module (PSM) input level detection
- OCXO current out of range
- FPGA communication error
- GPS communication error

Hardware Fault Indication, TTL High = Hardware OK

GPS Lock Indication, TTL High = GPS Lock

Manual Holdover Input: Active Low

Physical

- Size: 19" rack-mount 1RU high (1.72"), 8" deep, 17" width
- Weight: 11lbs nominal

Environmental Conditions

Temperature

- Operating 0 to +50C
- Storage -40 to +85C
- Temperature shock during operation without causing permanent damage: -20C to +70C at +/-3C / min per MIL-STD-810F Method 503.4

Humidity Up to 95% RH (non-condensing)

Altitude Operating 10,000ft
Non-operating 50,000ft

EMC FCC Part 15

- EN55022
- EN55024
- CE

Parameter	Specification			Unit	Conditions: T=0~+50°C Ambient, V supply = 115VAc unless otherwise specified						time
	Min	Typical	Max								
Nominal Frequency		10		MHz							
Output Power (J2)	14.0	15.0	17.0	dBm	T=25°C, Load = 50 ohms				-108	dBc/Hz	T=25°C, Load = 50 ohms
Output Power (J3, J4)	11.0	11.0	12.0	dBm	T=25°C, Load = 50 ohms				-138	dBc/Hz	T=25°C, Load = 50 ohms
Harmonics			-30	dBc	Load = 50 ohms				-151	dBc/Hz	T=25°C, Load = 50 ohms
Spurious			-70	dB	Load = 50 ohms				-153	dBc/Hz	T=25°C, Load = 50 ohms
Frequency Accuracy	-1		1	E-12	24 hour average when locked to GPS				-155	dBc/Hz	T=25°C, Load = 50 ohms
Short-term stability A			<7	E-12	@ Tau = 1 sec, after 24 hours				-50	nSec	When locked to GPS
Short-term stability B			15	E-12	@ Tau = 10 sec, after 24 hours				10	µSec	Default = 10 µS
Holdover Capability			40	uSec	24 hours, ΔT=30°C, after 3 days of power-on				2.4	V	Load = 50 ohms
									10	µSec	Default = 10 mS
									90	115	265
									25	Watts	T=25°C, During Warm-up

3 Rear Panel Connections

CONNECTOR REFERENCE	CONNECTOR TYPE	CONNECTOR PIN	SIGNAL
J1 1PPS OUT	BNC FEMALE	CENTER	1PPS
		SHIELD	GROUND
J2 10 MHz OUT	BNC FEMALE	CENTER	10 MHz
		SHIELD	GROUND
J3 10 MHz OUT	BNC FEMALE	CENTER	10 MHz
		SHIELD	GROUND
J4 10 MHz OUT	BNC FEMALE	CENTER	10 MHz
		SHIELD	GROUND
J5 1PPS IN	BNC FEMALE	CENTER	1PPS
		SHIELD	GROUND
J6 ANTENNA BACKUP	BNC FEMALE	CENTER	ANTENNA
		SHIELD	GROUND
J7 ANTENNA PRIMARY	BNC FEMALE	CENTER	ANTENNA
		SHIELD	GROUND
J8 BACKUP I/O (ETHERNET) (Only on RG-2111)	RJ-45	1	TX+
		2	TX-
		3	RX+
		4	-
		5	-
		6	RX-
		7	-
		8	-
J9 PRIMARY I/O (ETHERNET) (Only on RG-2111)	RJ-45	1	TX+
		2	TX-
		3	RX+
		4	-
		5	-
		6	RX-
		7	-
		8	-
J10 DIGITAL IN / ALARM	DB-9 FEMALE	1	Holdover In
		2	TXD (RS-232 transmit)
		3	RXD (RS-232 receive)
		4	GPS Locked Out
		5	GND
		6	Reset In
		7	GND
		8	GND
		9	Fault Out
J10 DIGITAL IN / ALARM	DB-9 FEMALE	1	Holdover In
		2	TXD (RS-232 transmit)
		3	RXD (RS-232 receive)
		4	GPS Locked Out
		5	GND
		6	Reset In
		7	GND
		8	GND
		9	Fault Out

Table 1 - RG-2100 Series Rear Panel Connections

4 Setting up the unit

Remove the unit from the shipping carton. The following items should be included in the shipment:

- 1 RG-2100 series unit
- 1 GPS antenna
- 1x 100 feet of coaxial antenna cable
- 1 user guide (CD-ROM)

1.1. Installation

1.1.1. Mounting

The RG-2100 series can be installed into a 19" rack mount cabinet either using rack slides or only using the front panel flanges. For static applications, the short depth and lightweight of the unit ensures that the front panel is not stressed when only the front panel is used for support.

If the unit is installed on a mobile platform and must survive shock and vibration, the use of slides is required. Slides are installed using 10-32 UNF-2B hardware.

Optional Rack Mount Slides:

P/N 002000123, SLIDE, RACK, 24", 21" TRAVEL, 85 LB

P/N 002000150, SLIDE, RACK, 28", 27" TRAVEL, 80 LB

Original Manufacturer: General Devices Chassis Trak Type C300.

