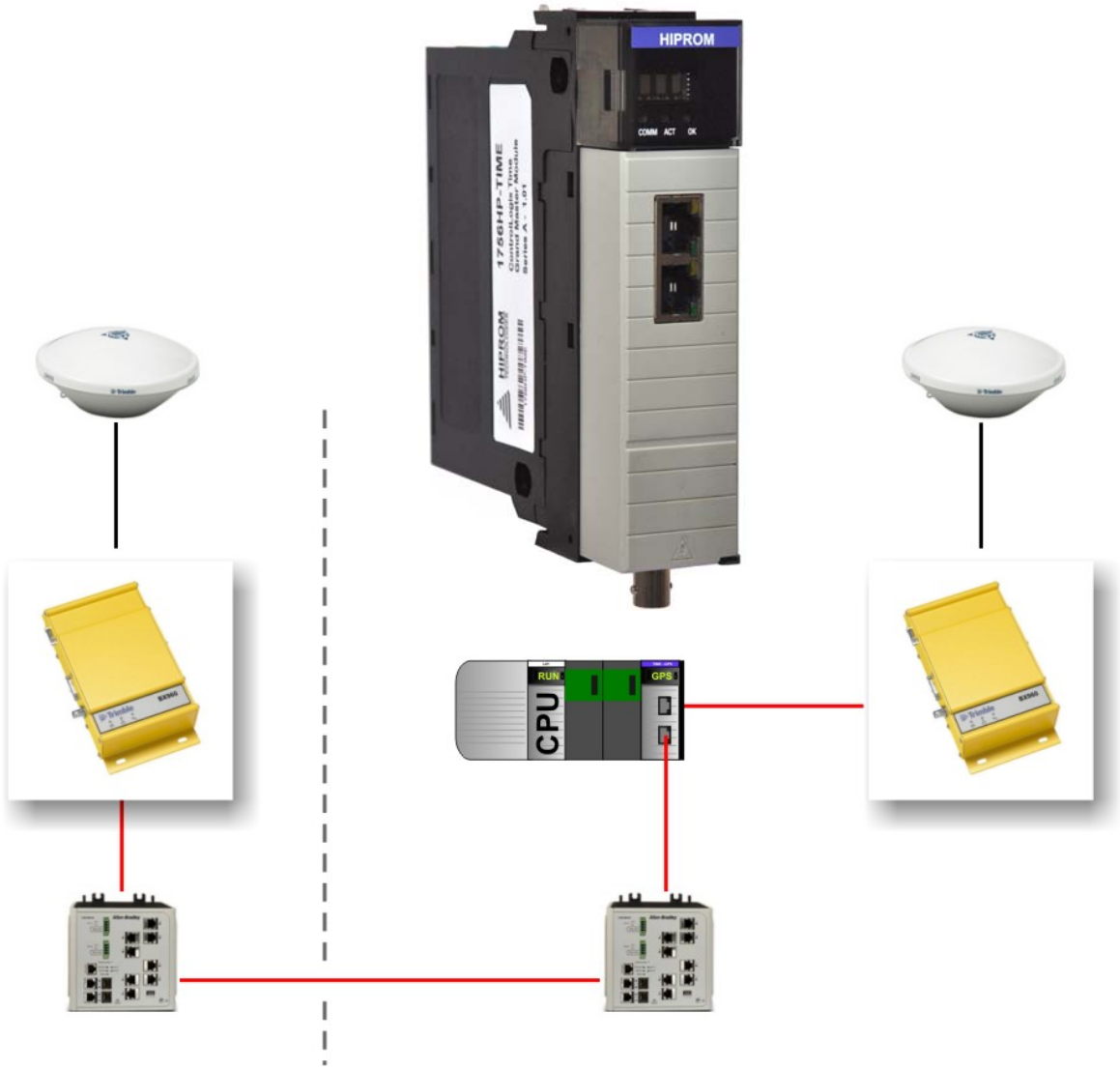
1756HP-TIME

HIGH POSITION ACCURACY APPLICATION EXAMPLE

V1.00.01



INTRODUCTION

The 1756HP-TIME module provides accurate time synchronization on a number of interfaces using Global Positioning System (GPS). The module also has the ability to obtain time from various sources and provide time synchronization on other, thus acting as a gateway between different time synchronization methods.

The module also provides GPS position in XYZ Cartesian ECEF (Earth Centered, Earth Fixed) and LLA (latitude, longitude and altitude). Velocity (m/s) is also provided in XYZ Cartesian ECEF and ENU (East-North-UP).

This document illustrates an application example of implementing high position accuracy using a pair of Trimble BX960 units.

HARDWARE

This system comprises the following hardware components :

- Hiprom 1756HP-TIME module
- Trimble BX960 Rover GPS Receiver + Antenna
- Trimble BX960 Base Station GPS Receiver + Antenna
- ControlLogix equipment Chassis, Controller etc
- Ethernet network infrastructure

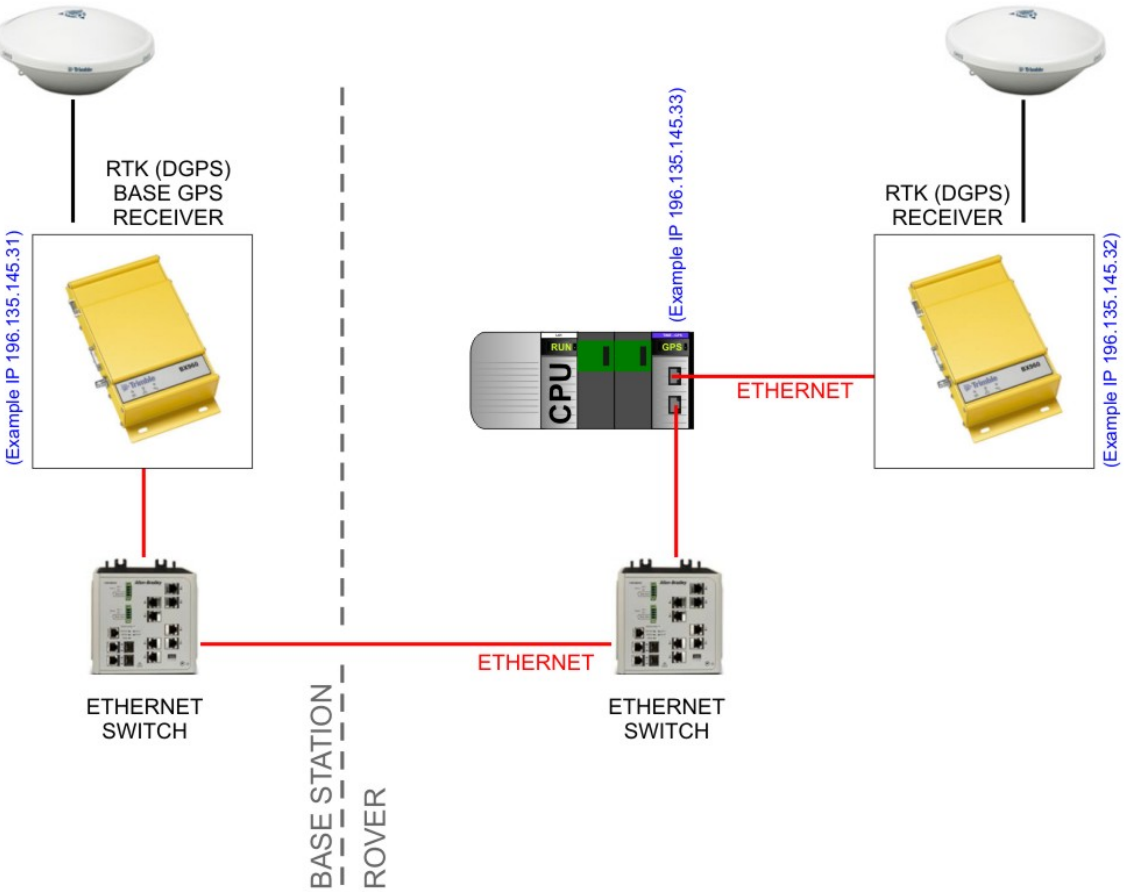


Figure 1 : Network Layout

BASIC OPERATION

The system makes use of a GPS correction method known as Differential GPS, whereby GPS corrections are calculated at a known point at the base station (fixed) and transferred to the rover unit (mobile.) These corrections are effectively error corrections for the distances (pseudo-ranges) between the base and each satellite currently being tracked, and not simply a position correction.

The corrections can either be code corrections, referred to as DGPS (Differential GPS) , or phase corrections referred to as RTK (Real-Time Kinematic). Typically DGPS can provide sub-meter accuracy whilst RTK can provide sub-centimeter accuracy.

Although the configuration is identical, and depends on the options purchased with the BX960, this example will focus on the RTK option.

SOFTWARE

The BX960 units have web interfaces and can be easily configured using any internet browser.

The configuration of the 1756HP-TIME module also supports a web interface but is configured primarily using RSLogix5000.

The example RSLogix project ***TimeModuleExtGPS03.ACD*** is available, illustrating the configuration. It also contains logic capable of transforming the ECEF (Earth-Centered-Earth-Fixed) coordinates to a local metric based coordinate system.

