User Guide

Enhanced Network Time Appliance

Model ENTA-2

P/N 023000004

Revision D

August 2011

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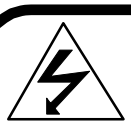
Revision History

REVISION	DATE	COMMENTS
1	JUN 2009	Initial Release
2	JUL 2009	Updated Screen Shots/ Text
A	JUL 2009	QA updates
B	AUG 2009	Updated IRIG-B input and 10MHz output connector numbers in table 1
C	AUG 2009	Added UL requirements, Updated Telnet information and FPGA install
D	AUG 2011	Changed Title Page/ Updated FPGA Upload

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

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.

WARNING:

Rack Mount Instructions -

The following instructions shall be followed with the installation of the unit:

Elevated Operating Ambient –

If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.

Reduced Air Flow –

Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

Mechanical Loading –

Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

Circuit Overloading –

Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on over-current protection and supply wiring.

Reliable Earthing –

Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the J1 Connector

WARNING:

J1 output is not a Limited Power Source (LPS). All devices connected to this connector must be listed by a National Recognized Testing Laboratory (NRTL) and be provided with a suitable fire enclosure.

brandywine communications

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1 Specifications

1.1 GPS Receiver

1.1.1 Receiver Type

Architecture	12 parallel channels

- Dynamics

Velocity	1000 knots everywhere > 1000 knots at altitudes < 60000 ft.
Acceleration	4 g
Jerk	5 m/s^3

- Acquisition Time

Hot (with the current almanac, position, time, and ephemeris)	< 20 s typical
Warm (with the current almanac, position, and time)	< 50 s typical
Cold	< 300 s typical

- Positioning Accuracy

Fix mode	< 25 m SEP
Site Survey mode	< 5 m SEP typical after position average

- Datum

WGS-84

1.2 Internal Oscillator

1.2.1 Oscillator Type

GPS disciplined High Precision OCXO	
Aging	< $5x10^{-10}$ per month when free running
Temperature coefficient	± $2x10^{-9}$;-20°C to +50°C
Design lifetime	> 20 years

1.3 Inputs

1.3.1 Antenna

Type	Active patch antenna
Connector	BNC
Pre-amp power	5 VDC @ 80 mA via center conductor

1.3.2 1 PPS

Signal used	1 PPS
Connector	BNC
Level	2.0 V min & 5.0 V max (TTL compatible)
Impedance	50Ω
Minimum pulse width	5 microseconds
On time	Rising edge

1.3.3 IRIG-B

Signal used	IRIG B122 and B123 per IRIG 215.98 2 – 5 Vpp
Connector	BNC

1.4 Outputs

1.4.1 Reference Frequency Output

Frequency	10 MHz
Connector	BNC
Output level	TTL INTO 50Ω

1.4.2 Time Code - IRIG B + IRIG E

Code format IEEE 1344 Ext.	IRIG B modulated DC Level Shift IRIG E DC Level Shift
Modulation ratio	3:1 nominal
Amplitude	3 Vpp into 600 ohm (modulated) TTL into 50 ohm (DC Level Shift) DC offset voltage < 0.05 V
Connector	BNC

1.4.3 Serial Time Code RS 232/ RS 422 (Not Used)

1.4.4 Pulse Rates

- 1 PPS

Amplitude	0-5 V logic compatible V_{OH} > 2.4 V & V_{OL} < 0.55 V Output impedance 50 ohm
Connector	BNC
Pulse width	10 microseconds
On time	Rising edge
Phase relationship to 10 MHz	When synchronized there are always 10^7 10 MHz cycles between each 1 PPS rising edge

1.5 Network Ports

Number of ports	2
Port type	Ethernet 10/100BaseT
Protocols supported	NTP (RFC 1305), Telnet (RFC 854)
Connector	RJ-45

1.6 Status Indicators

- LEDS

Power (Green)	Indicates power is available
Fault (Red)	Indicates monitored parameter is out of range

1.7 Time Display

Minutes/Hours/Seconds – UTC or Local time

1.8 Environmental

- Temperature

Unit	Operating -20°C to +50°C
Antenna	Operating -40 to +85°C
All units	Storage -55 to +85°C

- Humidity

Unit	Up to 95% RH non-condensing
Antenna	Not limited

- Altitude

Unit	Operating 20, 000 ft Transport 40, 000 ft

- Power

Range	85-264 VAC 50/60 Hz
Power	40W Nom.

Connector	IEC 320 with integrated switch and fuse
Fuse	1A 5x20mm slo-blo

- EMC

FCC port 15
EN55022
EN55024

1.9 Mechanical

Size (unit)	17” x 1.72” x 9” excluding the connectors and handles. Front panel width 19”.
Weight	5 lbs. nominal

1.10 Rear Panel Connections

CONNECTOR REFERENCE	CONNECTOR TYPE	CONNECTOR PIN	SIGNAL
J1 TIMER 1 - 12	REMOVABLE TERMINAL BLOCK		NOT USED
ANTENNA, J3	BNC	CENTER CENTER SHIELD	GPS SIGNAL INPUT +5 V LNA SUPPLY GROUND
CONSOLE PORT, J4	DB-9 FEMALE	1 2 3 4 5 6 7 8 9	- TRANSMIT DATA RECEIVE DATA - GROUND - - - -
FUNCTION SWITCH	SWITCH		ADJUSTS DISPLAY
TIME CODE/STATUS QUAD SERIAL PORTS	DB-9 MALE		
PORT 1, RS422, J5	DB-9 MALE		NOT USED
PORT 2, RS422, J6	DB-9 MALE		NOT USED
PORT 3, RS232, J7	DB-9 MALE		NOT USED
PORT 4, RS232, J8	DB-9 MALE		NOT USED
IRIG-B IN, J10	BNC	CENTER SHIELD	IRIG-B GROUND
10MHz OUT, J9	BNC	CENTER SHIELD	10 MHz GROUND
1 PPS IN, J11	BNC	CENTER SHIELD	1 PPS GROUND
1 PPS OUT, J12	BNC	CENTER SHIELD	1 PPS GROUND
1 IRIG E DC LEVEL SHIFT, J13	BNC	CENTER SHIELD	IRIG E TIME CODE GROUND
1 IRIG E OUT , J14	BNC	CENTER SHIELD	IRIG E TIME CODE GROUND
IRIG B DC LEVEL SHIFT, J15	BNC	CENTER SHIELD	IRIG B TIME CODE GROUND
1 IRIG B OUT, J16	BNC	CENTER SHIELD	IRIG B TIME CODE GROUND
ETHERNET, J2	RJ-45	1 2 3 4 5 6 7 8	TX+ TX- RX+ - - RX- - -
ETHERNET, J17	RJ-45	1 2 3 4 5 6 7 8	TX+ TX- RX+ - - RX- - -

Table 1 Connector Pinouts

2 General Description

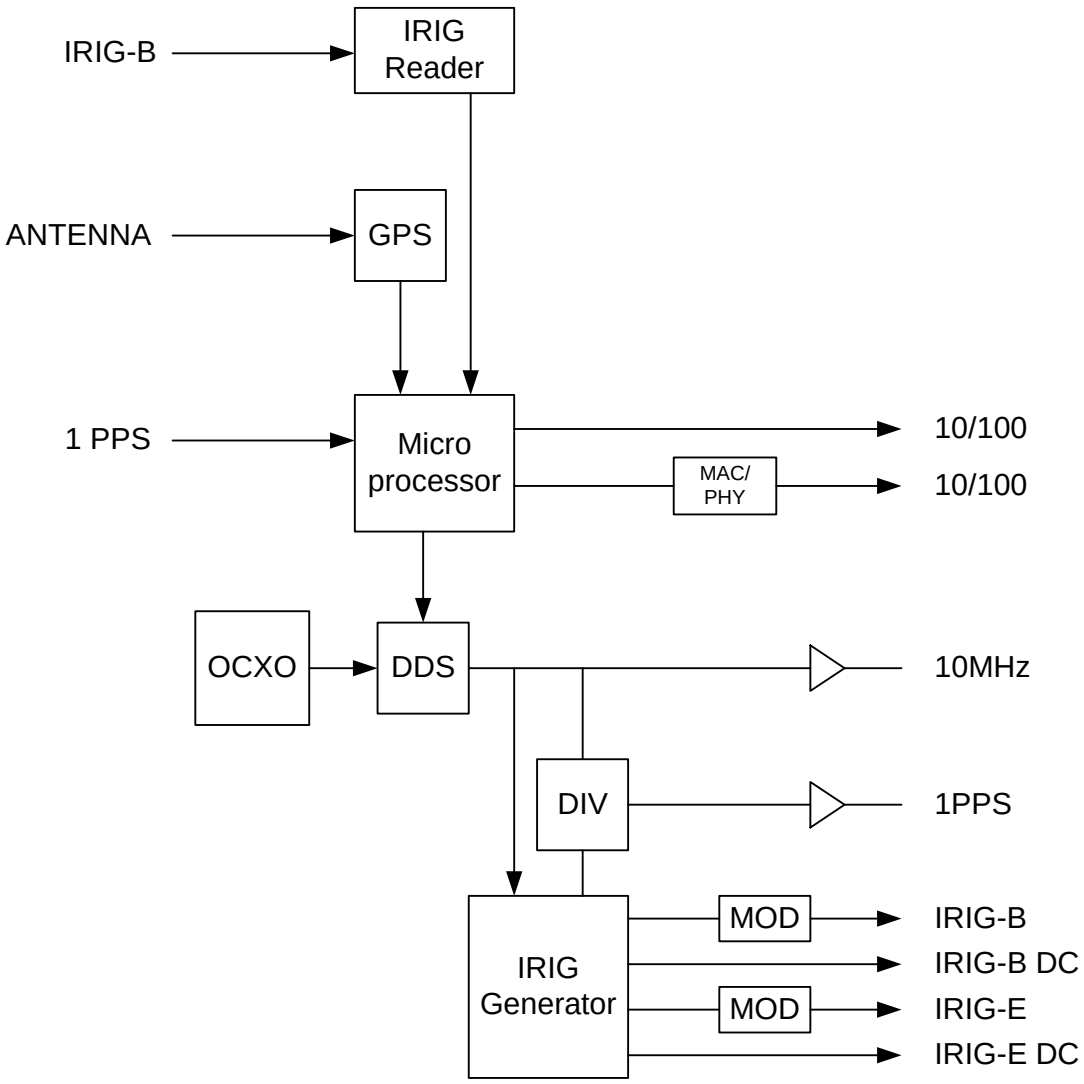


Figure 1 ENTA Simplified Block Diagram

3 Unpacking and Installation

3.1 Unpacking

Carefully remove the ENTA from the shipping carton. The following items are included in the shipment:

- 1 ENTA
- 1 power cord
- 1 GPS antenna
- 1 GPS antenna cable
- 1 user guide

3.2 Installation

Install the ENTA in its mounting rack location and secure with four rack mounting screws

3.3 Connections

3.3.1 Power

Insert the provided power cord into the rear of the power entry module and connect the power cord to an AC power outlet.

3.3.2 Antenna

Connect the GPS antenna to the Antenna connector (J3) on the rear panel of the ENTA. The GPS antenna must be placed in a suitable location with a clear view of the sky. In most cases, the GPS signals do NOT penetrate buildings. Use the provided antenna cable to connect the GPS antenna to the ENTA. If a longer cable is required, a low loss cable must be used so that the total signal attenuation at 1575 MHz is < 20 dB. Contact Brandywine Communications for more details on suitable cables.

- Location

Several factors must be considered when installing the GPS antenna. In most cases, the antenna is mounted externally (outdoor) and is exposed to the elements. A good quality coaxial cable of 50 ohm impedance is required to connect the GPS antenna to the ENTA. 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 ENTA and to conduct the DC bias voltage (5 VDC) provided by the ENTA to the LNA (low noise amplifier) contained inside of the GPS antenna. The antenna should be mounted securely, have a clear view of the sky, and have the top of the antenna pointing upward. For some installations, it may not be possible to mount the antenna such that the antenna has a clear (360 degree) view of the sky. For these cases, pick the location with the best view of the sky.

- Exposure to High RF Fields

Some antenna 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, it is better to place the antenna either above, below, or to the side of high power RF transmission antennas.

- Lightning Protection

The ENTA 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 designed to shunt the high voltage transient to a well established earth ground. Lightning arresting devices designed for use in GPS antenna systems are available at Brandywine Communications (P/N 001000914).

- Antenna Cable Factors

Other factors affecting the antenna mounting location deal with the cable length required to provide connection between the GPS antenna and ENTA.

- RF Loss

The most important cause 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 ENTA. It is recommended that the overall antenna system gain (antenna gain - cable loss) be between 10 to 33 dB. Thus, using an antenna with 30 dB of gain allows about 20 dB of cable loss.

The ENTA is shipped with 100' of high quality antenna cable, which has a loss of approximately 13 dB. Refer to Table 2 for additional cable configurations. For distances beyond 330' an in-line amplifier is required.

PART NUMBER	CABLE LENGTH	CABLE TYPE
002-0037	100 ft	RG 58 (supplied)
002-0039	330 ft	RG 8
002-0040	150 ft	RG 8
051000001	In-line amplifier 20 dB	TNC/TNC connectors

Table 2 Antenna Cables

3.3.3 Network Connection

Connect one end of the network cable to the RJ-45 10/100 BaseT Network port (J2/J17) and connect the other end of the network cable to your network. The ENTA configuration process is described in Section 4 and Section 5 .

3.3.4 Other Connections

Connect the output signals as required. For additional help connecting the output signals please refer to Section 1.10.