1.1.2. Power

Insert the power cord of the unit into an electrical socket to power up the unit. The Power LED indicator will illuminate green.

If dual redundant power is required, connect both power sources to independent power sources

1.1.3. Ethernet (RG-2111 only)

Connect one end of an Ethernet patch cable to the RG-2111 Ethernet port J9 or J10. Connect the other end of the Ethernet cable to your network with an Ethernet hub or switch.

1.1.4. Input Reference Connections

4.1.1.1 GPS Antenna



Connect the GPS antenna to the J1 Antenna BNC connector on the rear panel of the unit. The GPS antenna must be located in a suitable location with a clear view of the sky. In most cases, the GPS signals do not penetrate buildings. Use the cable provided in the shipment to connect the GPS antenna and unit. In the event that a longer cable is required, a low loss cable must be used so that the total signal attenuation at 1575 MHz is < 20 dB. For more information on suitable cables contact Brandywine Communications.

- Location

Several factors need to be considered when installing the GPS antenna. In most cases, the antenna is mounted externally (outdoor) and exposed to the elements. A good quality coaxial cable of 50-ohm impedance is required to connect the GPS antenna to the RG-2100 series. The cable provides two functions, which are to conduct the GPS RF signals (1575.42 MHz) that are received from the GPS antenna to the RG-2100 and to conduct the DC bias voltage (5 VDC) provided by the unit to the LNA (low noise amplifier) contained inside of the GPS antenna. The antenna should be mounted securely, with a clear view of the sky, and with the top of the antenna pointing upward. In some installations it may not be possible to mount the antenna such that the antenna has a clear 360-degree view of the sky. In such cases pick the location with the best view of the sky.

- Exposure to High RF Fields

Some installations may occur in locations where a variety of high power transmitters and antennas are located. The GPS antenna should not be directly exposed to or bombarded with high-level RF energy. In such cases, the antenna should be located above, below, or to the side of these high power RF transmission antennas.

- Lightning Protection

The RG-2100 series does not provide any inherent protection against lightning strikes. In general, lightning protection (when desired or needed) is provided by an externally mounted protection device that is designed to shunt the high voltage transient to a well-established earth ground. Lightning arresting devices designed for use with the GPS antenna system are available at Brandywine Communications (P/N 001000914).

- RF Loss

The most important source of signal loss is the RF signal attenuation experienced in the cable. The amount of attenuation is related to the type (quality) of coaxial cable and cable length. The antenna provides about 30 dB of gain to the received GPS

signal. The purpose of this gain is to offset the loss that is experienced in the cable between the GPS antenna and the unit. It is recommended that the overall antenna system gain (antenna gain - cable loss) be between 10 dB - 33 dB. Using an antenna with 30 dB of gain allows for about 20 dB of cable loss. The RG-2100 series is shipped with 100' of Belden 8240 antenna cable with a cable loss of approximately 18 dB. For distances beyond 100', Brandywine recommends low loss Belden 9914 with a loss of 5.84 dB/100ft

Standard antenna cable using this configuration is available from Brandywine as shown in Table 2.

For distances beyond 330', an in-line amplifier is required.

- Tempest Facilities/Extremely Long Cable Runs

For applications where no conductive penetration of EMC shielding can be tolerated or for extremely long cable runs, Brandywine Communications offers a remotely powered fiber optic antenna link. This comprises two external units. The remote down-converter and fiber unit is connected to the antenna and it converts the GPS RF signal to an optic signal at lower frequencies that is suitable for transmissions over a fiber optic cable. The local fiber and up-converter unit accepts the optical signal and converts it back into an electrical RF signal that is processed by the RG-2100 series.

PART NUMBER	CABLE LENGTH	CABLE TYPE
002-0037	100 feet	RG58 (supplied)
002-0040	150 feet	RG58
002-0052	250 feet	RG58
002-0039	330 feet	RG58
051000001	In-line amplifier 20 dB	TNC/TNC connectors
002-0065	Fiber optic cable converter up to 1500 meters	Multi-mode fiber optic

Table 2 - RG-2100 series Antenna Cable options

4.1.1.2 External 1PPS Receiver

The RG-2100 series can also be synchronized to an external receiver that incorporates a 1PPS Time Mark only as a reference. An accurate manual time entry is necessary in this case.

4.1.1.3 10 MHz Outputs

Connect the 10 MHz Outputs of the unit with a standard RG-58 connector

5 Configuring the RG-2100 Series

The dual redundant Ethernet ports of the RG-2111 allow it to be managed and monitored using Simple Network Management Protocol (SNMP), as well as via the RS-232 serial ports. Other models must use the provided RS-232 serial port.