CONFIGURATION

For the system to operate correctly, the three Ethernet devices must be connected on the same network. In this example the IP addresses are configured as follows :

Base Station BX960 Receiver	196.135.145.31
Rover BX960 Receiver	196.135.145.32
1756HP-TIME Module	196.135.145.33

Base Station BX960

(See Appendix A)

For a detailed description of the configuration please refer to the Trimble BX960 User manual. (see www.trimble.com). The basic setup should include the following :

1. Install the unit in a suitable position such that the antenna has an unimpeded view of the sky.
2. Connect to the unit using the Hiprom configured IP address. If not previously configured the unit will default to DHCP, and will be assigned an address by your network DHCP server.
3. Login to the web server using the default security :
    - Username : **admin**
    - Password : **password**
4. Change the units IP address if required. (It is strongly recommended that you provide the unit with a fixed IP address, that is, non-DHCP.
5. Navigate to **Receiver Configuration | Antenna**, and select the correct antenna configuration.
6. The unit should now start tracking satellites and resolving its position.
7. Navigate to **Receiver Configuration | Reference Station**, and select the "Load Current Position" by pressing the "**Here**" button.
8. Navigate to **I/O Configuration | Port Configuration** and add a new TCP/IP port, as follows :
    - Type : CMR
    - Port : 5018
    - Client : Off
    - Output Only : On
    - UDP Mode : Off
    - Delay : 0 ms

Rover Unit BX960

(See Appendix B)

For a detailed description of the configuration please refer to the Trimble BX960 User manual. (see www.trimble.com). The basic setup should include the following :

1. Install the unit in a suitable position on the mobile unit such that the antenna has an unimpeded view of the sky.
2. Connect to the unit using the Hiprom configured IP address. If not previously configured the unit will default to DHCP, and will be assigned an address by your network DHCP server.
3. Login to the web server using the default security :
    - Username : **admin**
    - Password : **password**
4. Change the units IP address if required. (It is strongly recommended that you provide the unit with a fixed IP address, that is, non-DHCP.
5. Navigate to **Receiver Configuration | Antenna**, and select the correct antenna configuration.
6. Navigate to **I/O Configuration | Port Configuration** and add a new TCP/IP port, for communication to the 1756HP-TIME module as follows :
    - Type : GSOF
    - Port : 5017
    - Client : Off
    - Output Only : On
    - UDP Mode : Off
7. Within **I/O Configuration | Port Configuration** add another new TCP/IP port, as follows :
    - Type : CMR
    - Port : 5018
    - Client : On
    - Output Only : Off
    - UDP Mode : Off
    - Remote IP : (IP Address of Base Station) : 5018
    - CMR Input : Disabled

1756HP-TIME Module

For the detailed configuration please refer to the example RSLogix project ***TimeModuleExtGPS03.ACD.***

The basic setup should include the following :

1. Set the GPS Source = 5 (External GPS)
2. Configure the External Source IP Address of the Rover unit. As each byte is displayed as a signed byte in decimal in RSLogix, it is easier to enter each octet in hexadecimal format, for example 196.135.145.31 would be expressed as :

Decimal	Hex
196	C4
135	87
145	91
31	1F

⊟ Time_C	{...}	{...}		TimeConfig
⊞ Time_C.ConfigRevNumber	0		Decimal	DINT
⊞ Time_C.Source	5		Decimal	INT
Time_C.PTPOutputEnable	0		Decimal	BOOL
Time_C.NTPOutputEnable	0		Decimal	BOOL
Time_C.IRIGBOutputEnable	0		Decimal	BOOL
Time_C.IRIGBLockLostTx	0		Decimal	BOOL
Time_C.PreV16Support	0		Decimal	BOOL
Time_C.CSTMastershipEnable	0		Decimal	BOOL
⊟ Time_C.ExternalSourceAddress	{...}	{...}	Hex	SINT[4]
⊞ Time_C.ExternalSourceAddress[0]	16#c4		Hex	SINT
⊞ Time_C.ExternalSourceAddress[1]	16#87		Hex	SINT
⊞ Time_C.ExternalSourceAddress[2]	16#91		Hex	SINT
⊞ Time_C.ExternalSourceAddress[3]	16#20		Hex	SINT
⊞ Time_C.NTPUpdateInterval	0		Decimal	DINT
⊞ Time_C.AdvancedConfig	0		Decimal	DINT
⊞ Time_C.DemoWeekNumber	1580		Decimal	DINT
⊞ Time_C.DemoWeekSeconds	225551		Decimal	DINT

Figure 2 : RSLogix TIME Module Configuration Assembly

To ensure the system is fully operational, the following items should be examined in logic :

- Correct connection to the 1756HP-TIME module, typical GSV instruction.
- GPSLock bit is ok
- GPS Antenna is ok.
- Differential GPS is active (either normal DGPS or RTK)
- Operating mode bits. These bits will depend on the type of GPS correction strategy chosen.

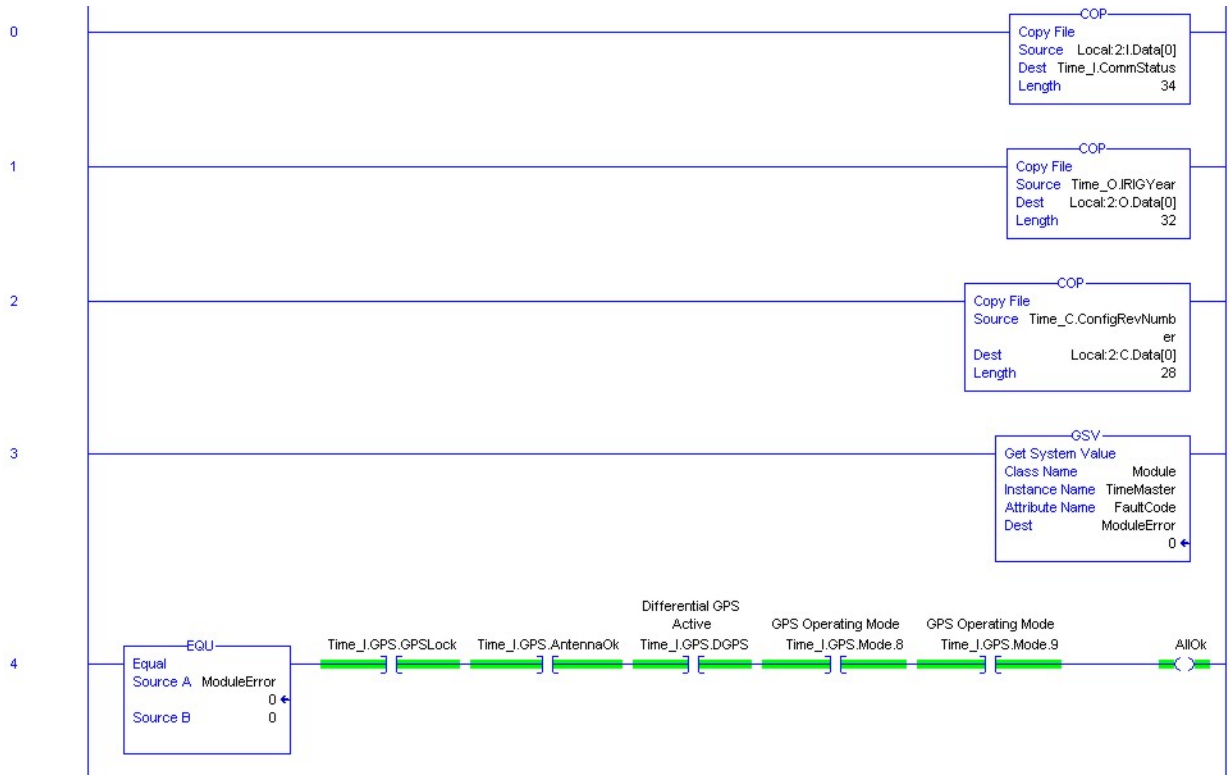
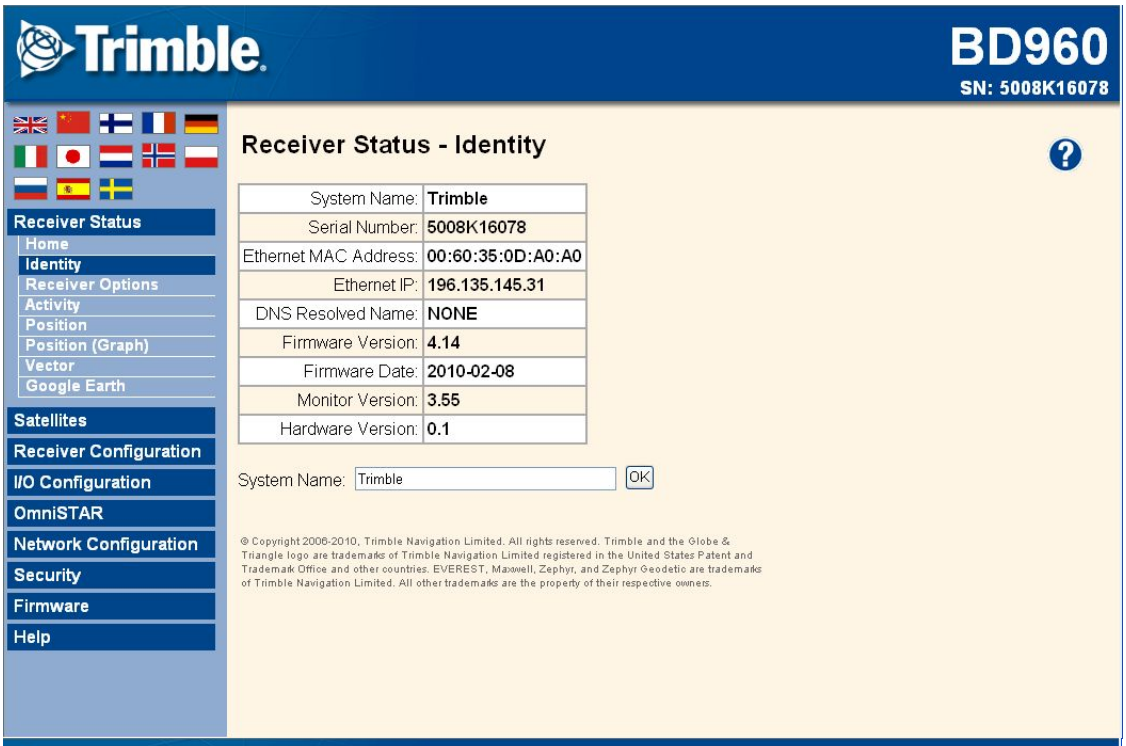