4 Getting Started

4.1 Powering Up the ENTA

Once all connections to the ENTA have been made, apply power to the unit by setting the On/Off switch to the on position. The On/Off switch is located on the rear panel power entry module.

The POWER LED on the front panel should be illuminated green within 2 seconds. The POWER LED indicates that the ENTA has power.

Once the GPS has acquired satellites, time should be displayed on the front panel in the format: HH:MM:SS.

4.2 Setting the Network Address

The ENTA is shipped with a label that indicates the IP address stored in the unit. The default settings are:

- IP Address: 192.168.1.240
- Subnet Mask: 255.255.255.0
- Gateway: 192.168.1.1

To set the network address, the user may use either IPSetup.exe or a web browser. The two processes are described below.

4.2.1 IPSetup.exe

To set up the network address using the IP Setup program, follow the steps given below. Please note that IPSetup uses a local broadcast on UDP port 20034.

1. Download the IP Setup program from the NetBurner website located at http://www.netburner.com/support/public_downloads.html .
2. Double click on the IPSetup.exe icon and Figure 2 will be displayed.

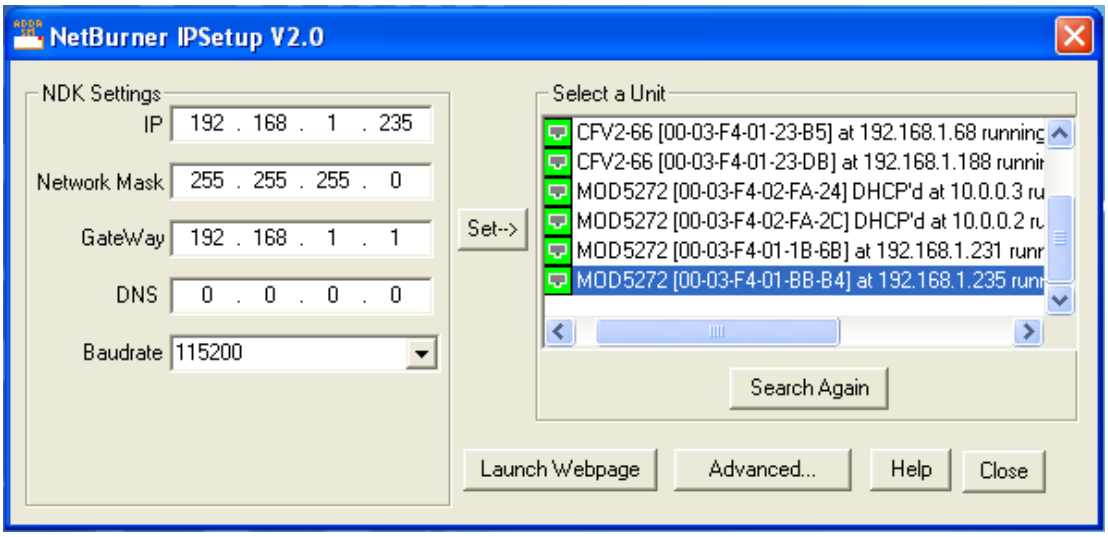


Figure 2 NetBurner IPSetup Screen

3. Verify that the "Select a Unit" displays the current MAC and IP address of the ENTA unit connected to the network.
4. Click on the ENTA unit that needs to be configured. Please note that the ENTA unit is identified by MOD5272.
5. Enter the NDK Settings (IP, Network Mask, GateWay, and DNS).
6. To transfer the NDK Settings to the selected ENTA unit, click the Set--> button.
7. Wait 15 seconds for the NDK Settings to be loaded into the ENTA unit and for the ENTA unit to restart.
8. Verify that the ENTA unit has the correct NDK Settings and is connected to the network by clicking the Search Again button.
9. To exit the IP Setup program, click the Close button.
10. Open a web browser, type the IP Address of the ENTA unit in the Address bar, and press <Enter>. For example, type 192.168.1.240 or http://192.168.1.240 and press <Enter>.
11. Figure 3 will be displayed.
12. Configure the ENTA unit. For more information on ENTA configuration, refer to the Configuration section of the user guide.

IMPORTANT INFORMATION:

If the new NDK Settings make the ENTA unit inaccessible from the setup computer, the IP Setup program won't be able to locate the ENTA unit on the network.

4.2.2 Web Browser

To set up the network address using the web browser, follow the steps given below.

1. Connect one end of an Ethernet cable to the ENTA Network Port.
2. Connect the other end of the Ethernet cable to your network.
3. Open a web browser, type the IP Address of the ENTA unit in the Address bar, and press <Enter>. For example, type 192.168.1.240 or http://192.168.1.240 and press <Enter>.
4. Figure 3 will be displayed.
5. Configure the ENTA unit. For more information on ENTA configuration, refer to the Configuration section of the user guide.

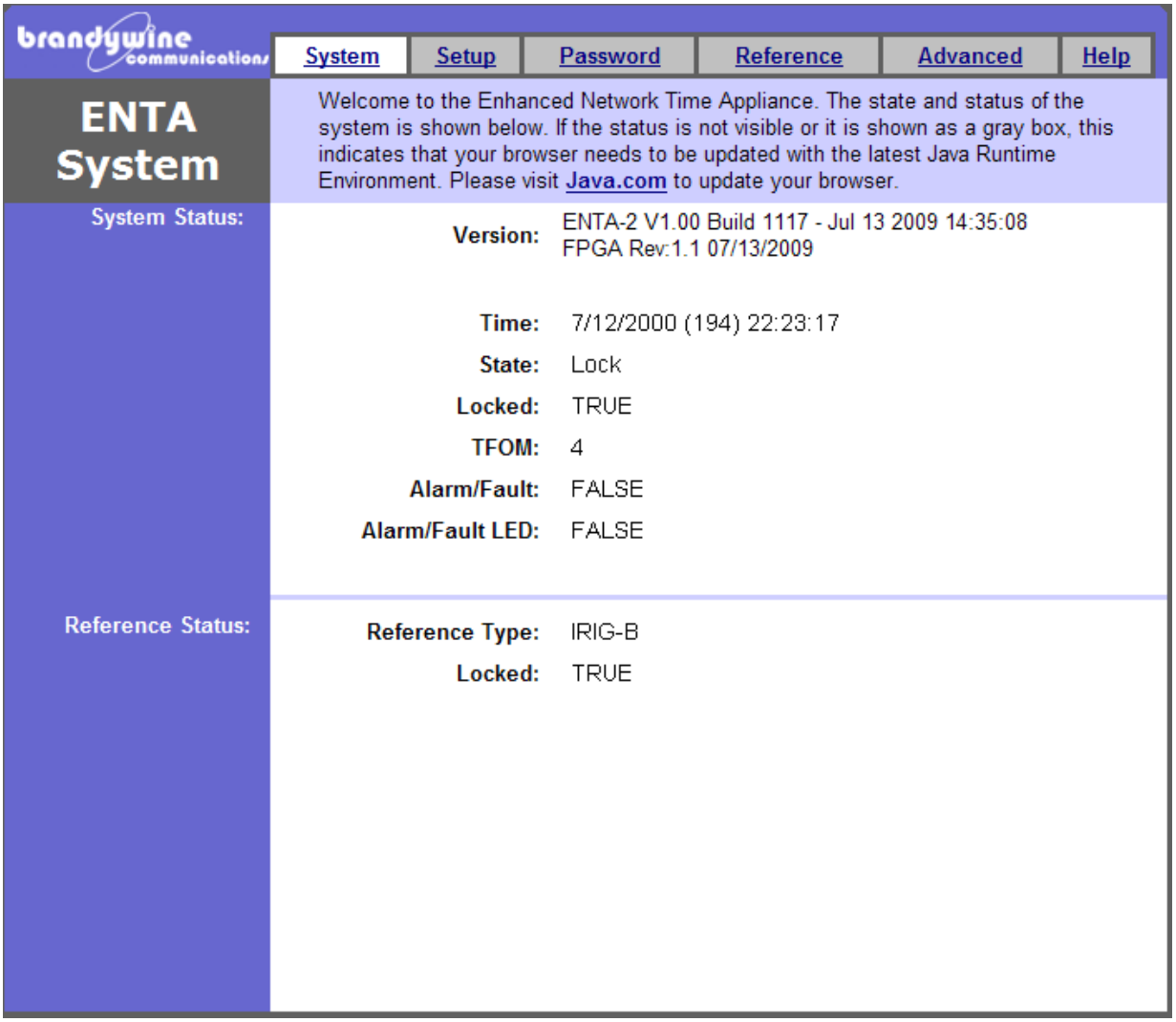


Figure 3 ENTA System Screen

4.3 Latest Version of Java Software

To properly control and monitor the ENTA via a web browser based interface, Java software must be installed on your computer. To obtain the Java software, follow the steps given below.

1. Go to http://www.sun.com/ .
2. Click on the Downloads link.
3. Click on the Java Download link.
4. Download Java.
5. Complete the installation process.

5 Configuration

The ENTA configuration may be completed in one of three ways.

- Via the web browser (recommended)
- Via a TELNET session
- Via the console port

5.1 Web Browser Configuration

5.1.1 System

The System tab consists of two sections, the System Status and Reference Status. This tab allows the user to view the state, status, and reference of the ENTA system.

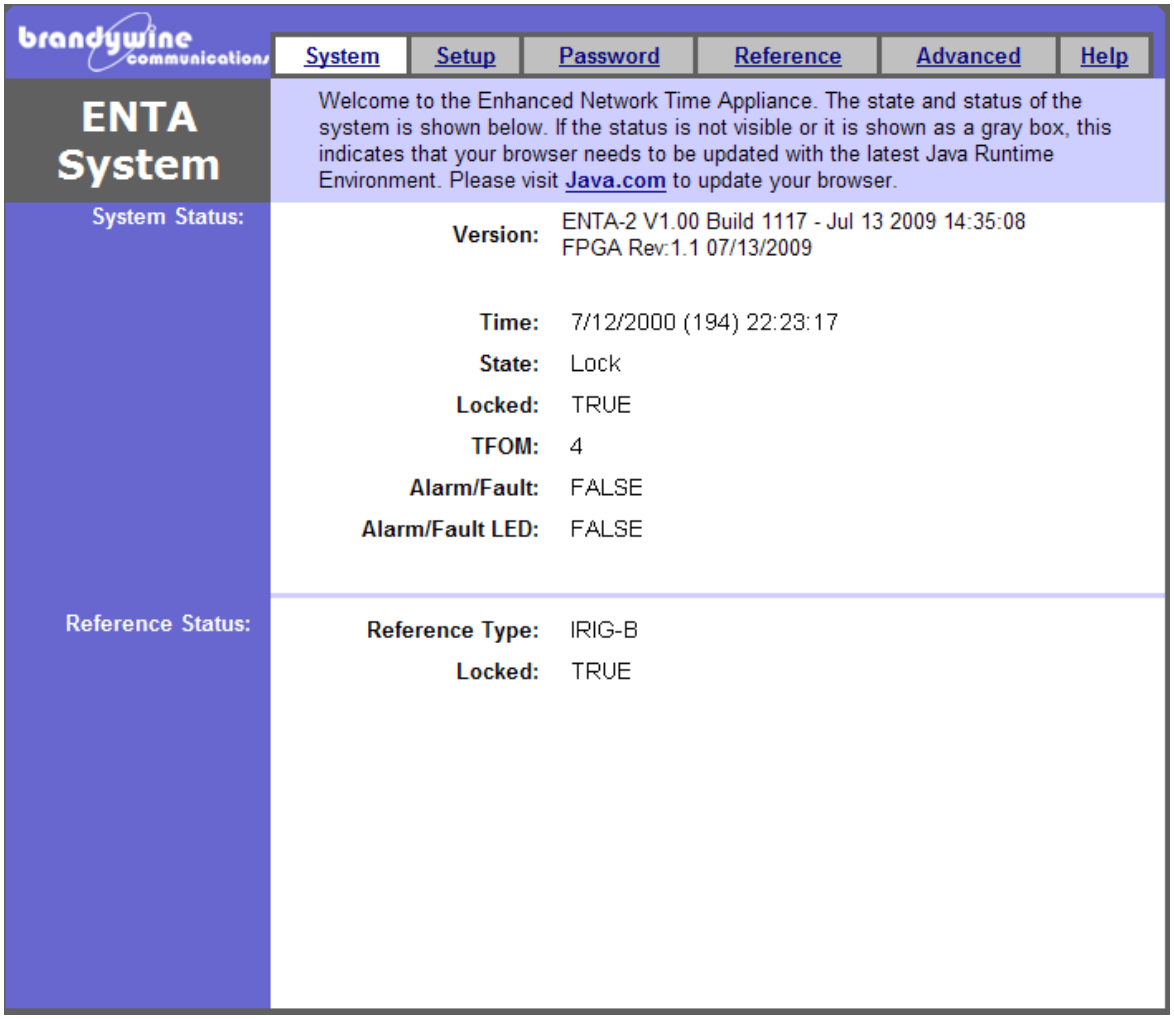


Figure 4 ENTA System Screen

5.1.1.1 System Status

The System Status section consists of seven fields, the Version, Time, State, Locked, TFOM, Alarm/Fault and Alarm/Fault LED. The Version refers to the version number of the ENTA. The Time refers to the current UTC time. The State refers to the state of the system. If the system has locked to the reference and the time is valid, Locked is 'TRUE'. Otherwise, Locked is 'FALSE'. If an alarm or fault exists in the system, Alarm/Fault is 'TRUE'. Otherwise, Alarm/Fault is 'FALSE'. If the system's fault is latched, Alarm/Fault LED is 'TRUE'. Otherwise, Alarm/Fault LED is 'FALSE'.
The three system states are described in Table 3.