Connect your PC to the RS-232 port using a serial cable or serial to USB adapter.
Open up your terminal program and connect to the unit with the following settings:

Baud rate: 115200
Data bits: 8
Stop bit: 1
Flow control: None
Parity: None

6 Operation

The user can obtain information from the unit by sending ASCII decimal character requests terminated by CRLF. The RG-2111 response message structure is <COMMAND><DATA><ETX>. The same structure is used for commands from the user to set the RG-2111 operating parameters.

The user command and response structure is as follows:

- Command: 2 character base command
- Data:
 - ? : gets the value
 - n : uses the new value sent
 - n! : uses the new value sent and writes the new value to EEPROM
- ETX: <CRLF> is the end of packet indicator

The requested record will be directed to the data field of Serial port. All characters transmitted by the unit are consistent with the ASCII characters or control code. When hexadecimal numbers are transmitted to communicate status bit values they are transmitted as ASCII characters 0 through 9 and A through F (A through F is always upper case).

Reserved characters are used to indicate the end of records in the data stream and to delimit data fields within a record. The reserved characters are described in the following table:

CHARACTER	USAGE
<CRLF>	End of record identifier
,	Record field delimiter

6.1 List of available RS-232 commands:

COMMAND	FUNCTION	COMMENTS
AR	Recall factory defaults (Write Only)	Recall all factory default settings Example: Recall Factory default AR1 AR1
DA	DAC Value (Read Only)	Report DAC value (0..65535). Example: DA? DA32767 DAC count is 32767
ES	Elapsed Seconds (Read Only)	Read Elapsed Seconds since power up. Example: ES? ES345678 Elapsed Seconds: 345678 seconds
ID	Set/Get DHCP	Set/Get DHCP and Store into NVM. Example Enable DHCP and Store into NVM ID1! Read DHCP address ID? ID1 Disable DHCP and Store into NVM ID0! Read DHCP ID? ID0
IP	Set/Read IP Address	Set/Get the IP Address (decimal number) IP4, IP3, IP2, IP1 and Store into NVM. Example Set IP address and Store into NVM IP192.168.1.145!

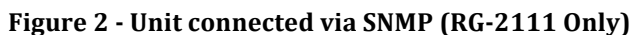
		<p>Read IP address IP? IP192.168.1.145,255.255.255.0,192.168.1.1</p>
IM	Set/Read Mask Address	<p>Set/Get the Mask Address (decimal number)Mask4, Mask 3, Mask 2, Mask 1 and Store into NVM.</p> <p>Example Set Mask address and Store into NVM IM255.255.255.0!</p> <p>Read Mask address IM? IP255.255.255.0</p>
IG	Set/Read Gateway Address	<p>Set/Get the Gateway Address (decimal number) Gateway4, Gateway 3, Gateway 2, Gateway 1 and Store into NVM.</p> <p>Example Set Gateway address and Store into NVM IG192.168.1.1!</p> <p>Read Gateway address IG? IP192.168.1.1</p>
LL	Latitude / Longitude / Altitude (Read Only)	<p>Report the current latitude/longitude/Altitude Example: LL? LL34,44.123,N,135,21,E,25 Interpreting Example 34 deg 44.1230 min N 135 deg 21.0000 min E 25 meters</p>
MT	Enable/Disable Manual Time (Read/Write)	<p>Accept Manual Time Entry Enable/Disable commands (Using user TOD) MTYYMMDDhhmmss</p> <p>Example: Enable Manual Time (enter the Manual Time mode and set the TOD, uses the external 1PPS input) MT090407160101 MT1</p>

		<p>Current Reference: External 1PPS</p> <p>Disable Manual Time (exit Manual Time mode and use all subsequent GPS based messages)</p> <p>MT0</p> <p>MT0</p> <p>Current Reference: GPS 1PPS</p>
PE	Phase Error (Read Only)	<p>Report Phase error in nanosecond.</p> <p>Example:</p> <p>PE?</p> <p>PE-15</p> <p>Phase error is -15ns</p>
PR	Program FPGA	<p>Use the Hyper Terminal to program the FPGA chip through Serial port at 115200 Baud rate.</p> <p>Example:</p> <p>*PR1 <Enter></p> <p>*Turn <u>OFF</u> line feeds, echo boxes, and set 40 ms line delay as below:</p> <ol style="list-style-type: none"> 1. Select "File\Property" submenu 2. Select "Setting" tab 3. Hit "ASCII setup" button 4. Clear "Send line ends with line feeds" box 5. Clear "Echo typed character locally" box 6. Enter 40 in "Line delay:" edit box 6. Hit OK <p>*Select menu "Transfer\Send Text File"</p> <p>*Browse to "RG2111.ufp" file to send the FPGA file.</p> <p>*Turn <u>ON</u> the line feeds and echo boxes again to continue communicate with other commands.</p>
RE	Reset microcontroller (Write Only)	<p>Soft Reset the Microcontroller</p> <p>Example:</p> <p>RE1</p>
SF	Fault Status	<p>Read Fault Status</p> <p>Example:</p> <p>SF?</p> <p>SF03</p>