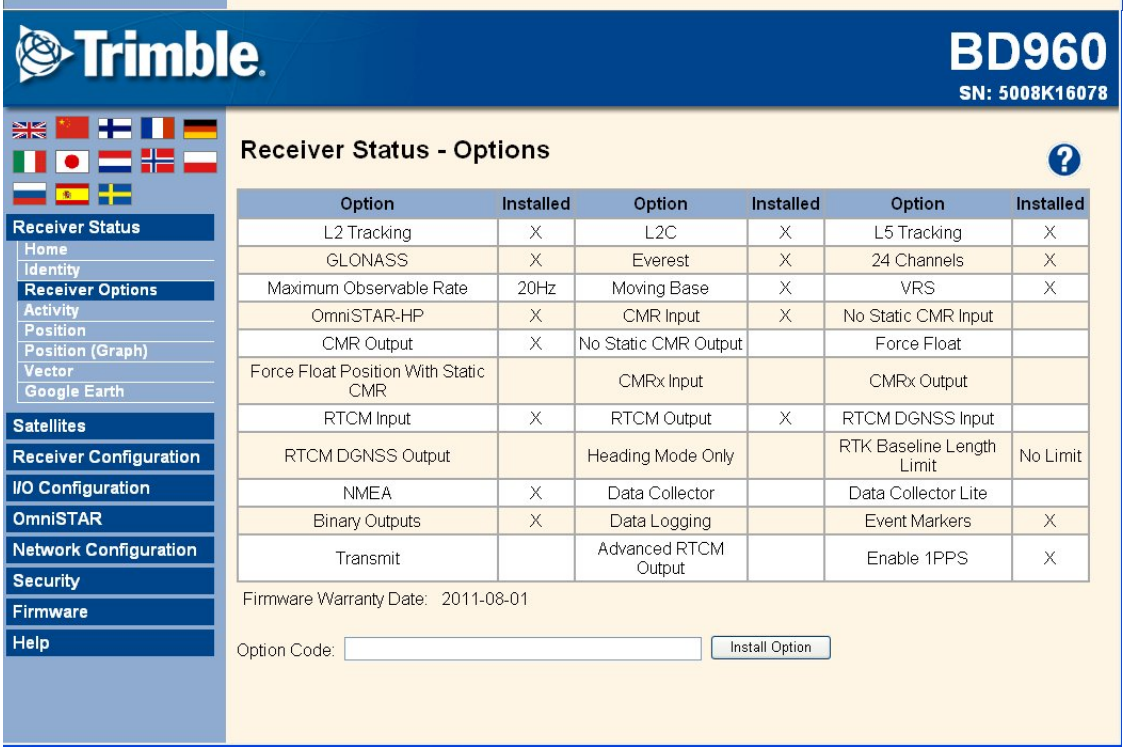
Figure 3 : RSLoigx Ladder logic Example

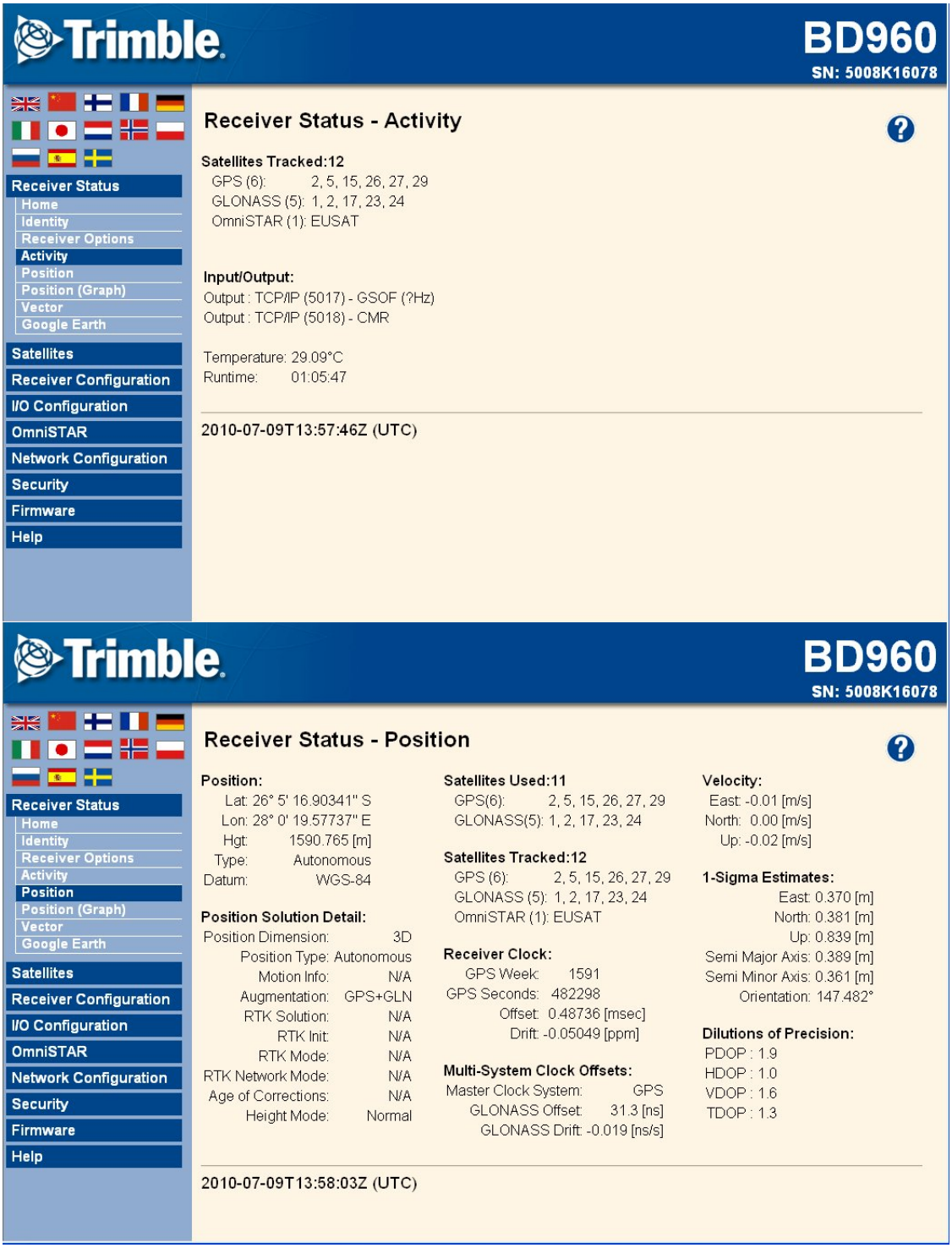
Bit	*Description*	*Interpretation*
0	**New position**	0: No. 1: Yes.
1	**Clock fix calculated for current position**	0: No. 1: Yes.
2	**Horizontal coordinates calculated this position**	0: No. 1: Yes.
3	**Height calculated this position**	0: No. 1: Yes.
4	**Weighted position**	0: No. 1: Yes.
5	**Overdetermined position**	0: No. 1: Yes.
6	**Ionosphere-free position**	0: No. 1: Yes.
7	**Position uses filtered L1 pseudoranges**	0: No. 1: Yes.
8	**Differential position**	0: Differential position is an autonomous or a WAAS solution. 1: Position is a differential solution.
9	**Differential position method**	0: Code 1: Phase including RTK, HP or XP OmniSTAR (VBS is not derived from Phase).
10	**Differential position method'**	0: Code (DGPS) or a float position (RTK). Uncorrected position is Autonomous (if bit 0 = 0). 1: Position is fixed integer phase position (RTK). Uncorrected position is WAAS (if bit 0 = 0).
11	**OmniSTAR solution**	0: Not active 1: OmniSTAR differential solution (including HP, XP, and VBS)
12	**Position determined with static as a constraint**	0: No. 1: Yes.
13	**Position is network RTK solution**	0: No. 1: Yes.
14	**Position is Location RTK**	0: No. 1: Yes.
15	**Position is Beacon DGPS**	0: No. 1: Yes.

Figure 4 : GPS Mode Interpretation (BX960 Only)

APPENDIX A : BX960 BASE STATION SETUP







Trimble BD960
SN: 5008K16078

Receiver Status
- Home
- Identity
- Receiver Options
- Activity
- Position
- Position (Graph)
- Vector
- Google Earth

Satellites
Receiver Configuration
I/O Configuration
OmniSTAR
Network Configuration
Security
Firmware
Help

Receiver Status - Activity

Satellites Tracked:12
GPS (6): 2, 5, 15, 26, 27, 29
GLONASS (5): 1, 2, 17, 23, 24
OmniSTAR (1): EUSAT

Input/Output:
Output : TCP/IP (5017) - GSOF (?Hz)
Output : TCP/IP (5018) - CMR

Temperature: 29.09°C
Runtime: 01:05:47

2010-07-09T13:57:46Z (UTC)

Trimble BD960
SN: 5008K16078

Receiver Status
- Home
- Identity
- Receiver Options
- Activity
- Position
- Position (Graph)
- Vector
- Google Earth

Satellites
Receiver Configuration
I/O Configuration
OmniSTAR
Network Configuration
Security
Firmware
Help

Receiver Status - Position

Position:
Lat: 26° 5' 16.90341" S
Lon: 28° 0' 19.57737" E
Hgt: 1590.765 [m]
Type: Autonomous
Datum: WGS-84

Position Solution Detail:
Position Dimension: 3D
Position Type: Autonomous
Motion Info: N/A
Augmentation: GPS+GLN
RTK Solution: N/A
RTK Init: N/A
RTK Mode: N/A
RTK Network Mode: N/A
Age of Corrections: N/A
Height Mode: Normal

Satellites Used:11
GPS(6): 2, 5, 15, 26, 27, 29
GLONASS(5): 1, 2, 17, 23, 24

Satellites Tracked:12
GPS (6): 2, 5, 15, 26, 27, 29
GLONASS (5): 1, 2, 17, 23, 24
OmniSTAR (1): EUSAT

Receiver Clock:
GPS Week: 1591
GPS Seconds: 482298
Offset: 0.48736 [msec]
Drift: -0.05049 [ppm]

Multi-System Clock Offsets:
Master Clock System: GPS
GLONASS Offset: 31.3 [ns]
GLONASS Drift: -0.019 [ns/s]

Velocity:
East: -0.01 [m/s]
North: 0.00 [m/s]
Up: -0.02 [m/s]

1-Sigma Estimates:
East: 0.370 [m]
North: 0.381 [m]
Up: 0.839 [m]
Semi Major Axis: 0.389 [m]
Semi Minor Axis: 0.361 [m]
Orientation: 147.482°

Dilutions of Precision:
PDOP : 1.9
HDOP : 1.0
VDOP : 1.6
TDOP : 1.3

2010-07-09T13:58:03Z (UTC)

Trimble

BD960
SN: 5008K16078

Receiver Status
Satellites
Receiver Configuration
- Summary
- Antenna
- Reference Station
- Tracking
- Position
- General
- Application Files
- Reset
- Default Language

I/O Configuration
OmniSTAR
Network Configuration
Security
Firmware
Help

Receiver Configuration

Elevation Mask:	10°
PDOP Mask:	7
Clock Steering:	Disabled
Everest™ Multipath Mitigation:	Enabled
Antenna ID:	85
Antenna Type:	Zephyr
Antenna Measurement Method:	Bottom of antenna mount
Antenna Height:	0.000 [m]
1PPS On/Off:	Disabled
Event 1 On/Off:	Disabled
Event 1 Slope:	Positive
RTK Mode:	Low Latency
Motion:	Static
CMR Input Filter:	Disabled
Reference Latitude:	26°05'16.90617"S
Reference Longitude:	28°00'19.55740"E
Reference Height:	1590.897 [m]
RTCM 2.x ID:	2
RTCM 3.x ID:	3
CMR ID:	1
Station Name:	CREF0001
Ethernet IP:	196.135.145.31
System Name:	Trimble
DNS Resolved Name:	NONE
Serial Number:	5008K16078
Firmware Version:	4.14
Firmware Date:	2010-02-08