STATE	DESCRIPTION
WARMUP	The power up warm-up period.
READY	The system is ready.
ACQUIRE	The system is acquiring its reference.
LOCKED	The system is locked to its reference.
HOLDOVER	The system is in holdover.

Table 3 System States

5.1.1.2 Reference Status

The Reference Status section consists of two fields, the Reference Type and Locked. The Reference Type refers to the reference the system is acquiring time from. If the reference is locked and provided to the disciplining engine, Locked is 'TRUE'. Otherwise, Locked is 'FALSE'.

5.1.2 Setup

The Setup tab consists of four sections, the System, Ethernet 1, Ethernet 2 and Front Panel Display. This tab allows the user to modify setup information for the ENTA. To save all modifications made to the Setup screen, click the Submit button. This saves all modifications to all changes made to all system parameters and settings. All values changed are written to non-volatile memory.

To undo all modifications made to the Setup screen, click the Reset button. This loads the system defaults.

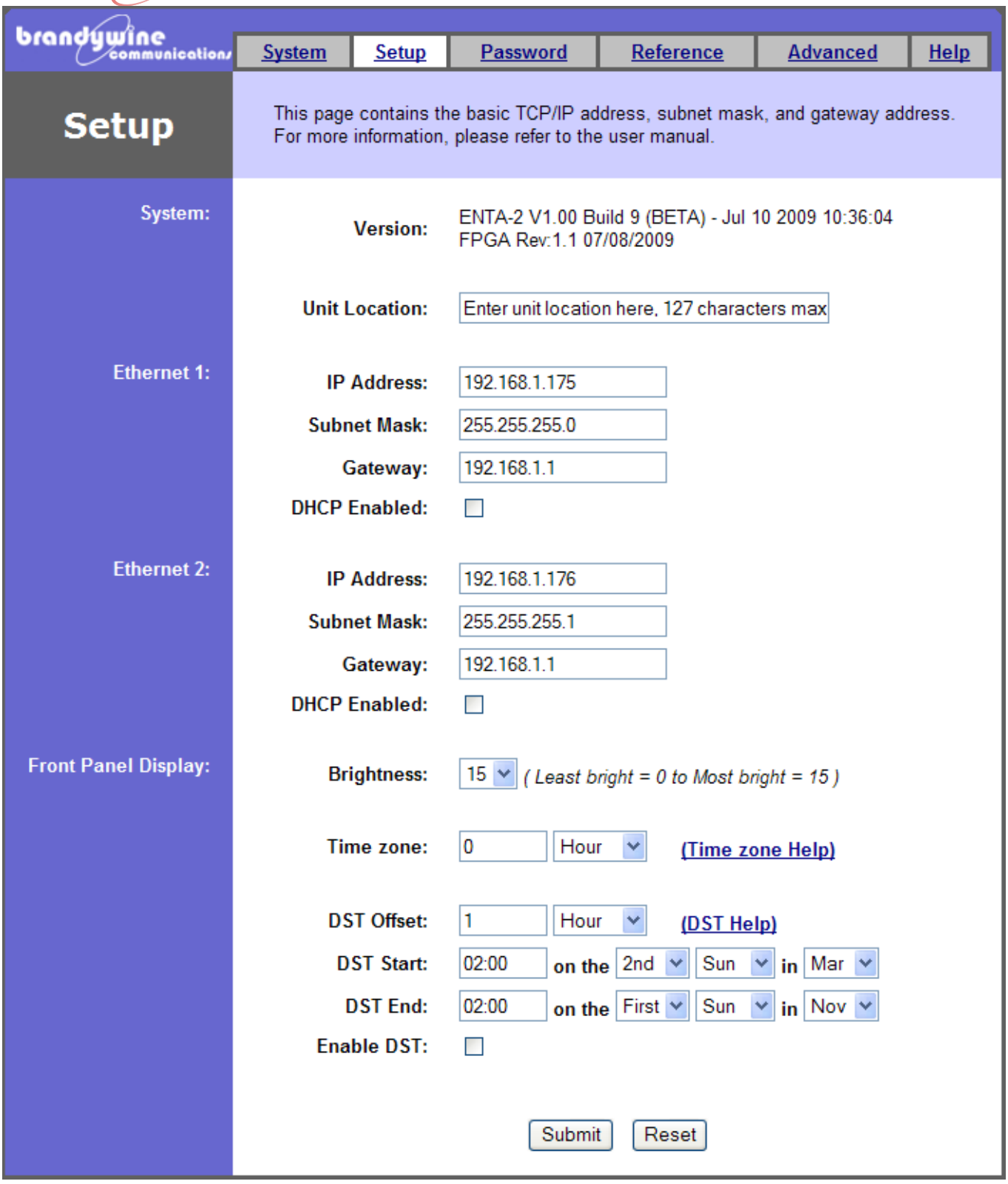


Figure 5 Setup Screen

5.1.2.1 System

The System section consists of two fields, the Version and Unit Location. The Version refers to the version number of the ENTA software. The Unit Location refers to the location of the unit on your network. A maximum of 127 characters may be entered in the Unit Location field. *Entering apostrophes (') in the Unit Location field is not recommended.*

5.1.2.2 Ethernet 1 and 2

Each of these sections consist of three fields, the IP Address, Subnet Mask, and Device Gateway, and the DHCP Enabled check box.

The Device IP Address is a 32-bit number that identifies the device on an IP network. The Device Subnet Mask is a 32-bit number that enables the user to define sub-networks. The Device Gateway is a 32-bit number used as the point of entrance from one network to another. The DHCP Enabled box needs to be checked if DHCP is to be enabled.

Please note that once the IP address is changed using the web browser, the user must enter the new IP address in the address bar of the web browser to continue monitoring the ENTA. If an IP address is entered that is not reachable from the computer running the web browser, it will not be possible to refresh the ENTA web browser based interface.

5.1.2.3 Front Panel Display

The Brightness box is available to adjust the brightness of the display. The least bright is equal to 0 and the most bright is equal to 15.

The Time Zone combo box allows the user to enter the Standard Time offset from the Universal Time. The Time Zone combo box allows the user to select either hour or minute. The Time Zone Table lists all time zones and their Standard Time offsets from the Universal Time.

Time Zone Table

TIME ZONE	STANDARD TIME OFFSET FROM UNIVERSAL TIME
Eniwetok (Marshall Islands)	-12
Samoa (Polynesian Islands)	-11
Hawaii	-10
Alaska	-9
Pacific Time	-8
Mountain Time	-7
Central Time	-6
Eastern Time	-5
Atlantic Time	-4
Brazilia (Brazil)	-3
Mid-Atlantic	-2
Azores (Azores Islands)	-1
Rome (Italy)	1
Israel	2

Moscow (Russia)	3
Baku (Azerbaijan)	4
New Delhi (India)	5
Dhakar (Jordan)	6
Bangkok (Thailand)	7
Hong Kong	8
Tokyo (Japan)	9
Sydney (Australia)	10
Magadan (Russia)	11
Wellington (New Zealand)	12

5.1.2.3.1 Daylight Savings Time

The Daylight Savings Time consists of three fields and a check box, the Daylight Savings Time Offset (DSTO), Daylight Savings Time Start, and Daylight Savings Time End. The DSTO is a number that is added to or subtracted from the time zone setting. The DSTO entered by the user may be either in hours or minutes.

The Daylight Savings Time Start allows the user to add the DSTO to the time the daylight saving should start. The user must enter the daylight saving start time, the occurrence of the specific day, the day of the week, and the month that the daylight saving should start. For example, Pacific Standard Time adds an hour at 02:00 on the second Sunday of March.

The Daylight Savings Time End allows the user to subtract the DSTO from the time the daylight saving should stop. The user must enter the daylight saving stop time, the occurrence of the specific day, the day of the week, and the month that the daylight saving should stop. For example, Pacific Standard Time subtracts an hour at 02:00 on the first Sunday of November.

Please note that the daylight saving start time and daylight saving stop time must be in 24 hour format. For example, if daylight saving start time and daylight saving stop time are at 1:00 pm, the user must enter 13:00.

The Enable DST check box must be checked to enable Daylight Savings Time adjustments.

5.1.3 Password

The Password tab allows the user to change the user name and password for the system. To save all modifications made to the Password screen, click the Submit button. To undo all modifications made to the Password screen, click the Reset button.

IMPORTANT INFORMATION:
The default user name and password for the system are both BRANDYWINE. The user must always enter a user name and password when submitting changes to the system.

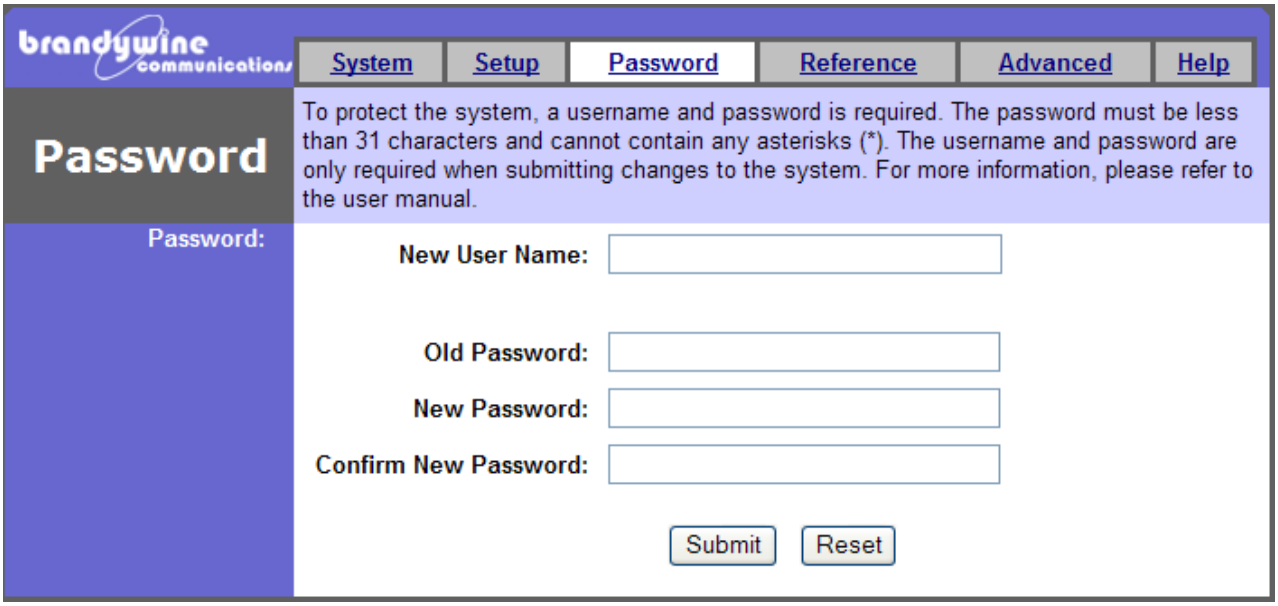


Figure 6 Password Screen

5.1.3.1 Password

The Password consists of four fields, the New User Name, Old Password, New Password, and Confirm New Password. The new password must be less than 31 characters and cannot contain any asterisks. Moreover, the user name and password are case sensitive.

5.1.4 Reference

The Reference tab consists of two sections, the Reference and Reference Settings. This tab allows the user to select the reference, view the reference status, and modify the reference settings for the system. To save all modifications made to the Reference screen, click the Submit button.

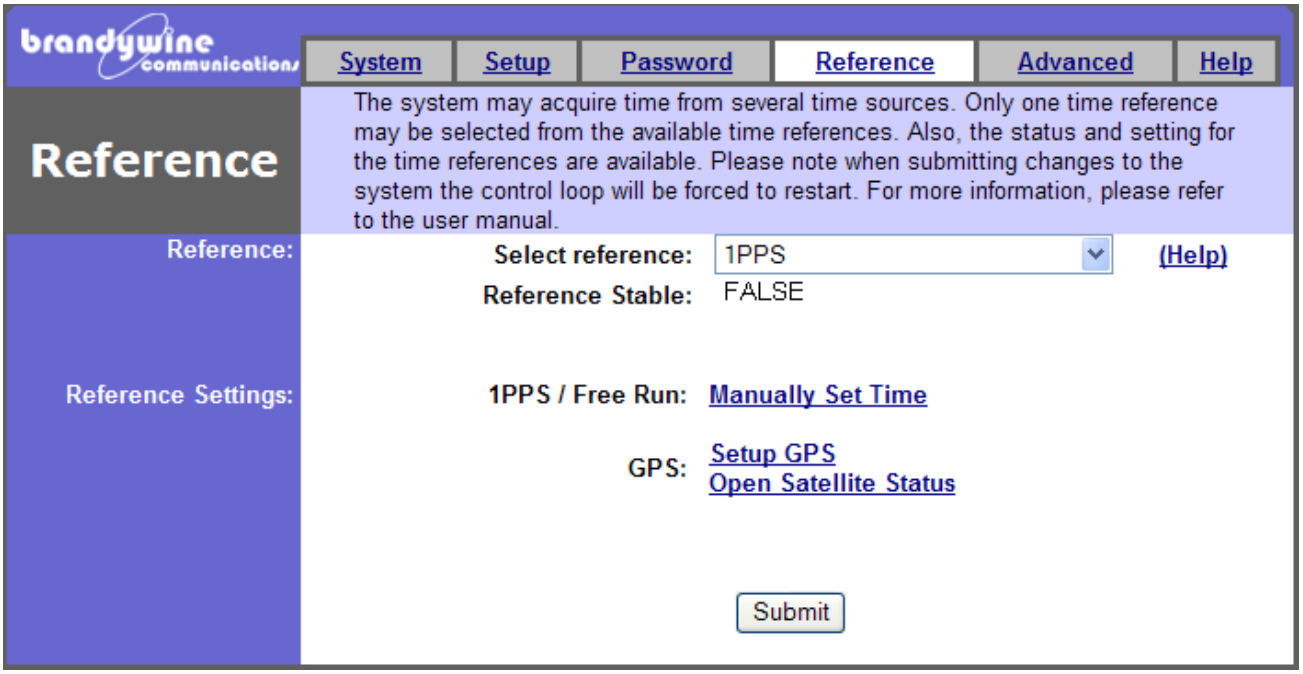


Figure 7 Reference Screen

5.1.4.1 Reference

The Reference consists of two fields, the Select Reference and Reference Stable. The Select Reference allows the user to select one of four references to acquire time from. The four references used by the system are Free Run (No External Reference), GPS, IRIG-B, and 1PPS . Table 4 describes each supported time reference. Please note that when submitting changes to the system, the control loop will be forced to restart.