		Fault Status Definitions: None 0 OCXO Current Out of Range Bit 0 GPS Communication Failure Bit 1 FPGA Communication Failure Bit 2 Not Disciplining (Phase Error >100us) Bit 3 1PPS output fault Bit 4 10MHz J2 output fault Bit 5 10MHz J3 output fault Bit 6 10MHz J4 output fault Bit 7
SS	System Status information (Read Only)	Read System Status Example: SS? SS1 System Status Definitions: WARM_UP 0 LOCKED 1 HOLDOVER 2
TO	TOD message (Read Only)	Output the UTC Time Of Day and TFOM once upon request. This time corresponds to the last 1PPS received or issued. TFOM range [0-9]. TOYYMMDDhhmmss,F Example: TO? TO090407010101,3
TS	Tracking Satellites (Read Only)	Report number satellites tracking Example: TS? TS9 Tracking 9 satellites
XH	Hardware version (Read Only)	Get Hardware version and store into NVM. The number are 2 characters and in the range of [1 to 99]. Example: Read the hardware version number XH? XH5
XM	Model (Read Only)	Read Model. The Model is an ASCII character string.

		<p>Example: Get Model "RG2111" XM? XMRG2111</p>
XS	Serial number (Read Only)	<p>Get serial number and store into NVM. The serial number is an ASCII character string that has a length of up to 11 characters.</p> <p>Example: Get serial number XS? XS1234567890</p>
XV	Firmware version (Read Only)	<p>Read firmware version number. The Firmware version is an ASCII character string that has a format of "MM.mm.bb" MM = Major version mm = Minor version bb = building version</p> <p>Example: XV? XV01.02.03</p>
	Upgrade Application	<p>Record the current baudrate of the Application program. Use the Hyper Terminal program to upgrade main application through Serial port. Change the Serial port to 115200 baudrate to communicate with the boot loader.</p> <p>Turn on echo and set 40 ms line delay as below:</p> <ol style="list-style-type: none"> 1. Select "File\Properties" submenu 2. Select "Setting" tab 3. Hit "ASCII setup" button 4. Check "Send line ends with line feeds" box 5. Check "Echo typed characters locally" box 6. Enter 40 in line delay edit box. 7. Hit OK 8. Hit OK 9. Turn on the power of unit and follow the instructions of followings: Hit <P> to download: P Confirm programming: y/n Y Starting Flash Programming, please DO NOT turn the unit off...

The Product Name, Versions, and Serial number are reserved fields for manufacturing and cannot be modified using the SNMP interface. **These fields can only be written to by the manufacturer.**



6.2.1.1 Product Name

Description	Product Name	Type	
MIB Read	1.3.6.1.4.1.18954.113.1.1.0	String	
MIB Write		String	

The product name is an ASCII character string that has a length of 12 characters.

```

ProductName      OBJECT-TYPE
    SYNTAX        DisplayString
    ACCESS        read-only
    STATUS        mandatory
    DESCRIPTION   "RG2111"
    ::= { product 1 }
  
```

6.2.1.2 Serial Number

Description	System S/N	Type	
MIB Read	1.3.6.1.4.1.18954.113.1.2.0	String	
MIB Write		String	

The system serial number is an ASCII character string that has a length of maximum 12 characters.

```

SerialNumber     OBJECT-TYPE
    SYNTAX        DisplayString
    ACCESS        read-only
    STATUS        mandatory
    DESCRIPTION   "12345"
    ::= { product 2 }
  
```

6.2.1.3 Hardware Version

Description	Hardware Version	Type	
MIB Read	1.3.6.1.4.1.18954.113.1.3.0	String	
MIB Write		String	

The Hardware version is an ASCII character string that has a length of maximum 12 characters.

```

HWVersion        OBJECT-TYPE
    SYNTAX        DisplayString
    ACCESS        read-only
    STATUS        mandatory
    DESCRIPTION   "D"
    ::= { product 3 }
  
```

6.2.1.4 Firmware Version

Description	Firmware Version	Type	
MIB Read	1.3.6.1.4.1.18954.113.1.4.0	String	
MIB Write		String	

The Firmware Version is an ASCII character string that has a length of maximum 12 characters.

```

FWVersion        OBJECT-TYPE
    SYNTAX        DisplayString
  
```

ACCESS read-only
 STATUS mandatory
 DESCRIPTION "V01.01.00"
 ::= { product 4 }

6.2.1.5 FPGA Version

Description	Firmware Version	Type	
MIB Read	1.3.6.1.4.1.18954.113.1.5.0	String	
MIB Write		String	

The FPGA Version is an ASCII character string that has a length of maximum 25 characters.

FPGAVersion OBJECT-TYPE
 SYNTAX DisplayString
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION "0101 4130 1842 0112 2010"
 ::= { product 5 }

6.2.2 Set up

Trap Table Subtree

The size of the Trap table is **5**. Once a Trap table entry is created with Trap Enabled set (1=SET), the RG2111 will generate a Trap whenever the front panel Fault LED is lighted up.