Trimble

BD960
SN: 5008K16078

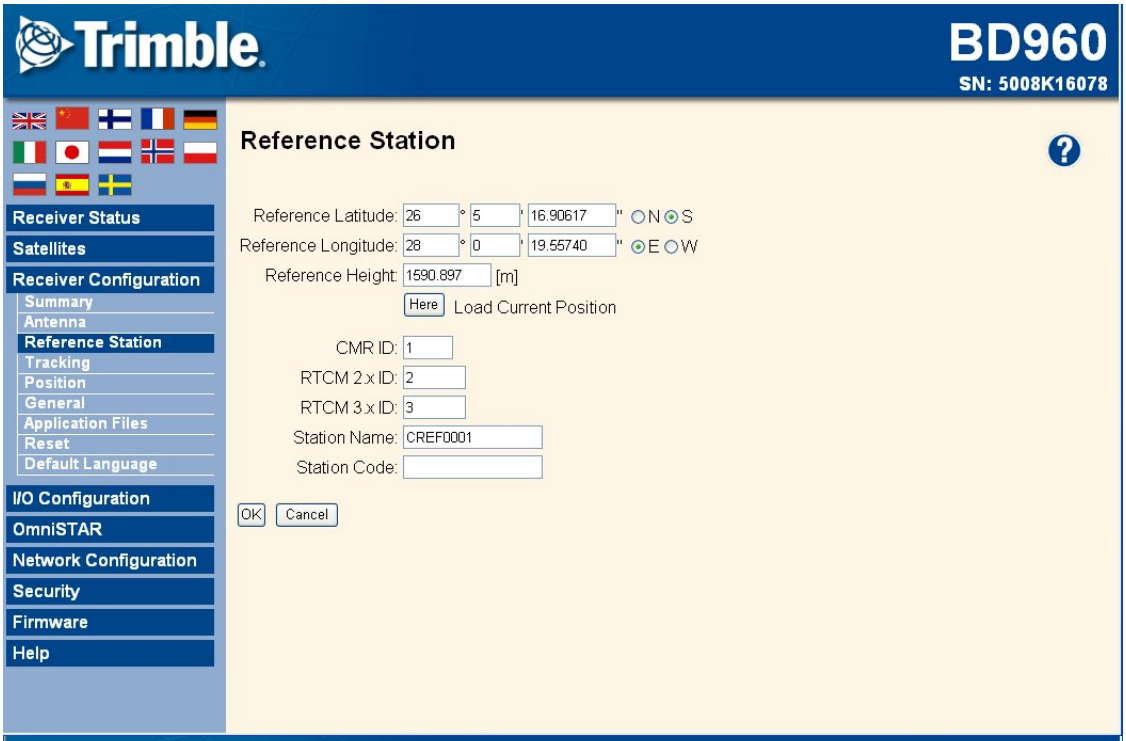
Receiver Status
Satellites
Receiver Configuration
- Summary
- Antenna
- Reference Station
- Tracking
- Position
- General
- Application Files
- Reset
- Default Language

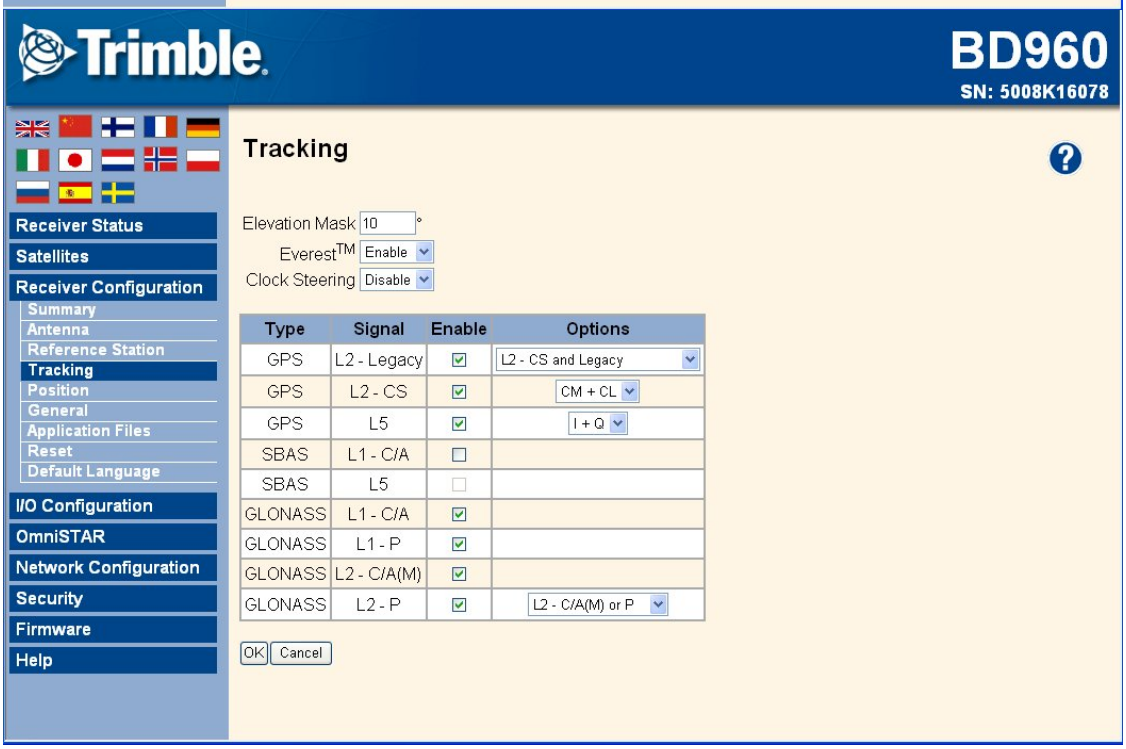
I/O Configuration
OmniSTAR
Network Configuration
Security
Firmware
Help

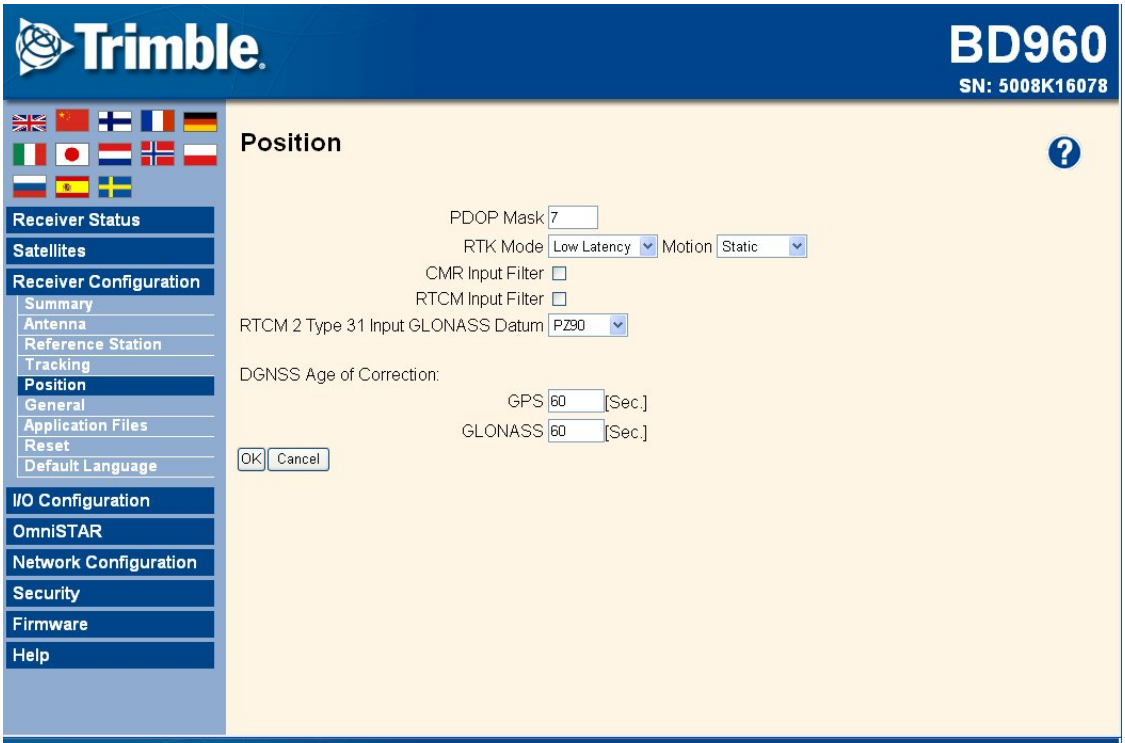
Antenna Configuration

Antenna Type: Zephyr
Antenna Serial Number:
Antenna Measurement Method: Bottom of antenna mount
Antenna Height [m]: 0.000