REFERENCE	DESCRIPTION
Free Run (No External Reference)	There are no external references being used.
GPS	Uses an installed GPS receiver to synchronize the internal clocks.
IRIG-B	Unit synchronizes to external IRIG-B input (J9).
1 PPS	Unit synchronizes to external 1PPS input (J11). The time of day must be set manually by the user.

Table 4 Time References

If the system has acquired time from the reference, Reference Stable is 'TRUE'. Otherwise, Reference Stable is 'FALSE'.

Please note that the ENTA unit does not guarantee 1 PPS or time coherency during a reference switch. When the reference is switched, the system will resynchronize to the 1 PPS and reset the time to the reference. Thus, it will take approximately one to two seconds before the time is coherent.

5.1.4.2 Reference Settings

The Reference Settings consist of two fields, the 1PPS/Free Run and GPS. A Manually Set Time link is available for the 1PPS/ Free Run reference setting. A Setup GPS link is available for the GPS reference setting as well as the Open Satellite Status. The following sections describe the links.

5.1.4.2.1 Manually Set Time

Figure 8 is displayed when the user clicks on the Manually Set Time link. The Manually Set Time consists of four fields, the Year, Month, Day, and Time (Hours:Minutes:Seconds). This link allows the user to set the date and time. Please note that setting the time is only valid when in Free Run reference mode.

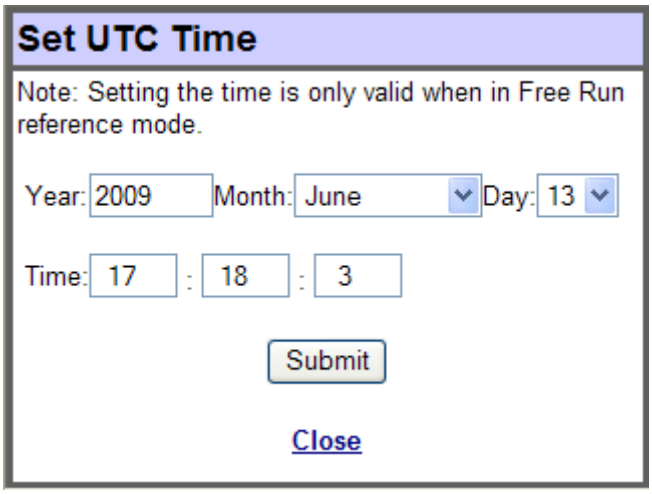


Figure 8 Set UTC Time Window

5.1.4.2.2 Setup GPS

Figure 9 is displayed when the user clicks on the Setup GPS link. The GPS Settings screen consists of two sections, the Settings and Version. This screen allows the user to select a position mode, set a position, cold start, and view the version number of the GPS receiver. To save all modifications made to the GPS Settings screen, click the Submit button.

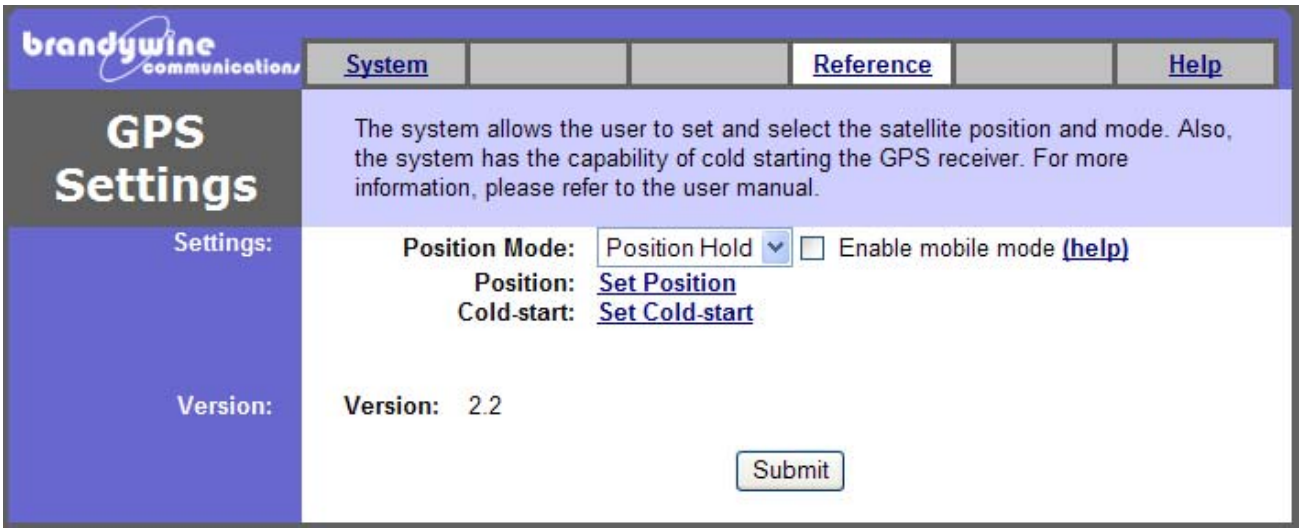


Figure 9 GPS Settings Screen

5.1.4.2.2.1 Settings

The Settings consist of three fields, the Position Mode, Position, and Cold Start. A Set Position link is available for the Position setting. A Cold Start link is available for the Cold Start setting. The following two sections describe the two links.

5.1.4.2.2.1.1 Position Mode

The GPS receiver operates in one of three position modes. Table 5 describes the three position modes supported by the system.

POSITION	DESCRIPTION
Position Fix	The GPS receiver navigates and continues to calculate new positions from a minimum of 4 satellites.
Position Hold	The GPS receiver does not navigate and is programmed to a known position therefore the receiver stops calculating new positions. Instead, the receiver will only derive time. Also only 1 satellite needs to be in view.
Site Survey	The GPS receiver navigates while it averages a specified number of sample positions. A minimum number of 4 satellites must be tracked during this time. Once the averaged value is determined, the receiver is set to the averaged value and enters position hold mode. Only 1 satellite must be tracked during this time.

Table 5 GPS Position Modes

Upon power up, the system checks whether the GPS receiver is in position hold mode or position fix mode,

If in position hold mode, the GPS receiver will be placed in navigation mode and a short position average is performed. If the averaged value is within the threshold (100 meters), the GPS receiver is placed in the original hold position. Otherwise, the GPS receiver will be placed in site survey mode.

If in position fix mode, the GPS receiver will be placed in site survey mode.

5.1.4.2.2.1.2 Position

Figure 10 is displayed when the user clicks on the Position link. The Position consists of seven fields, the Latitude, North, South, Longitude, West, East, and Altitude. This link allows the user to set the position of the GPS receiver. Please note that the input format is DD.DDDDDD. The latitude and longitude are in decimal degrees with decimal fractions (not minutes and seconds of arc). The North/ South radio button indicates whether the Latitude is North or South of the equator. The West/ East radio button indicates whether the Longitude is East or West of the Prime Meridian. The altitude is expressed as decimal meters with a decimal fraction.

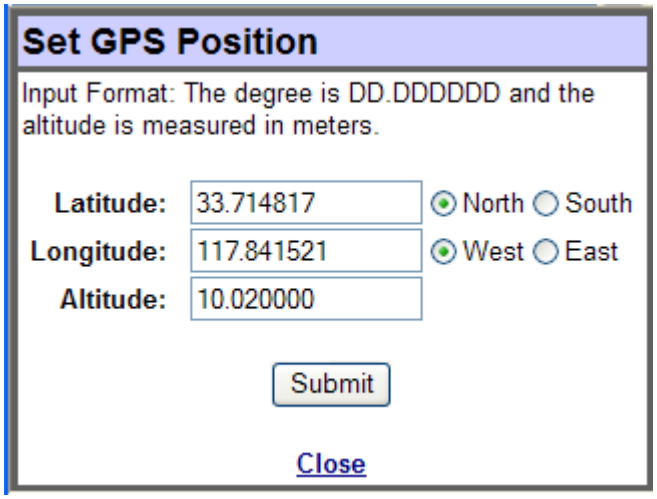


Figure 10 Set GPS Position Window

5.1.4.2.2.1.3 Cold Start

Figure 11 is displayed when the user clicks on the Cold Start link and enters a valid username and password. Cold start clears the almanac of the GPS receiver, forces the GPS receiver to search for satellites, and rebuilds its almanac.

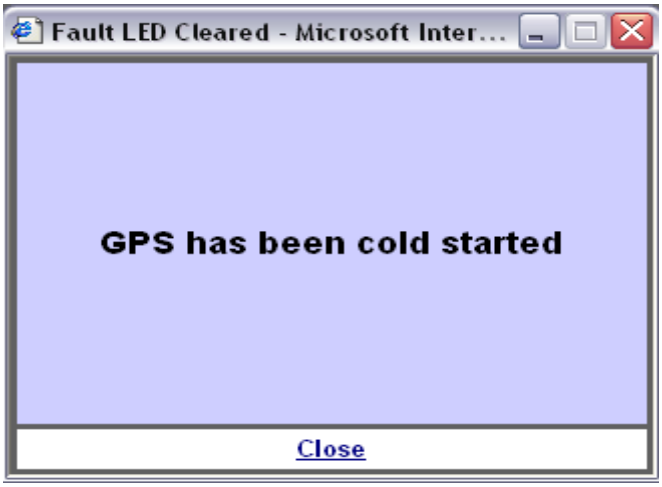


Figure 11 GPS Cold Start Window

5.1.4.2.2.2 Version

The Version consists of one field and refers to the version number of the GPS receiver.

5.1.4.2.3 Open Satellite Status

The system provides a comprehensive view of the GPS receiver. A typical GPS receiver screen is shown in Error! Reference source not found..

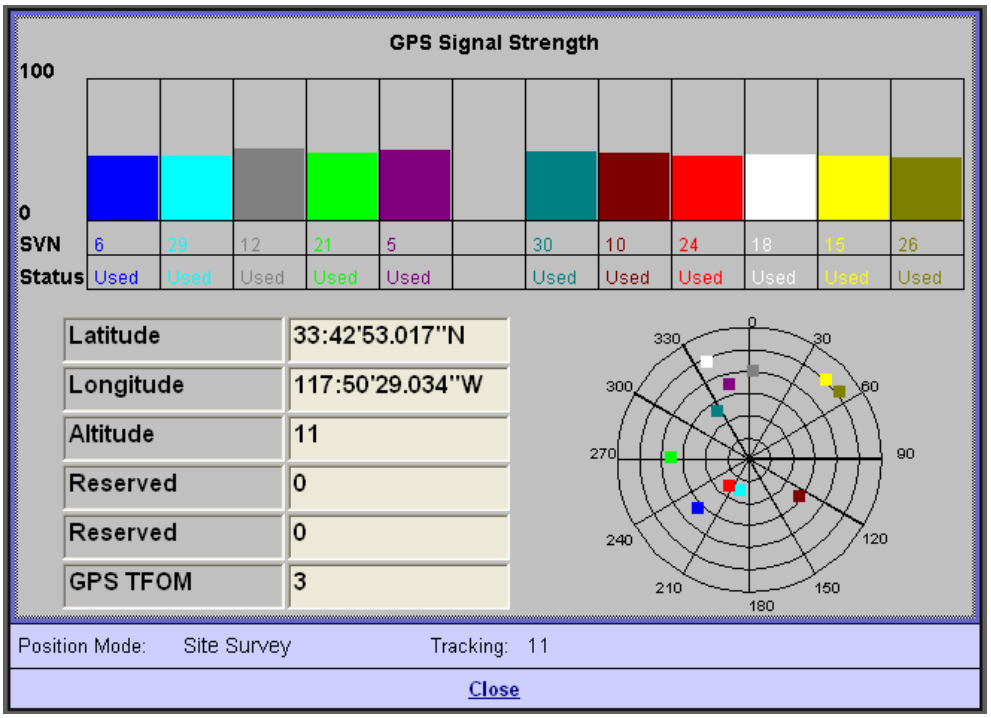


Figure 12 GPS Receiver Screen

The upper section of the screen displays different tracked satellites and their signal strengths. The typical GPS Signal Strength for a satellite that is overhead and has an unobstructed view is between 40 and 50. The SVN is the satellite C/A code PRN. The Status indicates whether the satellite is used or not.

The lower left section of the screen displays the current latitude, longitude, altitude, and GPS TFOM of the GPS receiver. The Position Mode refers to the position mode of the GPS receiver. The Tracking refers to the number of tracked satellites.

The lower right section of the screen displays the satellite locations in the sky. The satellites are color coded so that the user may associate a satellite with a SVN. The satellite locations are updated at a 1 per second rate.

5.1.5 Advanced

The Advanced tab consists of five sub-tabs, the 1PPS Output, Alarms, NTP Server, Plot, and SNMP. This tab allows the user to clear a fault, set the 1 PPS output delay, manage alarms, set the leap indicator, view cached and real-time time differences, and configure SNMP.