6.2.2.1 Trap Receiver Number

Description	Trap Receiver Number	Type	
MIB Read	1.3.6.1.4.1.18954.113.2.1.1.0	Integer	
MIB Write		Integer	

Index of trap receiver.

TrapReceiverNumber OBJECT-TYPE
 SYNTAX INTEGER (0..4)
 ACCESS not-accessible
 STATUS mandatory
 DESCRIPTION ""
 ::= { trapEntry 1 }

6.2.2.2 Trap Enabled

Description	Trap Enabled	Type	
MIB Read	1.3.6.1.4.1.18954.113.2.1.1.2.0	Integer	
MIB Write	1.3.6.1.4.1.18954.113.2.1.1.2.0	Integer	

Indicates if this trap entry is enabled or not (1=Enable; 0=Disable).

TrapEnabled OBJECT-TYPE
 SYNTAX INTEGER
 ACCESS read-write
 STATUS mandatory

DESCRIPTION "Indicates if this trap entry is enabled or not."
 ::= { trapEntry 2 }

6.2.2.3 Trap Receiver IP Address

Description	Trap Receiver IP Address	Type	
MIB Read	1.3.6.1.4.1.18954.113.2.1.1.3.0	IP_Address	
MIB Write	1.3.6.1.4.1.18954.113.2.1.1.3.0	IP_Address	

Trap receiver IP address where the trap message will be sent to.

TrapReceiverIPAddress OBJECT-TYPE

SYNTAX IP_Address
 ACCESS read-write
 STATUS mandatory
 DESCRIPTION "The IP Address of the received trap message computer"
 ::= { trapEntry 3 }

6.2.2.4 Trap Community

Description	Trap Community	Type	
MIB Read	1.3.6.1.4.1.18954.113.2.1.1.4.0	String	
MIB Write	1.3.6.1.4.1.18954.113.2.1.1.4.0	String	

Trap community to be used by agent to send trap.

TrapCommunity OBJECT-TYPE

SYNTAX DisplayString
 ACCESS read-write
 STATUS mandatory
 DESCRIPTION "Trap community to be used by agent to send trap"
 ::= { trapEntry 4 }

6.2.2.5 IP Address

Description	IP Address	Type	
MIB Read	1.3.6.1.4.1.18954.113.2.2.0	IP_ADDRESS	
MIB Write		IP_ADDRESS	

The IP address of the system will be stored in the Non Volatile Memory after the "WriteNVM" command is issued.

IPAddress OBJECT-TYPE

SYNTAX IP_ADDRESS
 ACCESS read-write
 STATUS mandatory
 DESCRIPTION "System IP Address"
 ::= { setup 2 }

6.2.2.6 IP Subnet Address

Description	IP Subnet Address	Type	
MIB Read	1.3.6.1.4.1.18954.113.2.3.0	IP_ADDRESS	
MIB Write	1.3.6.1.4.1.18954.113.2.3.0	IP_ADDRESS	

The IP Subnet address will be stored in the Non Volatile Memory after the "WriteNVM" command is issued.

IPSubNetAddress OBJECT-TYPE
 SYNTAX IP_ADDRESS
 ACCESS read-write
 STATUS mandatory
 DESCRIPTION "System Subnet IP Address"
 ::= { setup 3 }

6.2.2.7 IP Gateway Address

Description	IP Gateway Address	Type	
MIB Read	1.3.6.1.4.1.18954.113.2.4.0	IP_ADDRESS	
MIB Write	1.3.6.1.4.1.18954.113.2.4.0	IP_ADDRESS	

The IP Gateway address of the system will be stored in the Non Volatile Memory after the "WriteNVM" command is issued.

IPGatewayAddress OBJECT-TYPE
 SYNTAX IP_ADDRESS
 ACCESS read-write
 STATUS mandatory
 DESCRIPTION "System Gateway IP Address "
 ::= { setup 4 }

6.2.2.8 Enable_DHCP

Description	Enable_DHCP	Type	
MIB Read	1.3.6.1.4.1.18954.6.2.5.0	Integer	
MIB Write	1.3.6.1.4.1.18954.6.2.5.0	Integer	

Enable=1/Disable=0 DHCP. If the DHCP is disable, the static IP address will be used. It will be stored into the NVM after the "WriteNVM" command is issued.

DHCP_Enable OBJECT-TYPE
 SYNTAX INTEGER
 ACCESS read-write
 STATUS mandatory
 DESCRIPTION "Enable/Disable DHCP"
 ::= { setup 5 }

6.2.2.9 Recall Factory Default

Description	Recall Factory Default	Type	
MIB Read	1.3.6.1.4.1.18954.113.2.6.0	Integer	
MIB Write	1.3.6.1.4.1.18954.113.2.6.0	Integer	

All the User setting will be restored to the Factory Default. Use extreme care when issuing this command.