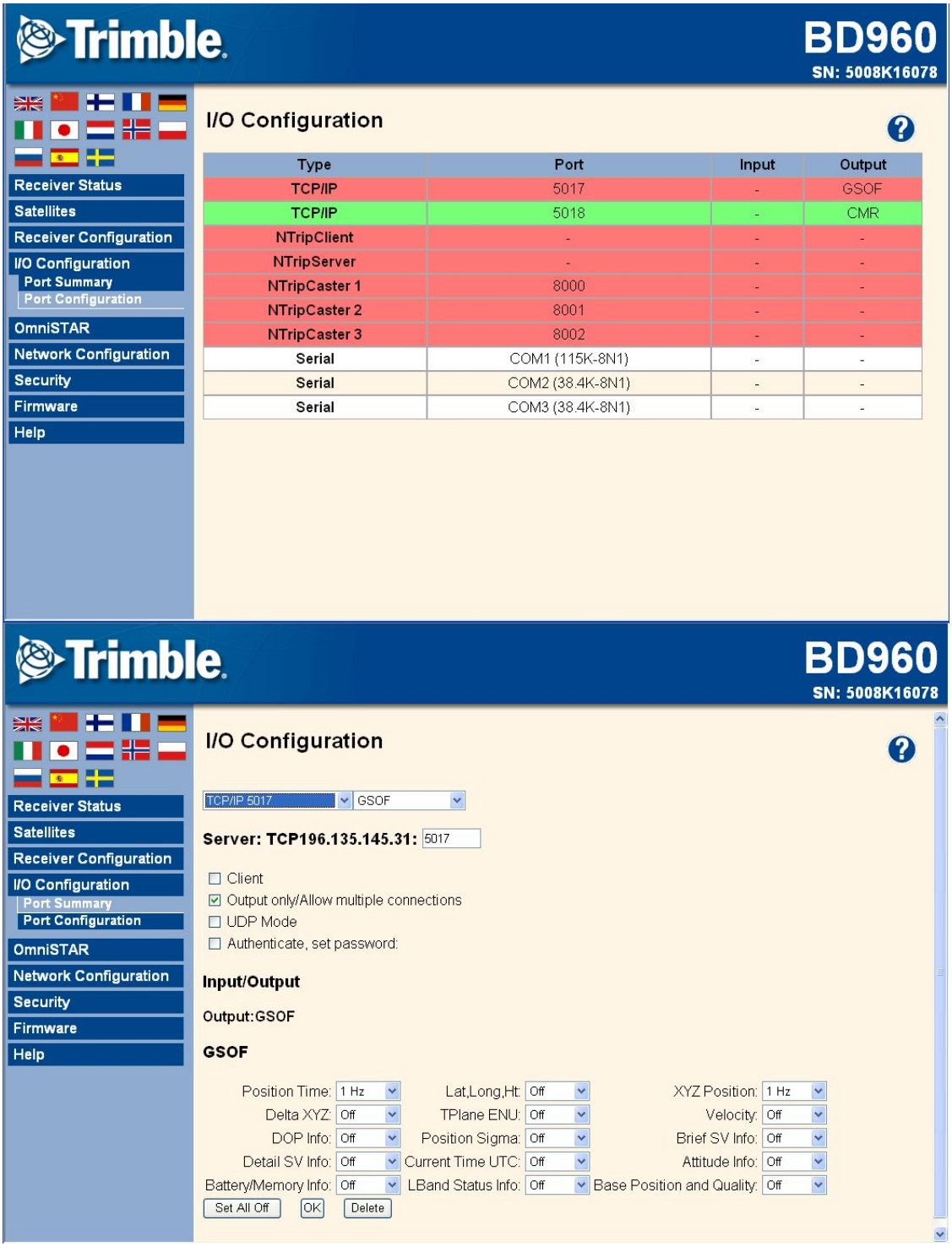
OK Cancel


Trimble
BD960
SN: 5008K16078
Reference Station
Receiver Status
Satellites
Receiver Configuration
Summary
Antenna
Reference Station
Tracking
Position
General
Application Files
Reset
Default Language
I/O Configuration
OmniSTAR
Network Configuration
Security
Firmware
Help
Reference Latitude: 26 ° 5 ' 16.90617 " N S
Reference Longitude: 28 ° 0 ' 19.55740 " E W
Reference Height: 1590.897 [m]
Here Load Current Position
CMR ID: 1
RTCM 2.x ID: 2
RTCM 3.x ID: 3
Station Name: CREF0001
Station Code:
OK Cancel


Trimble
BD960
SN: 5008K16078
Tracking
Receiver Status
Satellites
Receiver Configuration
Summary
Antenna
Reference Station
Tracking
Position
General
Application Files
Reset
Default Language
I/O Configuration
OmniSTAR
Network Configuration
Security
Firmware
Help
Elevation Mask 10 °
Everest™ Enable
Clock Steering Disable
Type Signal Enable Options
GPS L2 - Legacy L2 - CS and Legacy
GPS L2 - CS CM + CL
GPS L5 I + Q
SBAS L1 - C/A
SBAS L5
GLONASS L1 - C/A
GLONASS L1 - P
GLONASS L2 - C/A(M)
GLONASS L2 - P L2 - C/A(M) or P
OK Cancel

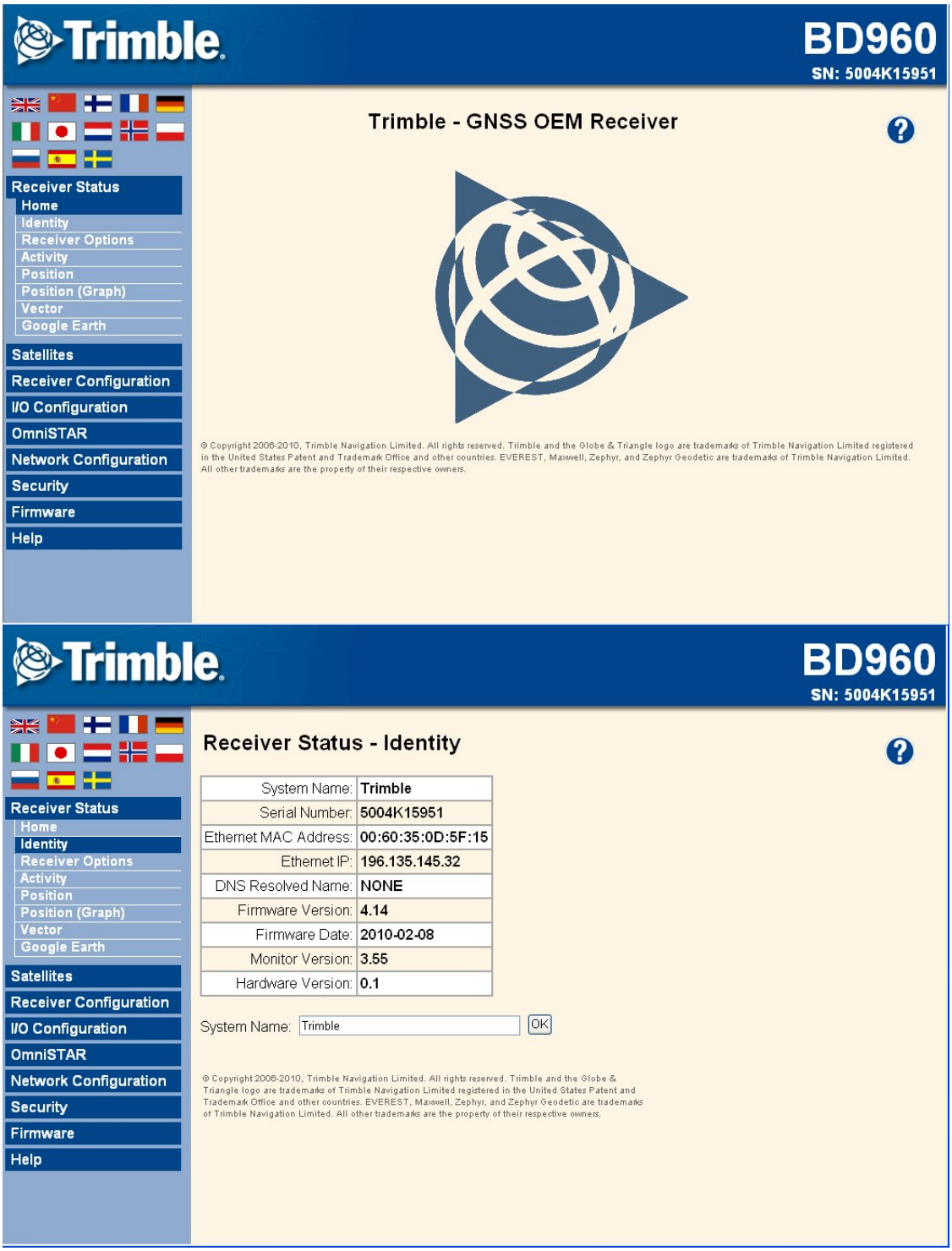

Trimble
BD960
SN: 5008K16078
Position
Receiver Status
Satellites
Receiver Configuration
Summary
Antenna
Reference Station
Tracking
Position
General
Application Files
Reset
Default Language
I/O Configuration
OmniSTAR
Network Configuration
Security
Firmware
Help
PDOP Mask 7
RTK Mode Low Latency Motion Static
CMR Input Filter
RTCM Input Filter
RTCM 2 Type 31 Input GLONASS Datum PZ90
DGNSS Age of Correction:
GPS 60 [Sec.]
GLONASS 60 [Sec.]
OK Cancel

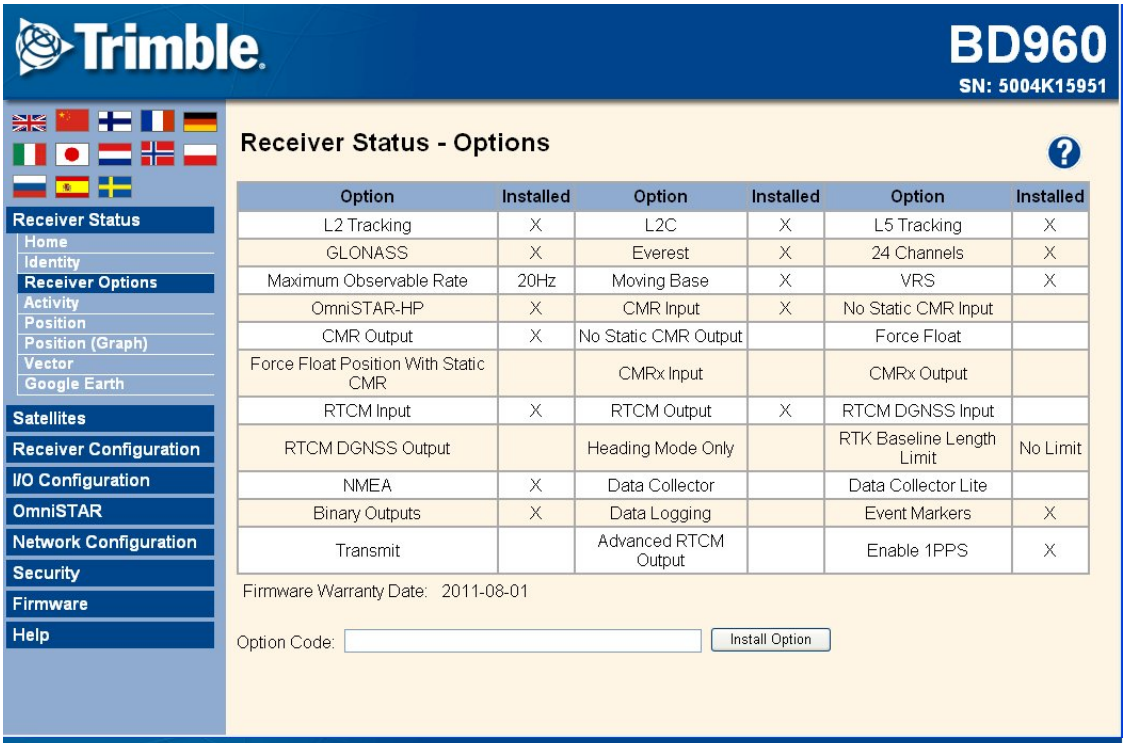

Trimble
BD960
SN: 5008K16078
General
Receiver Status
Satellites
Receiver Configuration
Summary
Antenna
Reference Station
Tracking
Position
General
Application Files
Reset
Default Language
I/O Configuration
OmniSTAR
Network Configuration
Security
Firmware
Help
Event 1 On/Off Disable
Event 1 Slope Positive
Operation Mode Base
Automatic MBase output Enable
1PPS On/Off Disable
OK Cancel