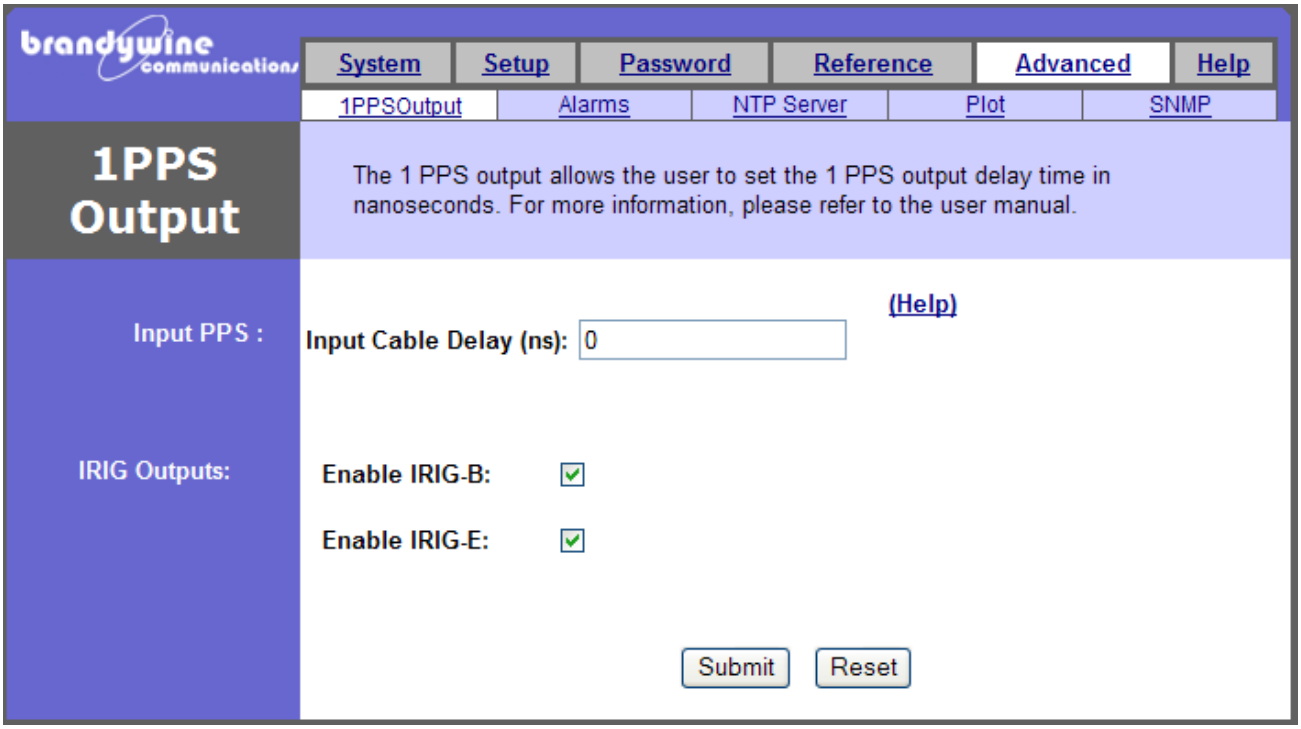


Figure 13 Advanced Screen

5.1.5.1 1PPS Output

Figure 13 is displayed when the 1PPS Output sub-tab is selected. This sub-tab allows the user to set the 1 PPS output delay. To save all modifications made to the 1PPS Output screen, click the Submit button. To undo all modifications made to the 1PPS Output screen, click the Reset button.

The 1PPS Output consists of two fields, the Input PPS and the IRIG Outputs. The Input PPS allows the user to set the Input Cable Delay time in nanoseconds.

Please note that when the default Input PPS delay value is changed, the user may restore the default Input PPS delay value by using the OSCDEFAULT command from the Telnet or TCP 2500 socket interface. After restoring this value, manually recycle the power in the unit so that the change will take effect.

IRIG Outputs can be enabled or disabled by means of the checkboxes on this screen.

5.1.5.2 Alarms

Figure 14 is displayed when the Alarms sub-tab is selected. To save all modifications made to the Alarms screen, click the Submit button.

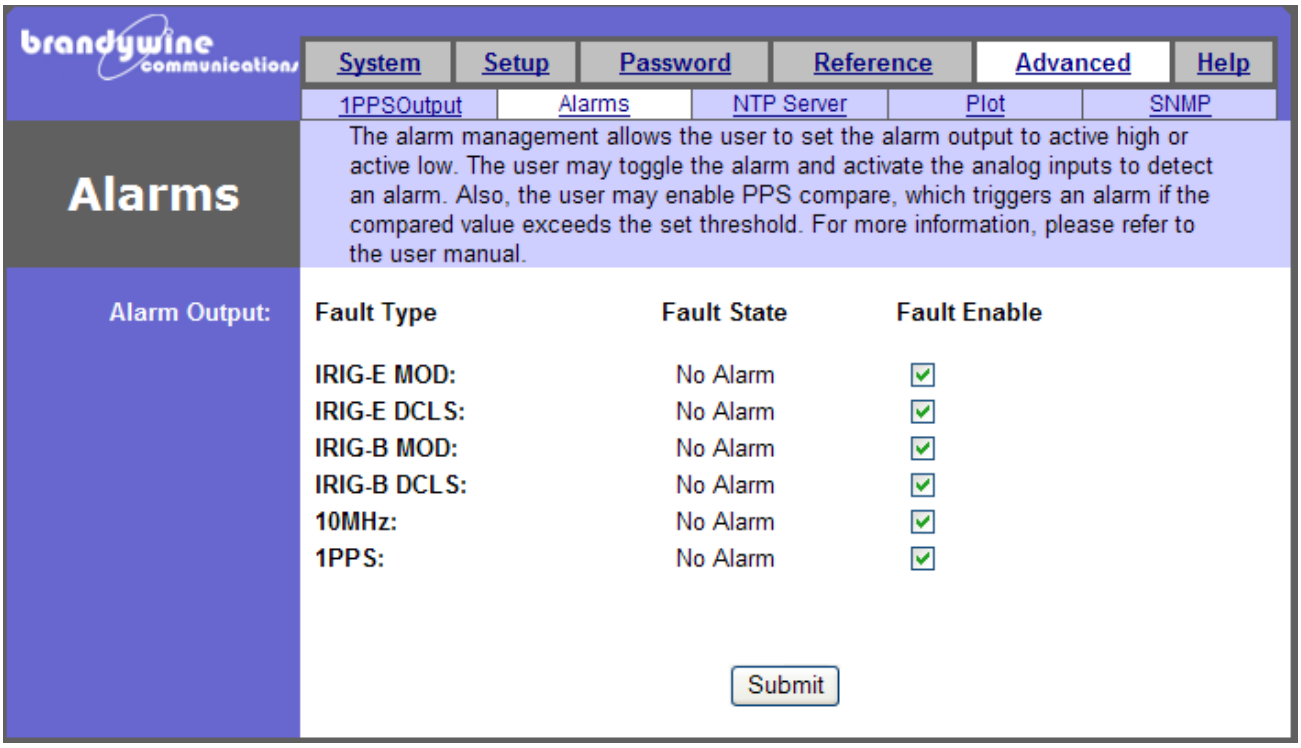


Figure 14 Alarms Screen

The checkboxes will allow each output signal to create an alarm when a fault is detected on its output circuitry. These settings are useful when only a subset of the output signals are being used.

5.1.5.3 NTP Server

Figure 15 is displayed when the NTP Server sub-tab is selected. The NTP Server consists of two sections, the Leap Indicator Mode and Manual Mode. To save all modifications made to the NTP Server screen, click the Submit button.

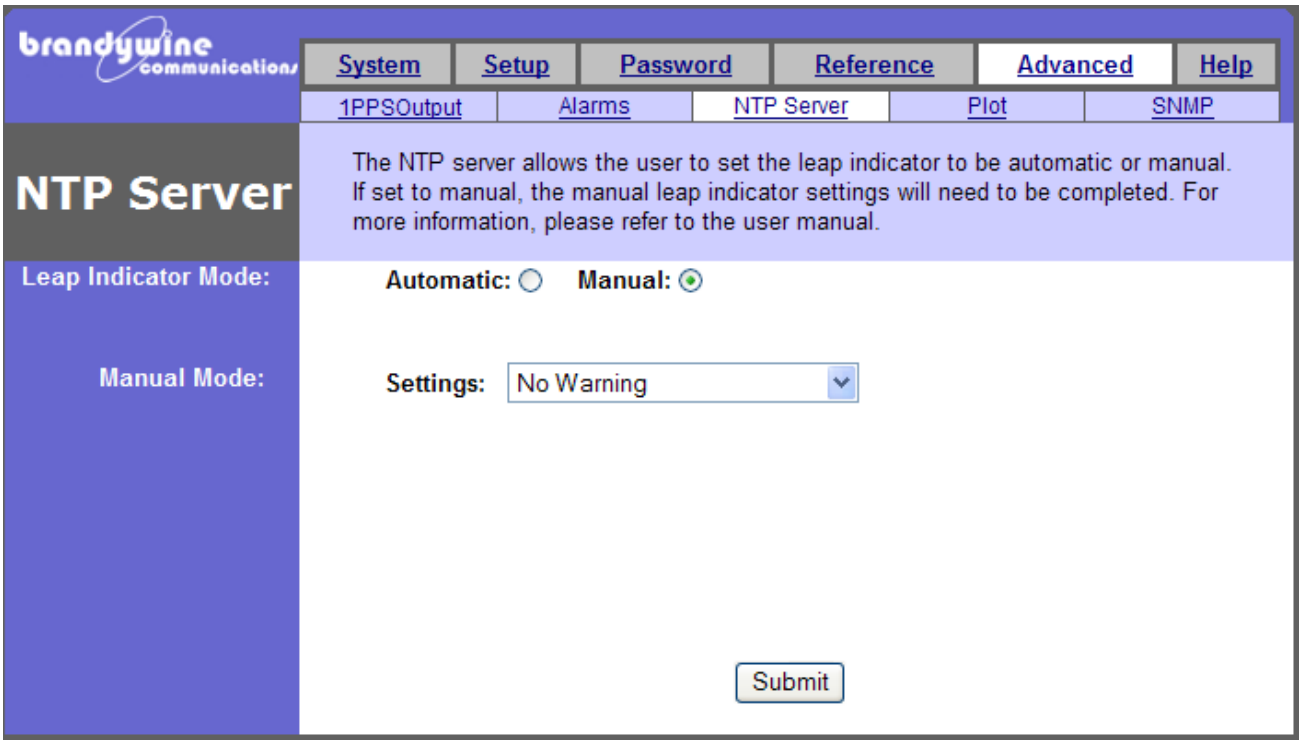


Figure 15 NTP Server Screen

5.1.5.3.1 Leap Indicator Mode

The Leap Indicator Mode consists of two radio buttons, the Automatic and Manual. The Leap Indicator Mode is a two-bit code (bit 0 and bit 1), which warns of an impending leap second that is inserted or deleted in the last minute of the current day. The Automatic radio button automatically sets the leap indicator settings. The Manual radio button allows the user to manually set the leap indicator settings.

5.1.5.3.2 Manual Mode Settings

The Manual Mode Settings consist of one combo box, the Settings. The Settings allows the user to manually set the leap indicator setting used. Table 6 describes the supported leap indicator settings used.

DESCRIPTION
No warning
Last minute has 61 seconds
Last minute has 59 seconds
Alarm condition (clock not synchronized)

Table 6 Leap Indicator Settings

If the leap indicator setting is set to no warning, the ENTA automatically warns of an impending leap second only if the internal GPS receiver is used as the synchronizing source.

5.1.5.4 Plot

Figure 16 is displayed when the Plot sub-tab is selected. The Plot consists of two fields, the Vertical Scale (± ns) and Horizontal Scale (hours). This sub-tab allows the user to modify the vertical and horizontal scale for the cached time difference plot and view the cached time difference and real-time time difference plots. The cached time difference displays recorded data for up to 168 hours. To save all modifications made to the Plot screen, click the Submit button. To undo all modifications made to the Plot screen, click the Reset button.