RecallFactoryDefault OBJECT-TYPE
 SYNTAX INTEGER
 ACCESS read-write

STATUS mandatory
 DESCRIPTION "Restore to Factory Default"
 ::= { setup 6 }

6.2.2.10 Baudrate

Description	Set User Baudrate	Type	
MIB Read	1.3.6.1.4.1.18954.113.2.7.0	Integer	
MIB Write	1.3.6.1.4.1.18954.113.2.7.0	Integer	

Set the User port baudrate. The range is from 600 to 115200. If outside of this range, it will be set to 9600. This value will be stored into the NVM after the "WriteNVM" command is issued.

Baudrate OBJECT-TYPE
 SYNTAX INTEGER
 ACCESS read-write
 STATUS mandatory
 DESCRIPTION "Set the Baudrate (600..115200)"
 ::= { setup 7 }

6.2.2.11 WriteNVM

Description	WriteNVM	Type	
MIB Read	1.3.6.1.4.1.18954.113.2.8.0	Integer	
MIB Write	1.3.6.1.4.1.18954.113.2.8.0	Integer	

The SNMP function writes the values to Non-Volatile memory. Changes made will automatically be loaded into the NFS-220 system the next time the unit is restarted. Use extreme care when issuing this command.

WriteNVM OBJECT-TYPE
 SYNTAX INTEGER
 ACCESS read-write
 STATUS mandatory
 DESCRIPTION ""
 ::= { setup 8 }

6.2.2.12 Soft Reset

Description	Reset the CPU	Type	
MIB Read			
MIB Write	1.3.6.1.4.1.18954.113.2.9.0	Integer	

Reset the CPU (1=RESET).

SoftReset OBJECT-TYPE
 SYNTAX INTEGER
 ACCESS write-only
 STATUS mandatory
 DESCRIPTION "Soft Reset (1=RESET CPU)."
 ::= { setup 7 }

6.2.3 STATUS

6.2.3.1 SysState

Description	SysState	Type	
MIB Read	1.3.6.1.4.1.18954.113.3.1.0	Integer	
MIB Write			

The status of the system. It can be warm-up, Locked, or Holdover.

SysState OBJECT-TYPE
 SYNTAX INTEGER
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION "System State: 0 = Warm up; 1 = Locked; 2 = Holdover"
 ::= { status 1 }

6.2.3.2 TOD Message

Description	TOD Message	Type	
MIB Read	1.3.6.1.4.1.18954.113.3.2.0	Integer	
MIB Write			

Time of Day message. The format is YYMMDDhhmmss. Ex: the time is 2012/02/14 17:35:26 will be displayed 120214173526.

TODMsg OBJECT-TYPE
 SYNTAX INTEGER
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION "TOD Msg. The format is YYMMDDhhmmss. Eg. 120214173526"
 ::= { status 2 }

6.2.3.3 Number of Tracking Sat

Description	Number of Tracking Satellites	Type	
MIB Read	1.3.6.1.4.1.18954.113.3.3.0	Integer	
MIB Write			

Number of tracking satellites in the position solution.

NTrackSat OBJECT-TYPE
 SYNTAX INTEGER
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION "Number of Tracking Satellites"
 ::= { status 3 }

6.2.3.4 Altitude

Description	Altitude	Type	
MIB Read	1.3.6.1.4.1.18954.113.3.4.0	String	

MIB Write			
------------------	--	--	--

GPS Position – Altitude displays in string with format in meter unit.

Altitude OBJECT-TYPE
 SYNTAX DisplayString
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION "GPS height - Altitude"
 ::= { status 4 }

Ex: 25 meters high

6.2.3.5 Latitude

Description	Latitude	Type	
MIB Read	1.3.6.1.4.1.18954.113.3.5.0	String	
MIB Write			

GPS Position – Latitude displays in string with format (degree[0-90], minute[0-59], minute fraction [0-9999], and 'N' or 'S' character)

Latitude OBJECT-TYPE
 SYNTAX DisplayString
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION "GPS Position - Latitude"
 ::= { status 5 }

Ex: 33,42.891,N
 Degree = 33
 Minute = 42
 Minute Fraction = 891
 Direction = North

6.2.3.6 Longitude

Description	Longitude	Type	
MIB Read	1.3.6.1.4.1.18954.113.3.6.0	String	
MIB Write			

GPS Position – Longitude displays in string with format (degree[0-180], minute[0-59], minute fraction [0-9999], and 'E' or 'W' character)

Longitude OBJECT-TYPE
 SYNTAX DisplayString
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION "GPS Position - Longitude"
 ::= { status 6 }

Ex: 117,50.490,W
 Degree = 117
 Minute = 50
 Minute Fraction = 490
 Direction = West

6.2.3.7 Elapsed Time

Description	Elapsed Time	Type	
MIB Read	1.3.6.1.4.1.18954.113.3.7.0	Integer	
MIB Write			

Elapsed seconds since the system was started up.

ElapsedTime OBJECT-TYPE
 SYNTAX Integer
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION "System Elapsed Time"
 ::= { status 7 }

6.2.3.8 Phase Error

Description	Phase Error	Type	
MIB Read	1.3.6.1.4.1.18954.113.3.8.0	String	
MIB Write			

Phase error in nanoseconds between the internal 1PPS versus the input reference 1PPS.