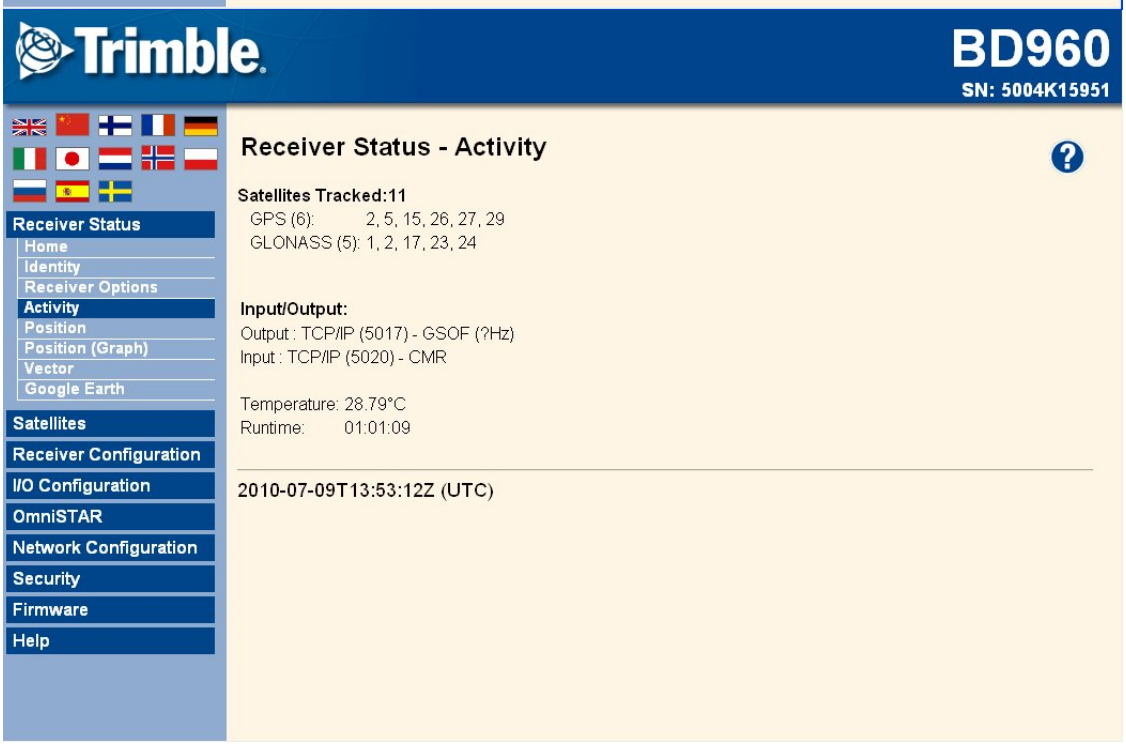

Trimble
BD960
SN: 5008K16078
Receiver Status
Satellites
Receiver Configuration
I/O Configuration
Port Summary
Port Configuration
OmniSTAR
Network Configuration
Security
Firmware
Help
I/O Configuration
Type Port Input Output
TCP/IP 5017 - GSOF
TCP/IP 5018 - CMR
NTripClient - - -
NTripServer - - -
NTripCaster 1 8000 - -
NTripCaster 2 8001 - -
NTripCaster 3 8002 - -
Serial COM1 (115K-8N1) - -
Serial COM2 (38.4K-8N1) - -
Serial COM3 (38.4K-8N1) - -
Trimble
BD960
SN: 5008K16078
Receiver Status
Satellites
Receiver Configuration
I/O Configuration
Port Summary
Port Configuration
OmniSTAR
Network Configuration
Security
Firmware
Help
I/O Configuration
TCP/IP 5017
GSOF
Server: TCP196.135.145.31: 5017
Client
Output only/Allow multiple connections
UDP Mode
Authenticate, set password:
Input/Output
Output:GSOF
GSOF
Position Time: 1 Hz
Lat,Long,Ht: Off
XYZ Position: 1 Hz
Delta XYZ: Off
TPlane ENU: Off
Velocity: Off
DOP Info: Off
Position Sigma: Off
Brief SV Info: Off
Detail SV Info: Off
Current Time UTC: Off
Attitude Info: Off
Battery/Memory Info: Off
LBand Status Info: Off
Base Position and Quality: Off
Set All Off
OK
Delete

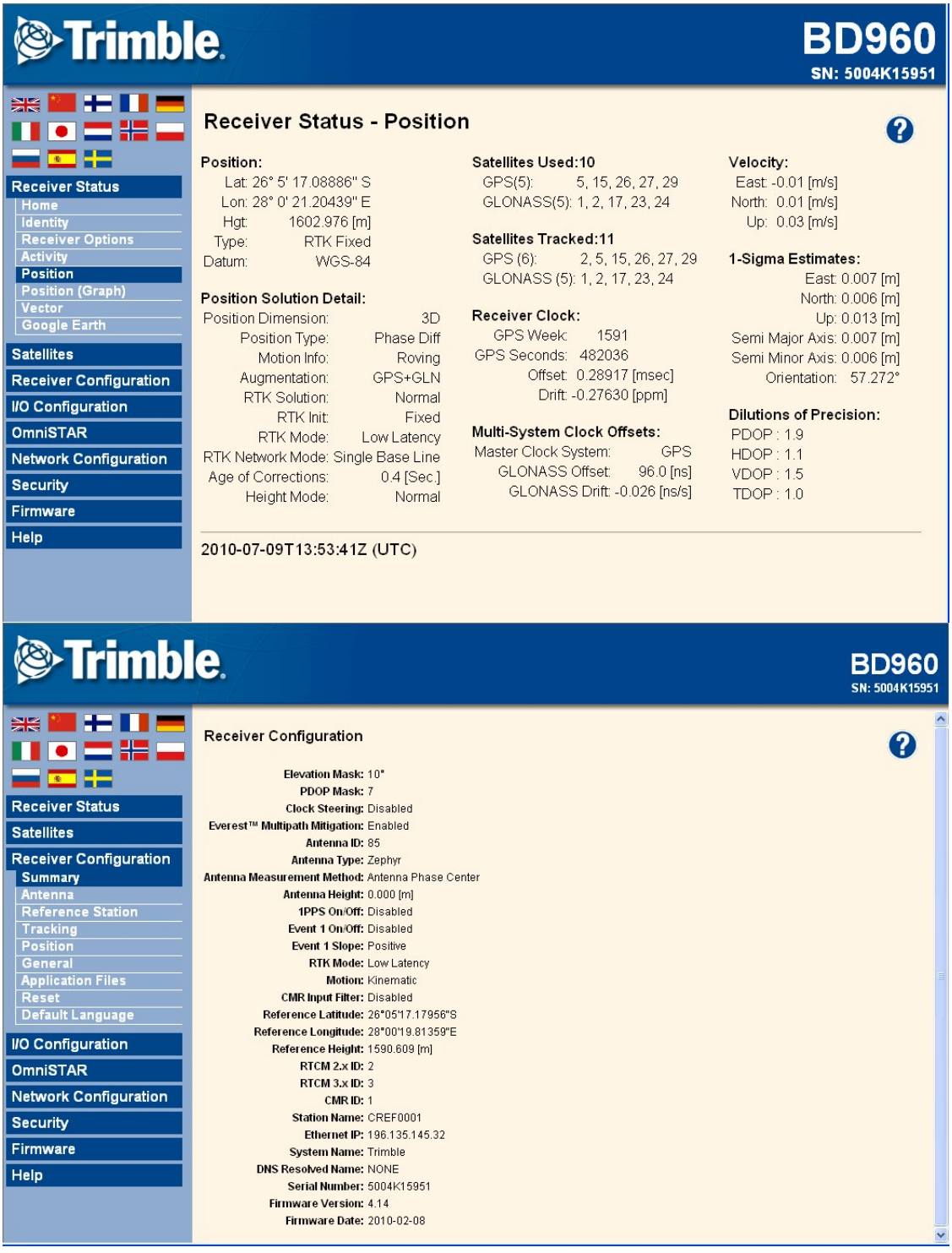

Trimble
BD960
SN: 5008K16078
Receiver Status
Satellites
Receiver Configuration
I/O Configuration
Port Summary
Port Configuration
OmniSTAR
Network Configuration
Security
Firmware
Help
I/O Configuration
TCP/IP 5018
CMR
Server: TCP196.135.145.31: 5018
Connected to remote 196.135.145.32:1024
Client
Output only/Allow multiple connections
UDP Mode
Authenticate, set password:
Input/Output
Output:CMR
CMR
CMR
Delay: 0 msec
OK
Delete

APPENDIX B : BX960 : ROVER SETUP




Trimble
BD960
SN: 5004K15951
Receiver Status
Home
Identity
Receiver Options
Activity
Position
Position (Graph)
Vector
Google Earth
Satellites
Receiver Configuration
I/O Configuration
OmniSTAR
Network Configuration
Security
Firmware
Help
Receiver Status - Options
Option | Installed | Option | Installed | Option | Installed
L2 Tracking | X | L2C | X | L5 Tracking | X
GLONASS | X | Everest | X | 24 Channels | X
Maximum Observable Rate | 20Hz | Moving Base | X | VRS | X
OmniSTAR-HP | X | CMR Input | X | No Static CMR Input |
CMR Output | X | No Static CMR Output | | Force Float |
Force Float Position With Static CMR | | CMRx Input | | CMRx Output |
RTCM Input | X | RTCM Output | X | RTCM DGNSS Input |
RTCM DGNSS Output | | Heading Mode Only | | RTK Baseline Length Limit | No Limit
NMEA | X | Data Collector | | Data Collector Lite |
Binary Outputs | X | Data Logging | | Event Markers | X
Transmit | | Advanced RTCM Output | | Enable 1PPS | X
Firmware Warranty Date: 2011-08-01
Option Code:
Install Option


Trimble
BD960
SN: 5004K15951
Receiver Status
Home
Identity
Receiver Options
Activity
Position
Position (Graph)
Vector
Google Earth
Satellites
Receiver Configuration
I/O Configuration
OmniSTAR
Network Configuration
Security
Firmware
Help
Receiver Status - Activity
Satellites Tracked:11
GPS (6): 2, 5, 15, 26, 27, 29
GLONASS (5): 1, 2, 17, 23, 24
Input/Output:
Output : TCP/IP (5017) - GSOF (?Hz)
Input : TCP/IP (5020) - CMR
Temperature: 28.79°C
Runtime: 01:01:09
2010-07-09T13:53:12Z (UTC)