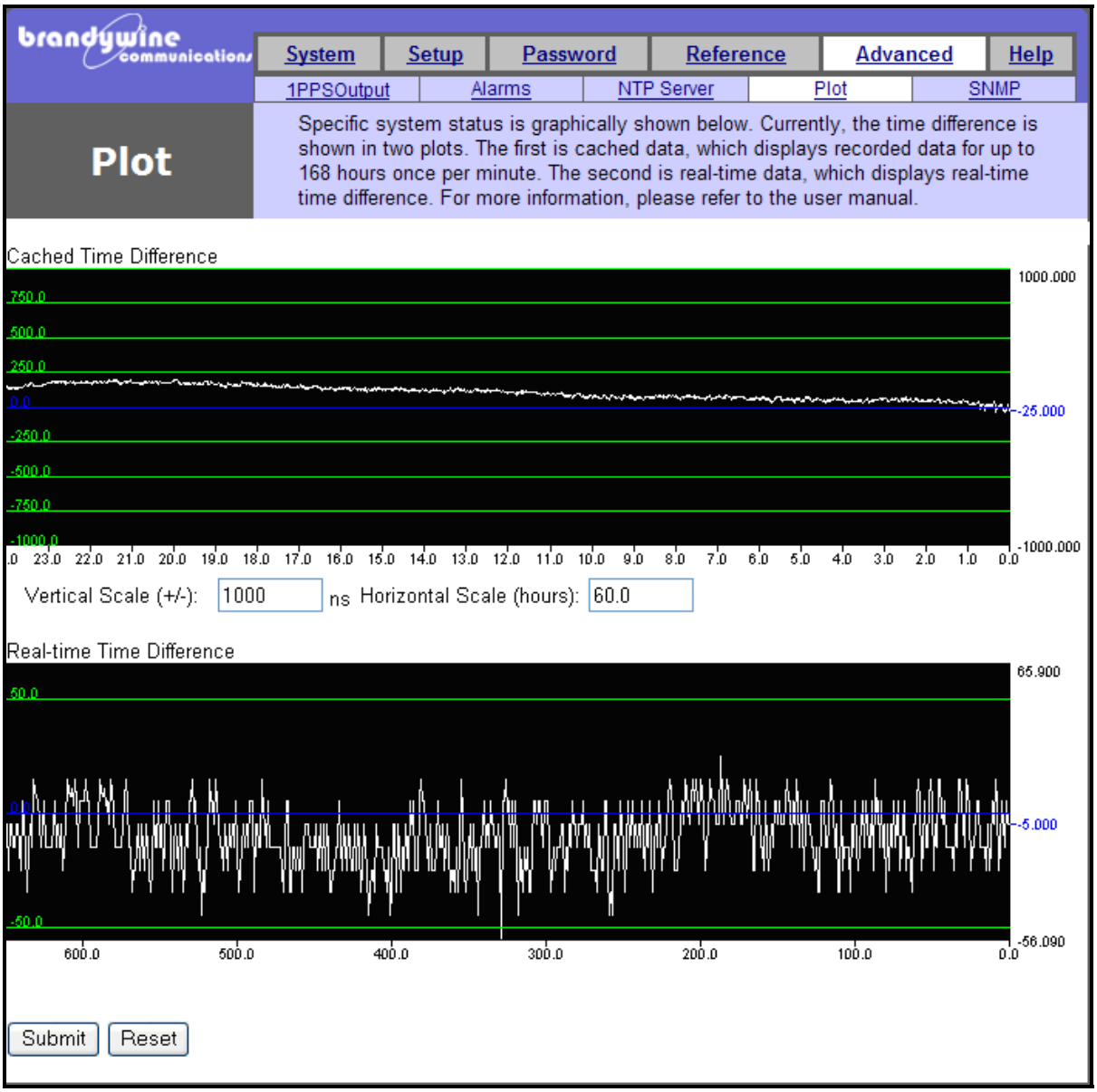


Figure 16 Plot Screen

5.1.5.5 SNMP

The Simple Network Management Protocol (SNMP) is a protocol used to expose variables to a Network Management System (NMS). The variables are arranged in a Management Information Base (MIB). The Brandywine Communications ENTA SNMP version 1 includes MIB-II and the capabilities listed below.

- ENTA status monitoring via SNMP
- ENTA control via SNMP

Figure 17 is displayed when the SNMP sub-tab is selected. The SNMP consists of three sections, the Community, Trap Address, and MIB. This sub-tab allows the user to modify the read community, write community, and trap IP address and download the MIB file used. To save all modifications made to the SNMP screen, click the Submit button. To undo all modifications made to the SNMP screen, click the Reset button.

Figure 17 SNMP Screen

5.1.5.5.1 Community

The Community consists of two fields, the Read Community and Write Community. The Community allows the user to enter the read community and write community names. Once the community names are entered, they are stored in non-volatile memory and will be recalled when the ENTA is powered up. Table 7 describes the read/write commands used by SNMP.

COMMAND	DESCRIPTION
Read	Used by NMS to monitor devices.
Write	Used by NMS to control devices.

Table 7 SNMP R/W Commands

5.1.5.5.2 Trap Address

The Trap Address consists of one field, the Trap IP. The Trap Address allows the user to enter the IP address of the trap. Once the trap address is entered, it is stored in non-volatile memory and will be recalled when the ENTA is powered up. Table 8 describes the trap command used by SNMP.

COMMAND	DESCRIPTION
Trap	Used by devices to report events to NMS.

Table 8 SNMP Trap Command

5.1.5.5.3 MIB

The MIB consists of one field, the Download MIB File. The Download MIB File allows the user to download and view the MIB file used by the ENTA system.

5.1.5.5.4 Status Monitoring via SNMP

The ENTA status should not be requested more often than every 10 seconds. After the ENTA is powered up, the statuses will be invalid for approximately 1 minute (zeroes will be returned).

5.1.5.5.5 ENTA Control Using SNMP

The following variables may be set and read from SNMP. Table 9 describes the variables supported by SNMP.

VARIABLE	OID	ACCESS	DESCRIPTION
ENTAszSystemSerialNumber	18954.3.1.1.0	Read-only	System Serial Number.
ENTAiSystemStatus	18954.3.1.4.0	Read-only	Current State Disciplining, System Lock, Fault, TFOM
ENTAiSystemState	18954.3.1.5.0	Read-only	Locked, Holdover, Warmup
ENTAszSystemTime	18954.3.1.6.0	Read-Write	ASCII Current time (UTC): YYYY:DOY:HH:MM:SS (DOY= day of year)
ENTAszSysNTPTime	18954.3.1.7.0	Read-only	NTP Time in seconds (ASCII Number): A write to this variable is only valid if in free-run or 1PPS only reference mode.
ENTAnSys1PPSDelay	18954.3.1.8.0	Read-Write	Factory calibrated 1PPS offset to synchronize to UTC. Users modify this value to adjust 1PPS. Note this value is in unit nanoseconds.
ENTAiAlarmStatus	18954.3.1.9.0	Read-only	Oscillator, GPS, Warm up and IRIG alarms
ENTAiTFOM	18954.3.1.10.0	Read-only	TFOM 3 < 100ns, 4 < 1us, 5 < 10us, 6 < 100us, 7< 1ms, 8< 10ms, 9 ≥ 10ms.
ENTAi1ppsPulseLength	18954.3.1.11.0	Read-Write	Output 1PPS, Pulse Width
ENTAi1ppsPulseOffset	18954.3.1.12.0	Read-Write	Output 1PPS Offset Adjust
ENTAszSystemTimeSetup0	18954.3.1.13.0	Read-Write	ASCII DST Format , Time Zone
ENTAszSystemModelName	18954.3.1.50.0	Read-only	Friendly Model Name
ENTAnReferenceSelect	18954.3.1.51.0	Read-Write	Selects Reference where 0=GPS, 1= IRIG-B Input
ENTAiWriteToNVM	18954.3.1.1000.0	Read-Write	Saves Settings to Non-Volatile Memory
ENTAiIRIGBEnabled	18954.3.2.1.0	Read-Write	Shows IRIG-B enabled =1
ENTAiIRIGEEnabled	18954.3.3.1.0	Read-Write	Shows IRIG-E enabled =1
ENTAiLatitude	18954.3.7.1.0	Read-Write	Latitude
ENTAiLongitude	18954.3.7.2.0	Read-Write	Longitude
ENTAiAltitude	18954.3.7.3.0	Read-Write	Altitude
ENTAiUTCOffset	18954.3.7.4.0	Read-only	No of seconds difference between GPS and UTC time.
ENTAiGPSSatsTracked	18954.3.7.5.0	Read-only	Shows the number of satellites tracked
ENTAiGPSSatsVisible	18954.3.7.6.0	Read-only	Shows the number of satellites visible in the sky
ENTAszGPSPosition	18954.3.7.7.0	Read-only	GPS position, Lat., Long. and Altitude
ENTAiSpclEnableManualNTPLI	18954.3.8.1.0	Read-Write	Enables manual mode for NTP Leap Indicator bits
ENTAiSpclManualNTPLI	18954.3.8.2.0	Read-Write	Manual NTP LI bits
precision Time System			Alarm Trap

Table 9 SNMP Variables

5.1.6 Help

The Help tab provides the user with help while using difficult areas in the system. Help links are located throughout the entire system so the user has access to the Help screen whenever the user encounters a problem. Once the user clicks on the Help link the user will be automatically redirected to the Help screen. Various topics are discussed in the Help screen.

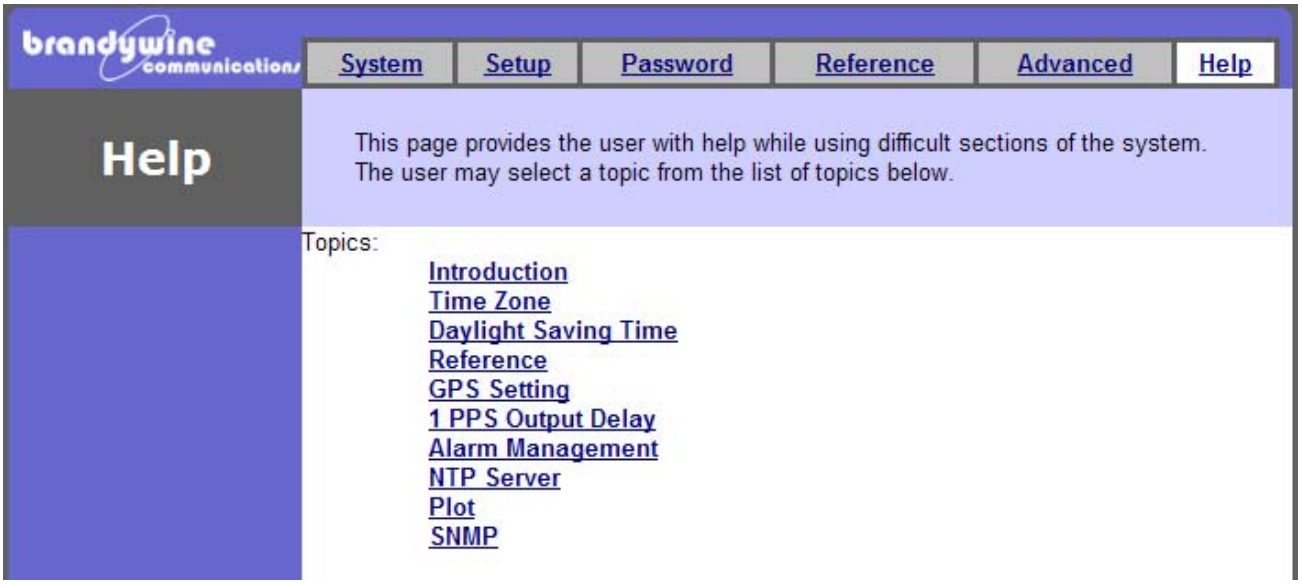


Figure 18 Help Screen

5.2 TCP 2500 Socket Interface

5.2.1 Opening TCP 2500 Socket Interface

To open the TCP 2500 socket interface, follow the given steps below.

1. Go to the Start menu.
2. Select Run.
3. Figure 19 will be displayed. Type TELNET XXX.XXX.XXX.XXX 2500 and press the OK button. The XXX.XXX.XXX.XXX is the IP address of the ENTA.

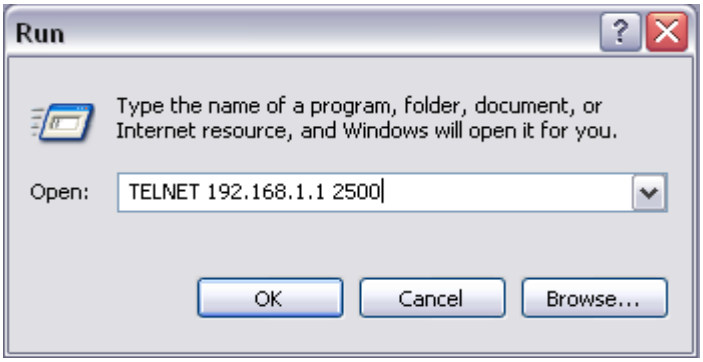


Figure 19 Run Screen

4. Figure 20 will be displayed. The TCP 2500 socket interface has now been successfully opened.

Figure 20 TCP 2500 Socket Interface

5.2.2 TCP 2500 Socket Interface Command List

The commands supported by the TCP 2500 socket interface are also supported by the telnet and console port. Refer to section 5.3.2 for the command list.

5.3 TELNET and Console Port Configurations

The TELNET and console port may be used to configure the ENTA. Both TELNET and console port configurations use exactly the same commands.

5.3.1 Opening TELNET Session

To open a TELNET session, follow the given steps below.

1. Go to the Start menu.
2. Select Run.
3. Figure 21 will be displayed. Type TELNET XXX.XXX.XXX.XXX and press the OK button. The XXX.XXX.XXX.XXX is the IP address of the ENTA.

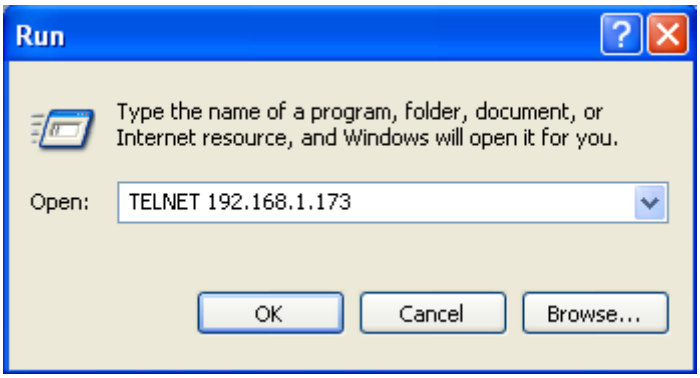


Figure 21 Run Screen

4. Figure 22 will be displayed. Enter the username, press <Enter>, enter the password, and press <Enter>. The TELNET session has now been established.