PhaseErr OBJECT-TYPE
 SYNTAX DisplayString
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION "Phase Error"
 ::= { status 8 }

6.2.3.9 DACVOLT

Description	DACVOLT	Type	
MIB Read	1.3.6.1.4.1.18954.113.3.9.0	String	
MIB Write			

DAC voltage (0-5V).

DACVOLT OBJECT-TYPE
 SYNTAX DisplayString
 ACCESS read-only
 STATUS mandatory
 DESCRIPTION "DAC Volt (0-5V)"
 ::= { status 9 }

6.2.3.10 Fault Status

Description	Fault Status	Type	
MIB Read	1.3.6.1.4.1.18954.113.3.10.0	Integer	
MIB Write			

FaultStatus OBJECT-TYPE
 SYNTAX INTEGER

ACCESS read-only
 STATUS mandatory
 DESCRIPTION "Fault Status"
 ::= { status 10 }

The bit(s) of the FaultStatus byte will be turned on according to the below sources:

Bit 7 -> 10MHZ J4
 Bit 6 -> 10MHZ J3
 Bit 5 -> 10MHZ J2
 Bit 4 -> 1PPS output
 Bit 3 -> Phase Error > 100us
 Bit 2 -> FPGA Failure
 Bit 1 -> GPS Failure
 Bit 0 -> OCXO Current out of range"

6.2.4 Reference

6.2.4.1 Manual Time

Description	SelectReference	Type	
MIB Read	1.3.6.1.4.1.18954.113.4.1.0	String	
MIB Write	1.3.6.1.4.1.18954.113.4.1.0	String	

Set the manual time and use external 1PPS as the input reference in the format YYDDMMhhmmss. If the enter is 0, the system will use GPS receiver as reference.

ManualTime OBJECT-TYPE
 SYNTAX DisplayString
 ACCESS read-write
 STATUS mandatory
 DESCRIPTION "Set Manual Time"
 ::= { ref 1 }

SET: Set the reference by either sending the YYDDMMhhmmss TOD time to use the external 1PPS or 0 to use the GPS 1PPS as reference.

Ex: 120215101123

Uses User's input as TOD and external 1PPS as reference.

Year: 2012
 Month: 02
 Day: 15
 Hour: 10
 Minute: 11
 Second: 23

Ex: 0 Uses GPS receiver as reference.

GET: Request the current Reference. It will reply with **0** (GPS) or **1**(external 1PPS). To get the current TOD, use the TODMsg command under the Status section.

7 Troubleshooting

Problem Description	Solution
Unit does not power up	<ul style="list-style-type: none"> • Check that both power supplies are connected to a power source, and that both power sources are receiving electricity • Check the fuse.
Unit does not have a GPS signal	<ul style="list-style-type: none"> • Check that the GPS antenna is connected to the unit • Check that the GPS antenna is properly installed
GPS Signal is weak or intermittent	<ul style="list-style-type: none"> • Ensure that the GPS antenna is correctly positioned according to Brandywine Document #####
Unit does not communicate through RS232	<ul style="list-style-type: none"> • Check that the RS232 cable is securely connected at both ends. • Check the RS232 cable is straight serial cable. • Check that the Transmit was set: CR+LF • Check that the Baud rate: 115200,8,n,1,n.

8 Support Information

All Brandywine Communications products come with a one-year warranty.

If your unit is still exhibiting problems not covered by the above troubleshooting guide, please contact us for technical support at support@brandywinecomm.com or call us at 714-755-1050.

If it becomes necessary to return your unit to the factory for repairs, please call us at 714-755-1050 extension 113 to arrange an RMA.



9 Bill of Materials

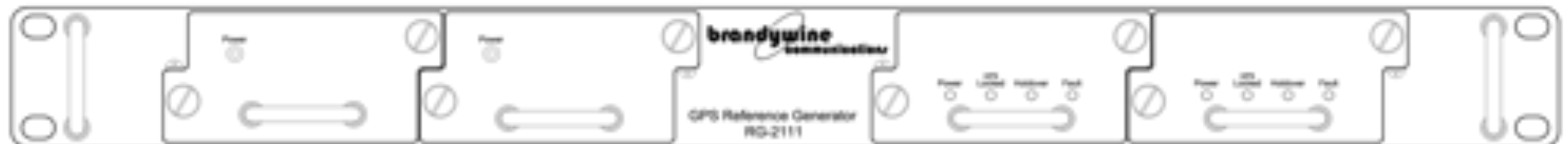
Brandywine Communications

BOM NUMBER :001-0230 REV:D BOM STATUS: Released
 BOM DESCRIPTION :GPS REFERENCE GENERATOR NTP MODEL NO: RG-2111
 DATE :06/18/2013 03:10:06 PM
 QTY :1.0000