Trimble
BD960
SN: 5004K15951
Receiver Status - Position
Receiver Status
Home
Identity
Receiver Options
Activity
Position
Position (Graph)
Vector
Google Earth
Satellites
Receiver Configuration
I/O Configuration
OmniSTAR
Network Configuration
Security
Firmware
Help
Position:
Lat: 26° 5' 17.08886" S
Lon: 28° 0' 21.20439" E
Hgt: 1602.976 [m]
Type: RTK Fixed
Datum: WGS-84
Position Solution Detail:
Position Dimension: 3D
Position Type: Phase Diff
Motion Info: Roving
Augmentation: GPS+GLN
RTK Solution: Normal
RTK Init: Fixed
RTK Mode: Low Latency
RTK Network Mode: Single Base Line
Age of Corrections: 0.4 [Sec.]
Height Mode: Normal
Satellites Used:10
GPS(5): 5, 15, 26, 27, 29
GLONASS(5): 1, 2, 17, 23, 24
Satellites Tracked:11
GPS (6): 2, 5, 15, 26, 27, 29
GLONASS (5): 1, 2, 17, 23, 24
Receiver Clock:
GPS Week: 1591
GPS Seconds: 482036
Offset: 0.28917 [msec]
Drift: -0.27630 [ppm]
Multi-System Clock Offsets:
Master Clock System: GPS
GLONASS Offset: 96.0 [ns]
GLONASS Drift: -0.026 [ns/s]
Velocity:
East: -0.01 [m/s]
North: 0.01 [m/s]
Up: 0.03 [m/s]
1-Sigma Estimates:
East: 0.007 [m]
North: 0.006 [m]
Up: 0.013 [m]
Semi Major Axis: 0.007 [m]
Semi Minor Axis: 0.006 [m]
Orientation: 57.272°
Dilutions of Precision:
PDOP : 1.9
HDOP : 1.1
VDOP : 1.5
TDOP : 1.0
2010-07-09T13:53:41Z (UTC)
Trimble
BD960
SN: 5004K15951
Receiver Configuration
Receiver Status
Satellites
Receiver Configuration
Summary
Antenna
Reference Station
Tracking
Position
General
Application Files
Reset
Default Language
I/O Configuration
OmniSTAR
Network Configuration
Security
Firmware
Help
Elevation Mask: 10°
PDOP Mask: 7
Clock Steering: Disabled
Everest™ Multipath Mitigation: Enabled
Antenna ID: 85
Antenna Type: Zephyr
Antenna Measurement Method: Antenna Phase Center
Antenna Height: 0.000 [m]
1PPS On/Off: Disabled
Event 1 On/Off: Disabled
Event 1 Slope: Positive
RTK Mode: Low Latency
Motion: Kinematic
CMR Input Filter: Disabled
Reference Latitude: 26°05'17.17956"S
Reference Longitude: 28°00'19.81359"E
Reference Height: 1590.609 [m]
RTCM 2.x ID: 2
RTCM 3.x ID: 3
CMR ID: 1
Station Name: CREF0001
Ethernet IP: 196.135.145.32
System Name: Trimble
DNS Resolved Name: NONE
Serial Number: 5004K15951
Firmware Version: 4.14
Firmware Date: 2010-02-08

Trimble BD960
SN: 5004K15951

Receiver Status
Satellites
Receiver Configuration
- Summary
- Antenna
- Reference Station
- Tracking
- Position
- General
- Application Files
- Reset
- Default Language

I/O Configuration
OmniSTAR
Network Configuration
Security
Firmware
Help

Antenna Configuration

Antenna Type: Zephyr
Antenna Serial Number:
Antenna Measurement Method: Antenna Phase Center
Antenna Height [m]: 0.000

OK Cancel

Trimble BD960
SN: 5004K15951

Receiver Status
Satellites
Receiver Configuration
- Summary
- Antenna
- Reference Station
- Tracking
- Position
- General
- Application Files
- Reset
- Default Language

I/O Configuration
OmniSTAR
Network Configuration
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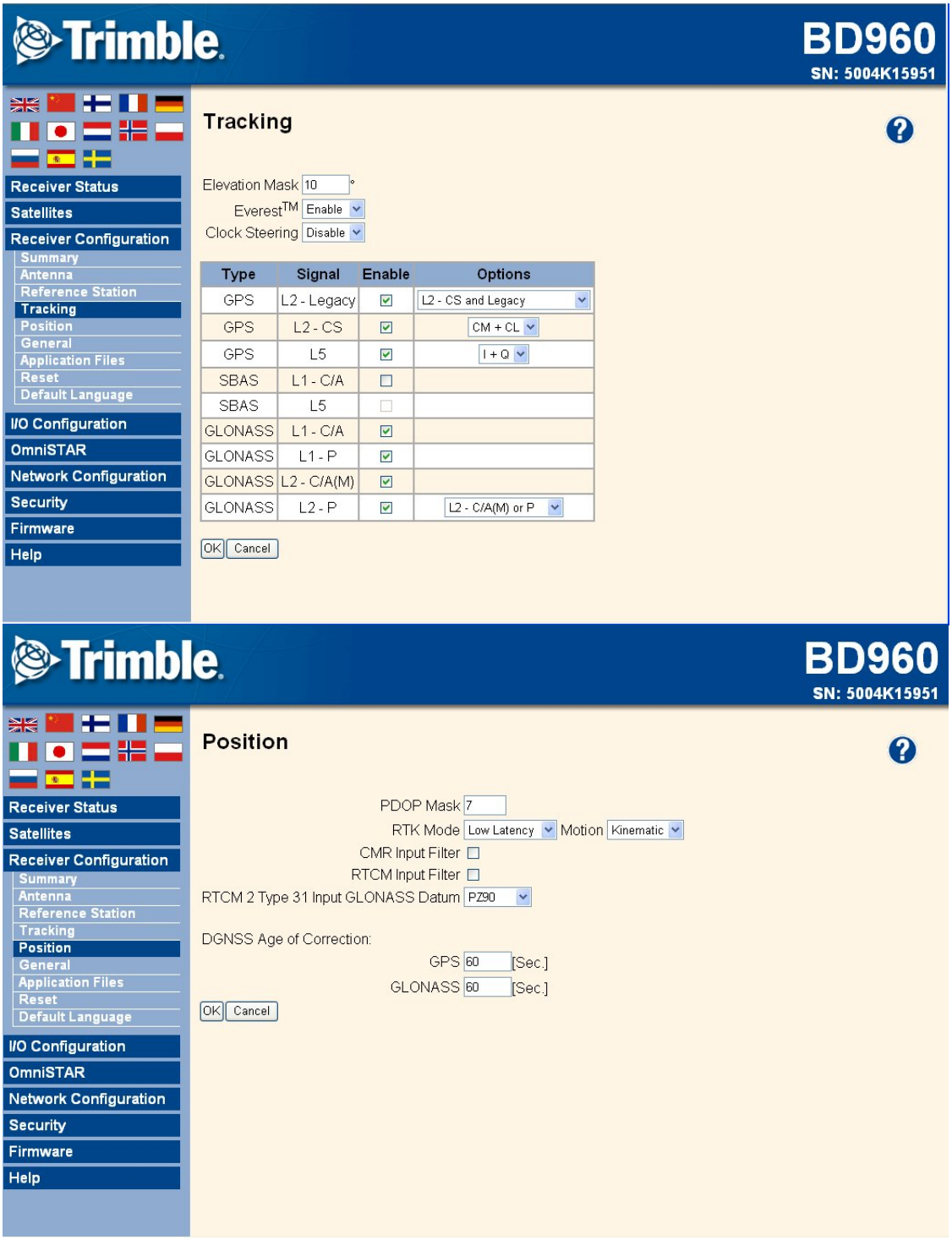
Help

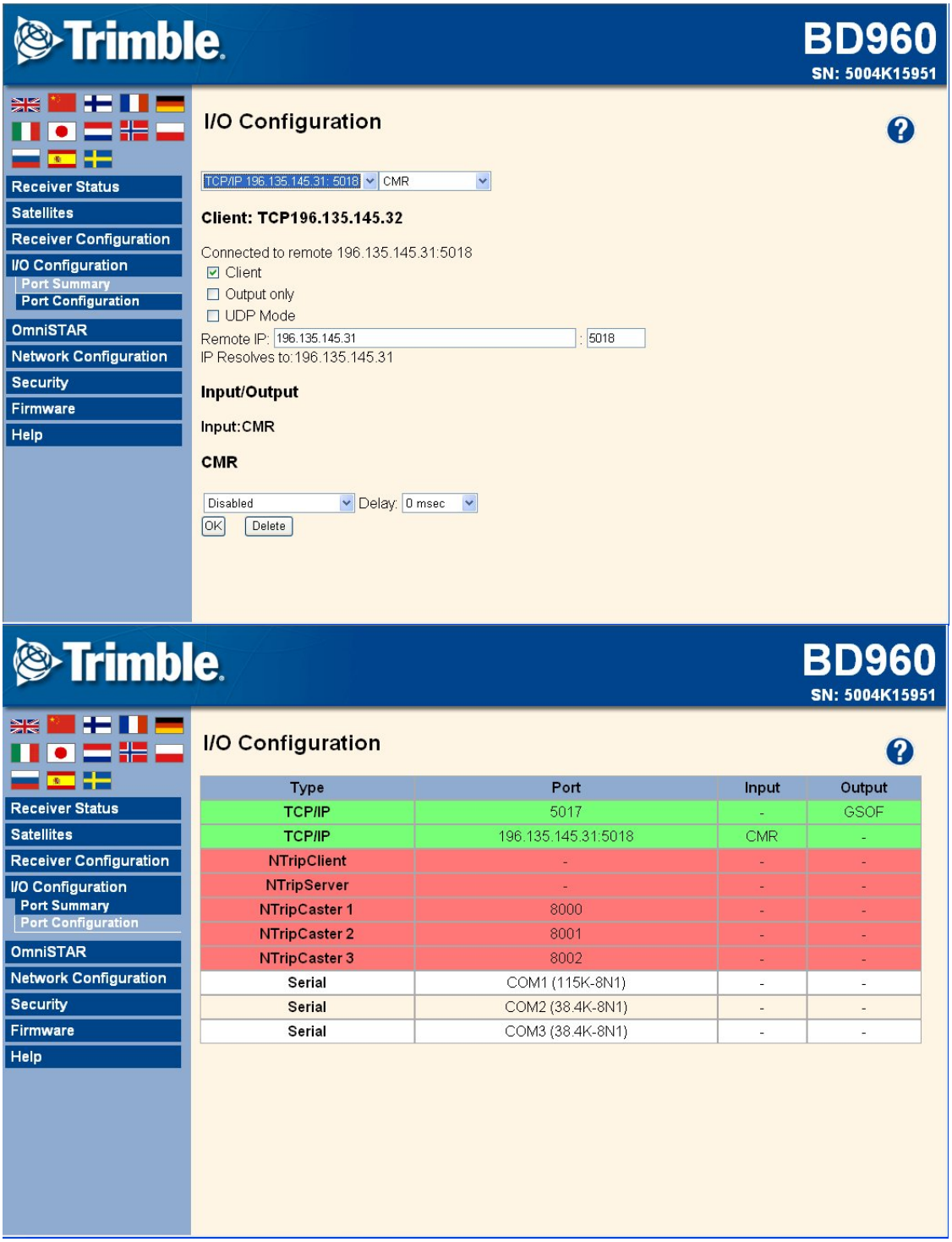
Reference Station

Reference Latitude: 26 ° 5 ' 17.17956 " ○N ◉S
Reference Longitude: 28 ° 0 ' 19.81359 " ◉E ○W
Reference Height: 1590.609 [m]
Here Load Current Position