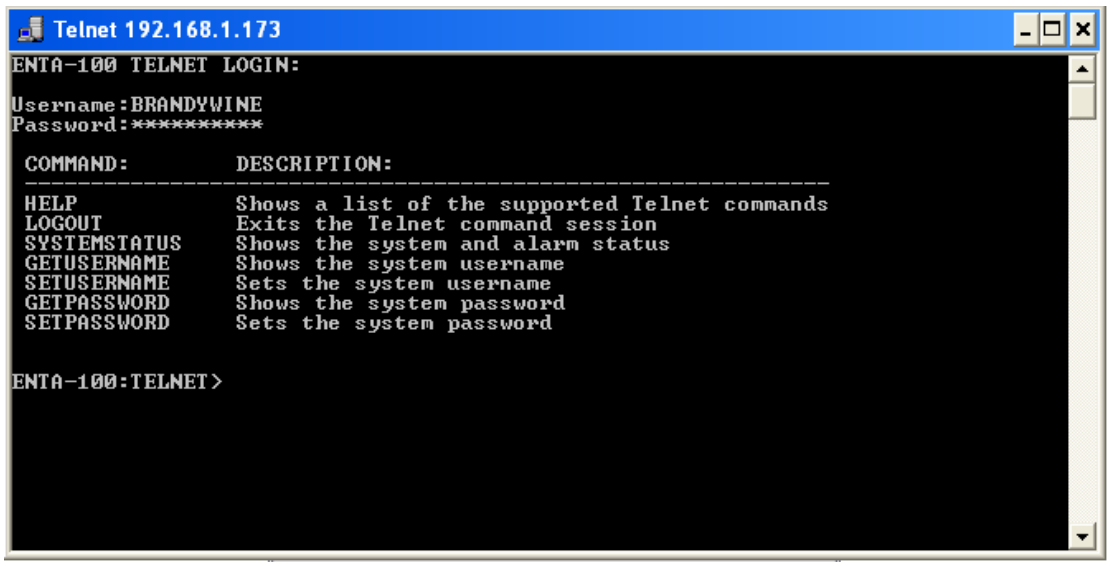


Figure 22 Telnet Interface

5.3.1.1 HELP Command

Shows a list of the supported Telnet commands.

5.3.1.2 LOGOUT Command

Exits the Telnet command session

5.3.1.3 SYSTEMSTATUS Command

The response format for this command is follows:

-> System State: Locked (See Table 10)
-> System Alarms…
1PPS Output: No Alarm (See Table 11)
10 MHz Output: No Alarm
IRIG-B MOD: No Alarm
IRIG-B DCLS: No Alarm
IRIG-E MOD: No Alarm
IRIG-E DCLS: No Alarm

RESPONSE
Warm up
Ready
Acquire
Locked
Holdover

Table 10 System State

RESPONSE
Alarm
No Alarm

Table 11 Alarm Status

5.3.1.4 GETUSERNAME Command

Shows the system username.

5.3.1.5 SETUSERNAME Command

Sets the system username.

5.3.1.6 GETPASSWORD Command

Shows the system password.

5.3.1.7 SETPASSWORD Command

Sets the system password.

6 Uploading Firmware

To upload new firmware for the ENTA, the user will need a software application such as AutoUpdate, the IP address of the ENTA, and the file name of the new released file. Follow the steps listed below to upload new firmware for the ENTA. Please note that AutoUpdate uses unicast on UDP port 20034.

1. Double click on the AutoUpdate icon and Figure 23 will be displayed.

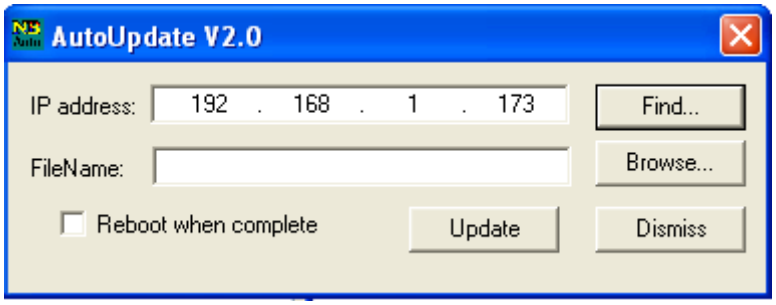


Figure 23 AutoUpdate Screen

2. Enter the IP address of the ENTA in the IP address field. If the user does not know the IP address, press the Find button and Figure 24 will be displayed. Locate and click on the IP address of the unit and click the OK button. The IP address field will be completed for you. If the unit is not on the list, click the Search Again button.

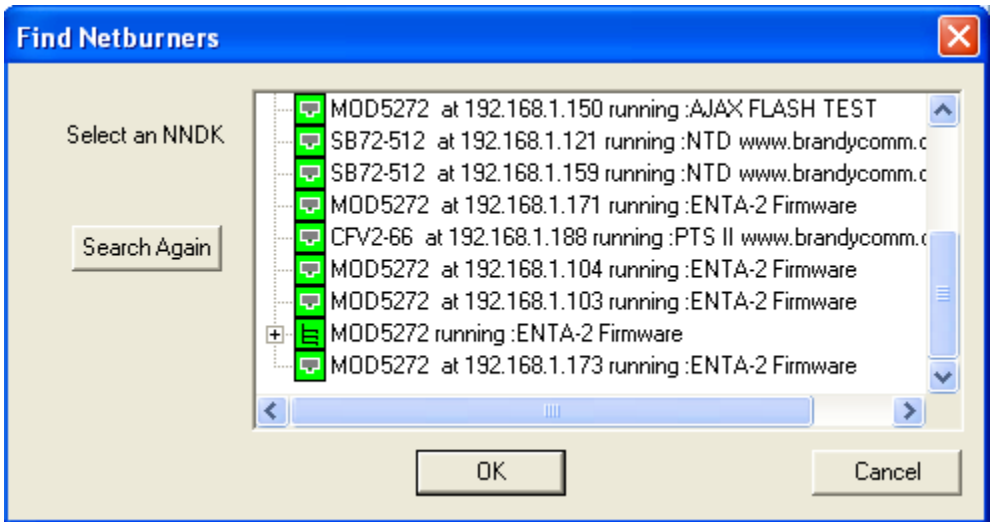


Figure 24 Find NetBurners Screen

3. Enter the path name to the new released file. If the user does not know the path name, press the Browse button and Figure 25 will be displayed. Locate and click on the file and click the Open button. The file will be in the form '*925000062A ENTA2v1.00Build 1129_APP.s19*' . The File Name field will be completed for you.

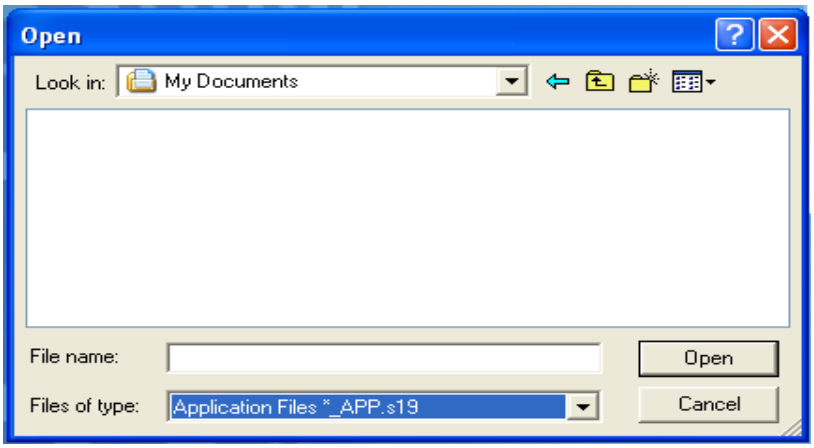


Figure 25 Open Screen

4. Now, click on the Reboot when complete check box.
5. To close the application, click the Dismiss button.
6. To upload the new firmware, click the Update button and Figure 26 will be displayed for a few seconds.

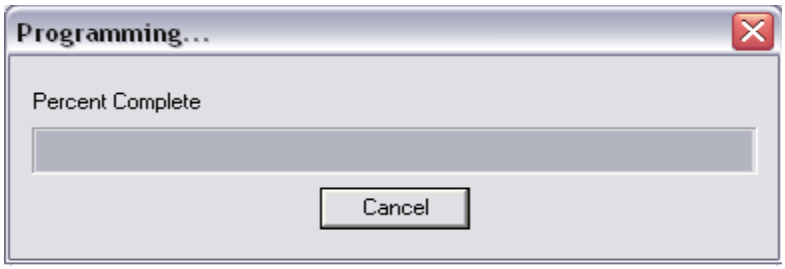


Figure 26 Programming Screen

7. After Figure 26 automatically closes, Figure 27 will be displayed. Click the OK button and now the uploading firmware process is completed.

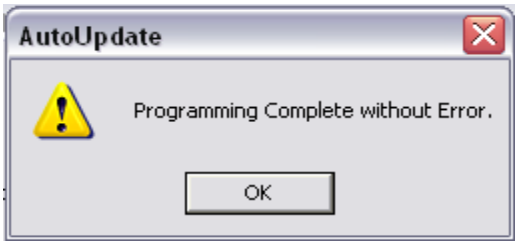
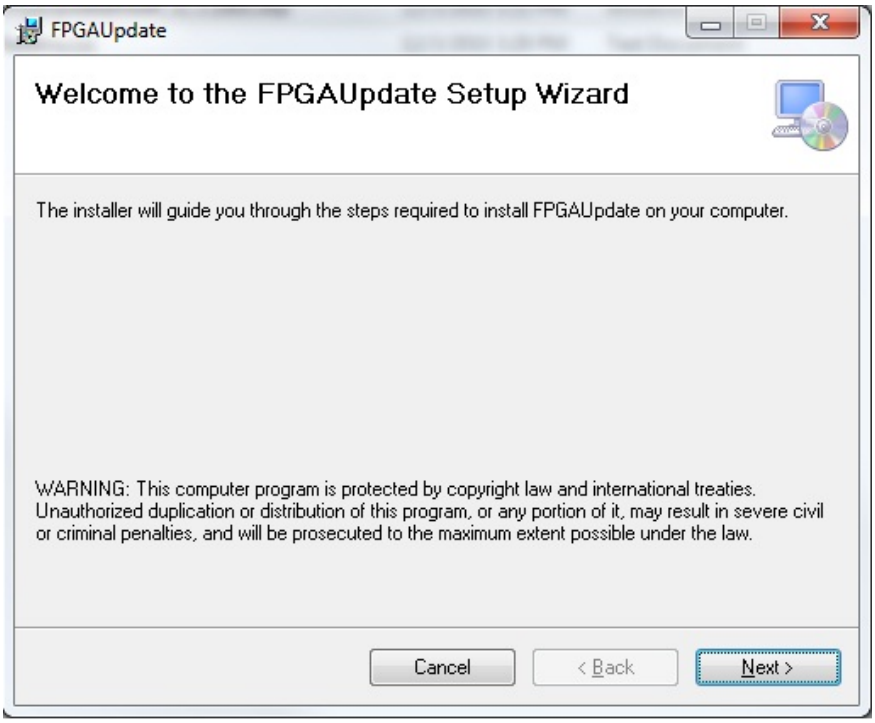


Figure 27 AutoUpdate Complete Screen

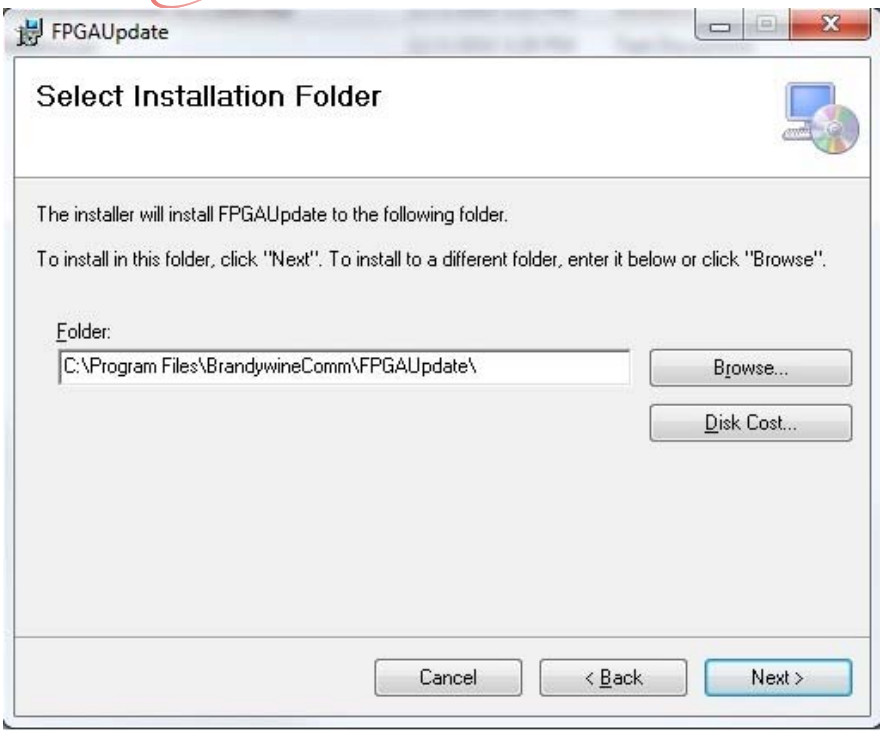
7 Uploading FPGA

To upload the FPGA for the ENTA, the user will need a software application called FPGA Update provided by Brandywine. This needs to be uploaded on the user's computer.