UNCOSTED SINGLE LEVEL BOM REPORT

ITEM	BOM/PART NUMBER	REV	DESCRIPTION	MANUFACTURER	MODEL NUMBER	QTY PER ASSY	QTY REQUIRED
0010	001001462	C	PWA POWER DISTRIBUTION			1.0000	1.0000
0003	001001472	A	REDUNDANT GPS REF GENERATO BRANDYWINE			1.0000	1.0000
0032	002-0037	A	ANTENNA CABLE, GPS, 100' R			2.0000	2.0000
0002	002-0222	A	DOM MODULE ASSY (BW) BRANDYWINE			2.0000	2.0000
0001	002-0224	B	PWR SUPPLY MODULE 85-264 V BRANDYWINE			2.0000	2.0000
0034	003000230	N/C	ANTENNA MAST ADAPTER AND			2.0000	2.0000
0004	003000873	B	COVER GPS REF GENERATOR BRANDYWINE			1.0000	1.0000
0007	003000882	D	CARD GUIDE GPS REF GENERAT BRANDYWINE			6.0000	6.0000
0008	003000883	A	SUPPORT BACKPLANE GPS REF BRANDYWINE			3.0000	3.0000
0006	003001066	C	CHASSIS GPS REF GEN WITH N BRANDYWINE			1.0000	1.0000
0005	003001072	A	PANEL FRONT GPS REF GEN BRANDYWINE			1.0000	1.0000
0040	003001124	A	LABEL, FUSE RATING, RG2111			1.0000	1.0000
0038	003001125	B	CE SCREEN, POWER SUPPLY			1.0000	1.0000
0037	003001132	A	INSULATOR .06" THK 2.5 x 1			2.0000	2.0000
0033	012000002	N/C	ANTENNA, GPS, POLE MOUNT,T SYNERGY		10001044G	2.0000	2.0000
0009	125000005	---	POWER ENTRY MODULE IEC SW CORCOM		PS0S0SS60	2.0000	2.0000
0015	191000098	---	FUSE, 5mm X 20mm 1AMP 250V LITTELFUSE lead		218001XP	2.0000	2.0000
0019	204000004	---	TERMINAL, RING TONGUE, 22- 3M		MVU18-6R/SK	4.0000	4.0000
0029	204000065	---	JACK, BNC, BULKHEAD, RG179 AMP		5225398-8 ROHS compl.	2.0000	2.0000
0027	204000084	---	HOUSING CONN 3-PIN .156 CT MOLEX		09-50-8033	2.0000	2.0000
0028	204000086	---	TERMINAL CRIMP 18-20 AWG (MOLEX		08-52-0113	4.0000	4.0000
0026	204000101	---	TERMINAL INSUL .187x.020 1 AMP		2-520182-2 lead free	6.0000	6.0000
0030	204000185	---	CONNECTOR PLUG MMCX R/A GO JOHNSON COMPONEN		135-3403-101	2.0000	2.0000
0036	405000002	---	SCREW MACH 4-40x1/2 PHPD C KAD FASTENERS		405-0010	1.0000	1.0000
0014	405000017	---	SCREW MACH 6-32x3/8 PHPD 1 KAD FASTENERS IN		0606MP1SS	4.0000	4.0000
0023	405000022	---	SCREW MACH 4-40x3/8 PHPD C KAD FASTENERS IN		0406MP1SS	9.0000	9.0000
0024	405000027	---	WASHER SPLIT-LOCK #4 SS KAD FASTENERS		04WSSS	10.0000	10.0000
0025	405000028	---	WASHER FLAT #4 SS .250 OD KAD FASTENERS		MS15795-803	10.0000	10.0000
0039	405001071	---	SCREW MACH 4-40x1/4 FHPD 1 KAD FASTENERS		0404MP1	2.0000	2.0000
0013	405001102	---	FERRULE, BLACK KEYSTONE		9123	4.0000	4.0000
0035	405001135	---	CABLE CLAMP NYLON .250 ID KEYSTONE		7624	1.0000	1.0000
0021	405001174	---	WASHER SPLIT-LOCK #6 KAD FASTENERS		06WSSS	2.0000	2.0000
0022	405001175	---	WASHER FLAT #6 KAD FASTENERS		15795-805	2.0000	2.0000
0012	405001188	---	HANDLE BLACK 1.25 CTRS 1.0 KEYSTONE		9116	2.0000	2.0000
0020	405001263	---	HEX NUT 6-32 SMALL PATTERN McMaster-CARR		90730A007	3.0000	3.0000
0017	405001271	---	SCREWLOCK KIT - FEMALE .13 3M		3341-1S	2.0000	2.0000
0018	405001435	---	SCREW MACH 4-40x5/16 FHPD McMaster CARR		93085A107	41.0000	41.0000
0016	415000019	---	POWER CORD, DETACHABLE, 3 QUALTEK		312003-01	2.0000	2.0000
0031	415000027	---	CABLE, COAX, RG-174 ALPHA		9174	1.0000	1.0000
0011	415000079	---	WIRE 18AWG 300V STR TEFLON		M16878/4-BHE-GRN/YEL	1.0000	1.0000

10 Front Panel Drawing



11 Rear Panel Drawing