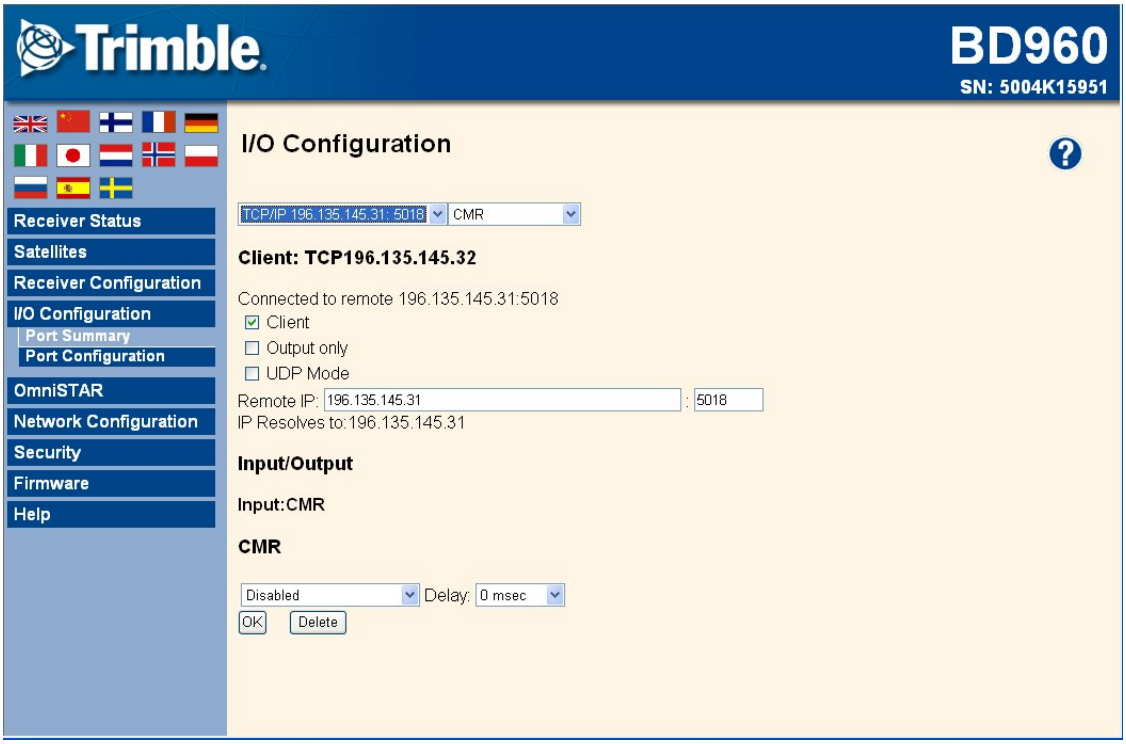
CMR ID: 1
RTCM 2.x ID: 2
RTCM 3.x ID: 3
Station Name: CREF0001
Station Code:

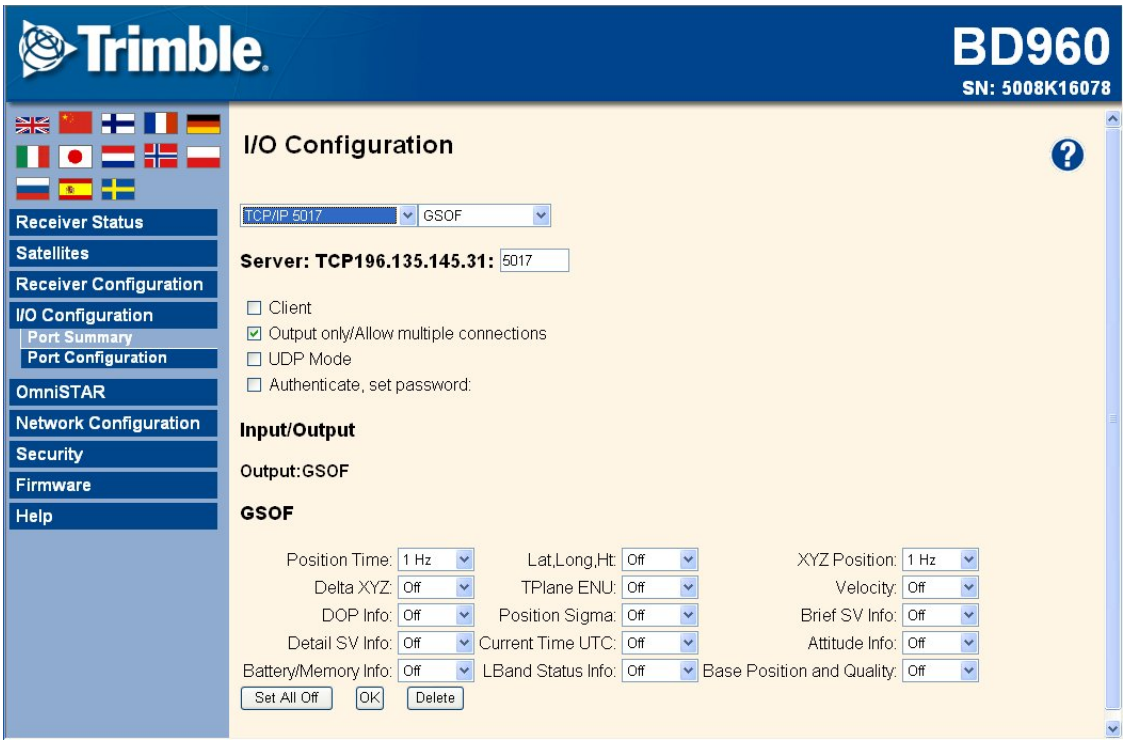
OK Cancel


Trimble
BD960
SN: 5004K15951
Receiver Status
Satellites
Receiver Configuration
Summary
Antenna
Reference Station
Tracking
Position
General
Application Files
Reset
Default Language
I/O Configuration
OmniSTAR
Network Configuration
Security
Firmware
Help
Tracking
Elevation Mask 10 °
Everest™ Enable
Clock Steering Disable
Type | Signal | Enable | Options
GPS | L2 - Legacy | L2 - CS and Legacy
GPS | L2 - CS | CM + CL
GPS | L5 | I + Q
SBAS | L1 - C/A
SBAS | L5
GLONASS | L1 - C/A
GLONASS | L1 - P
GLONASS | L2 - C/A(M)
GLONASS | L2 - P | L2 - C/A(M) or P
OK Cancel
Trimble
BD960
SN: 5004K15951
Receiver Status
Satellites
Receiver Configuration
Summary
Antenna
Reference Station
Tracking
Position
General
Application Files
Reset
Default Language
I/O Configuration
OmniSTAR
Network Configuration
Security
Firmware
Help
Position
PDOP Mask 7
RTK Mode Low Latency Motion Kinematic
CMR Input Filter
RTCM Input Filter
RTCM 2 Type 31 Input GLONASS Datum PZ90
DGNSS Age of Correction:
GPS 60 [Sec.]
GLONASS 60 [Sec.]
OK Cancel



Type	Port	Input	Output
TCP/IP	5017	-	GSOF
TCP/IP	196.135.145.31:5018	CMR	-
NTripClient	-	-	-
NTripServer	-	-	-
NTripCaster 1	8000	-	-
NTripCaster 2	8001	-	-
NTripCaster 3	8002	-	-
Serial	COM1 (115K-8N1)	-	-
Serial	COM2 (38.4K-8N1)	-	-
Serial	COM3 (38.4K-8N1)	-	-


Trimble
BD960
SN: 5004K15951
I/O Configuration
Receiver Status
Satellites
Receiver Configuration
I/O Configuration
Port Summary
Port Configuration
OmniSTAR
Network Configuration
Security
Firmware
Help
TCP/IP 196.135.145.31: 5018
CMR
Client: TCP196.135.145.32
Connected to remote 196.135.145.31:5018
Client
Output only
UDP Mode
Remote IP: 196.135.145.31 : 5018
IP Resolves to:196.135.145.31
Input/Output
Input:CMR
CMR
Disabled
Delay: 0 msec
OK
Delete


Trimble
BD960
SN: 5008K16078
I/O Configuration
Receiver Status
Satellites
Receiver Configuration
I/O Configuration
Port Summary
Port Configuration
OmniSTAR
Network Configuration
Security
Firmware
Help
TCP/IP 5017
GSOF
Server: TCP196.135.145.31: 5017
Client
Output only/Allow multiple connections
UDP Mode
Authenticate, set password:
Input/Output
Output:GSOF
GSOF
Position Time: 1 Hz
Lat,Long,Ht: Off
XYZ Position: 1 Hz
Delta XYZ: Off
TPlane ENU: Off
Velocity: Off
DOP Info: Off
Position Sigma: Off
Brief SV Info: Off
Detail SV Info: Off
Current Time UTC: Off
Attitude Info: Off
Battery/Memory Info: Off
LBand Status Info: Off
Base Position and Quality: Off
Set All Off
OK
Delete

HIPROM
TECHNOLOGIES

HIPROM TECHNOLOGIES
TEL: +27 11 787 4458
FAX: +27 11 787 7937

POSTAL
P.O. Box 732
Pinegowrie
South Africa
2123

PHYSICAL
369 Pretoria ave
Ferndale, Randburg
South Africa