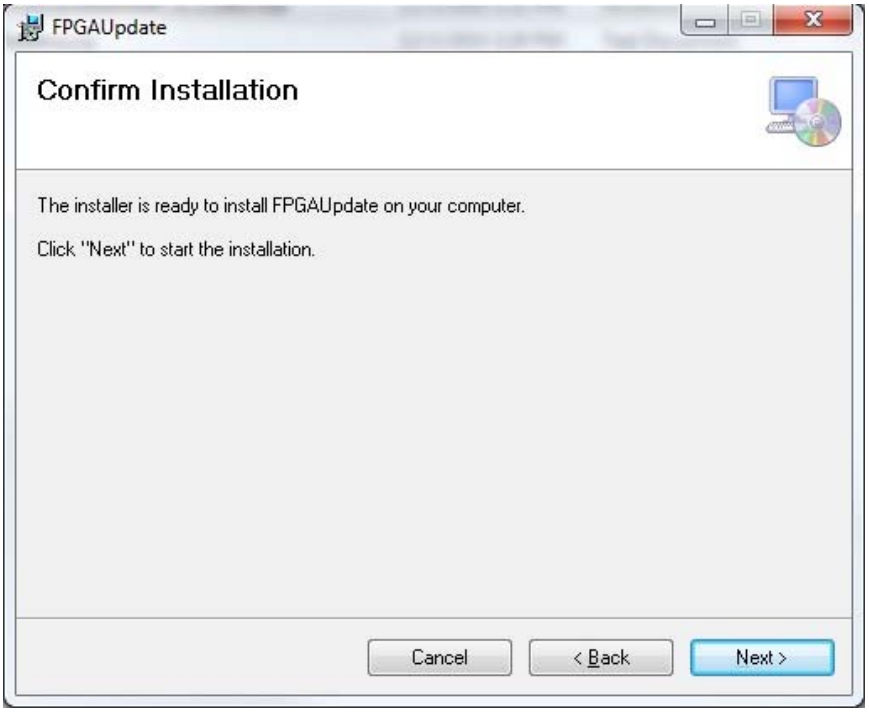
7.1 FPGA Update



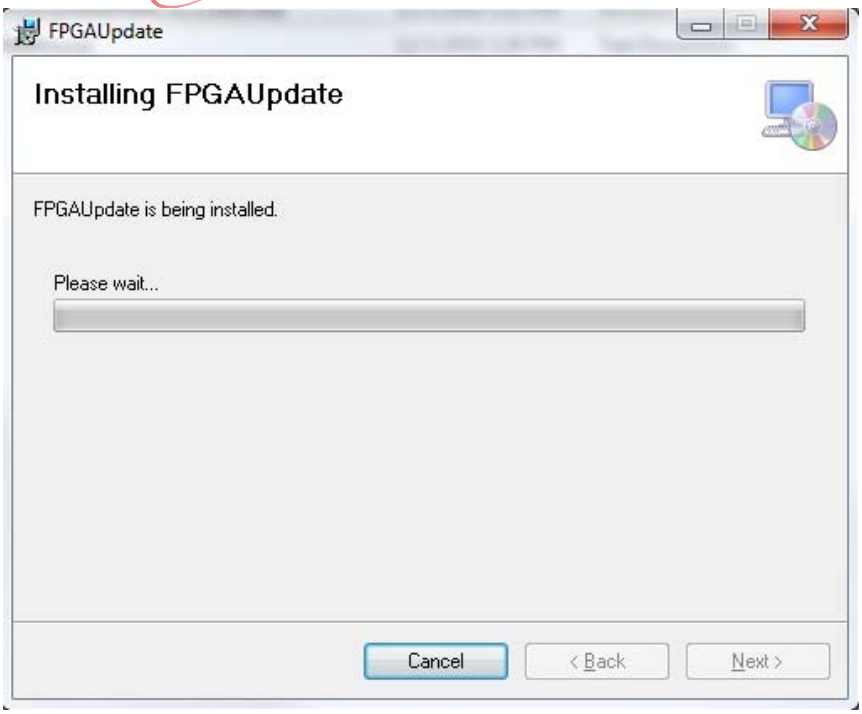
When installing the FPGAUpdate Application this is the initial Welcome screen. Click the "Next" button.



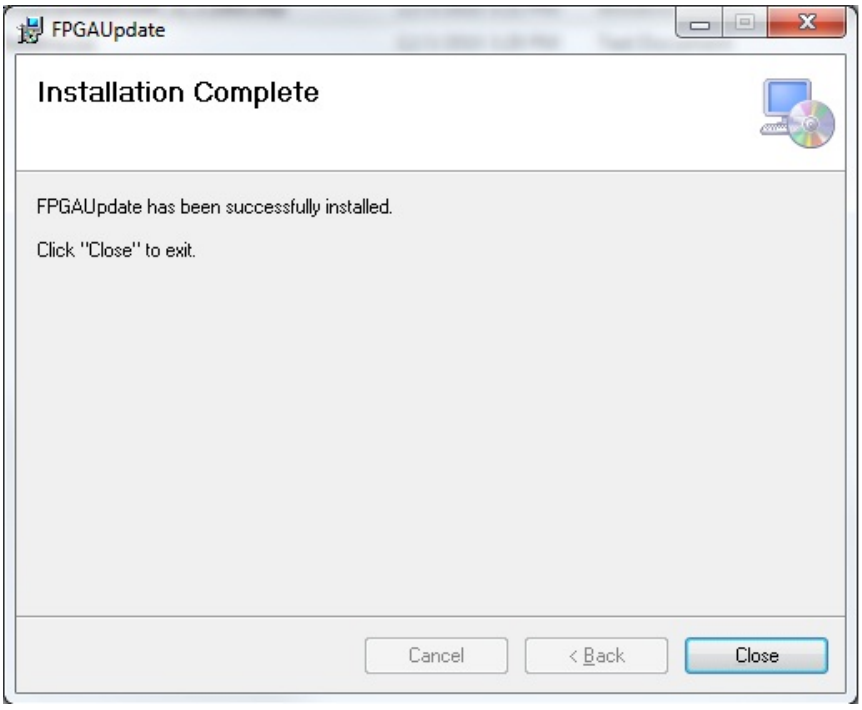
The FPGA Update application will then request the folder to install the application to. Keep the existing folder or browse for a new folder on the user's compluter. Click "Next".



Confirm by clicking "Next" to start the installation.

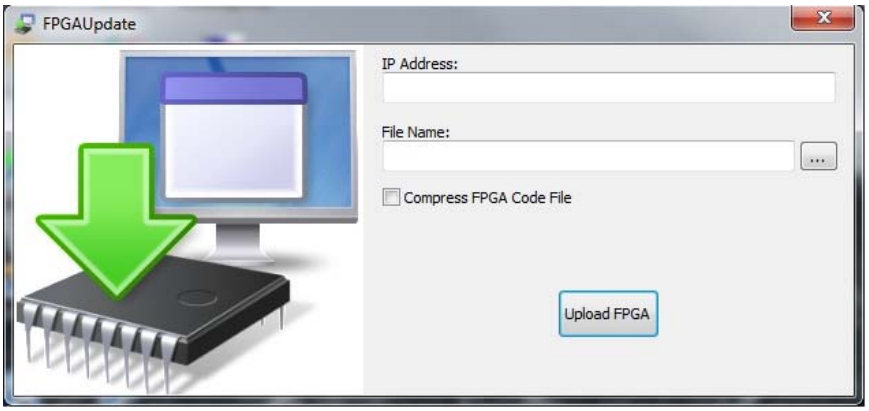


FPGAUpdate will be installed.

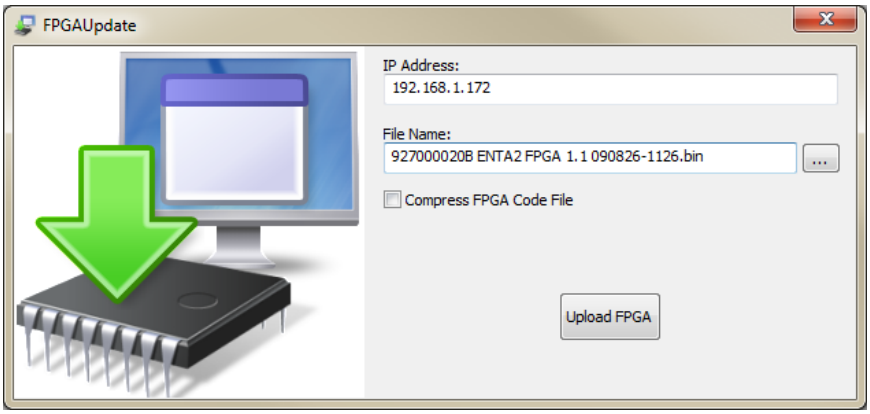


FPGAUpdate is installed. Click “Close” to exit.

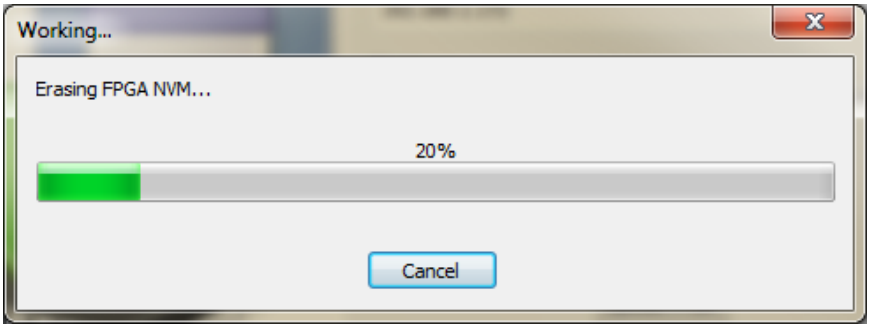
7.2 FPGA Upload



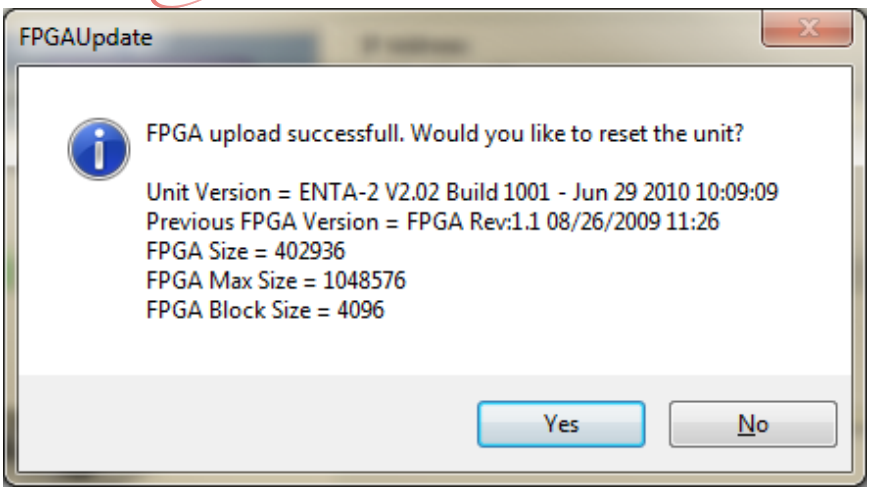
Start FPGA Update



Provide the IP address of the unit and the file name of the FPGA to be uploaded.
Make sure that the Compress FPGA Code File box is not checked.
Click the "Upload FPGA" button.



The above will be shown while the file is being uploaded.



The Unit Version and the Previous FPGA Version will be shown in the above box.
The new FPGA version will take effect once the unit has restarted. Click the “Yes” button to restart the unit now or the “No” button to restart later.

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8 Maintenance and Troubleshooting

There is no required preventive maintenance for the ENTA. To troubleshoot the problems, refer to Table 12.

SYMPTOM	POTENTIAL CAUSE	CORRECTIVE ACTION
Power LED does not illuminate	1. There is no power. 2. There is a blown fuse. 3. There is a ENTA power supply failure.	1. Verify that the AC power is available. 2. Replace the fuse. 3. Return unit to the factory.
Display colons continue flashing	1. ENTA is performing a cold start. 2. Antenna is in bad location. 3. The antenna is bad. 4. There is an excessive cable loss. 5. There is excessive EMI interference with the antenna. 6. The oscillator is not synchronized. 7. There is an oscillator failure.	1. Wait for 15 minutes. 2. The antenna should see > 50% of the sky. Use the GPS screen to verify which satellites (if any) are being tracked. 3. Replace the antenna. 4. Replace the cable with a lower loss cable. 5. Check for nearby interfering radiators and move the GPS antenna. 6. Allow the system to warm up for 10 minutes. 7. Return unit to the factory.
Fault LED is illuminated	1. There is an internal failure.	1. Check the alarm screen to verify cause of the fault. 2. Recycle the power.
No signal outputs	1. There is an internal failure.	1. Return unit to the factory.

Table 12 Troubleshooting ENTA Problems

9 Drawings

FIGURE	DESCRIPTION
1	ENTA Front Panel
2	ENTA Rear Panel

Table 21 ENTA Drawings

Figure 1 ENTA Front Panel

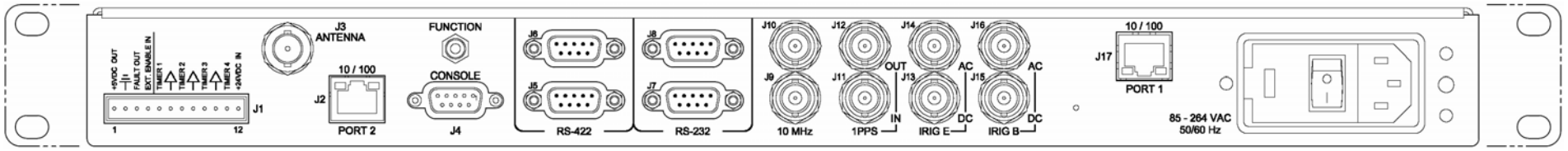

Figure 2 ENTA Rear Panel