



User Guide

Network Time Display

Model NTD-XXXX[X]

P\N 0610000XX

Revision E

May 2005

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NTD Models and Part Numbers

NTD 3.20" Digit Height Models

MODEL	PART NUMBER	DESCRIPTION
NTD-104B	061000031	Hours:Minutes, No GPS, and Blue
NTD-204B	061000032	Hours:Minutes, GPS, and Blue
NTD-104R	061000051	Hours:Minutes, No GPS, and Red
NTD-204R	061000052	Hours:Minutes, GPS, and Red
NTD-104G	061000055	Hours:Minutes, No GPS, and Green
NTD-204G	061000056	Hours:Minutes, GPS, and Green
NTD-104Y	061000059	Hours:Minutes, No GPS, and Yellow
NTD-204Y	061000060	Hours:Minutes, GPS, and Yellow
NTD-106B	061000033	Hours:Minutes:Seconds, No GPS, and Blue
NTD-206B	061000034	Hours:Minutes:Seconds, GPS, and Blue
NTD-106R	061000053	Hours:Minutes:Seconds, No GPS, and Red
NTD-206R	061000054	Hours:Minutes:Seconds, GPS, and Red
NTD-106G	061000057	Hours:Minutes:Seconds, No GPS, and Green
NTD-206G	061000058	Hours:Minutes:Seconds, GPS, and Green
NTD-106Y	061000061	Hours:Minutes:Seconds, No GPS, and Yellow
NTD-206Y	061000062	Hours:Minutes:Seconds, GPS, and Yellow

NTD 5.00" Digit Height Models

MODEL	PART NUMBER	DESCRIPTION
NTD-5104B	061000064	Hours:Minutes, No GPS, and Blue
NTD-5204B	061000065	Hours:Minutes, GPS, and Blue
NTD-5104R	061000068	Hours:Minutes, No GPS, and Red
NTD-5204R	061000069	Hours:Minutes, GPS, and Red
NTD-5104G	061000072	Hours:Minutes, No GPS, and Green
NTD-5204G	061000073	Hours:Minutes, GPS, and Green
NTD-5104Y	061000076	Hours:Minutes, No GPS, and Yellow
NTD-5204Y	061000077	Hours:Minutes, GPS, and Yellow
NTD-5106B	061000066	Hours:Minutes:Seconds, No GPS, and Blue
NTD-5206B	061000067	Hours:Minutes:Seconds, GPS, and Blue
NTD-5106R	061000070	Hours:Minutes:Seconds, No GPS, and Red
NTD-5206R	061000071	Hours:Minutes:Seconds, GPS, and Red
NTD-5106G	061000074	Hours:Minutes:Seconds, No GPS, and Green
NTD-5206G	061000075	Hours:Minutes:Seconds, GPS, and Green
NTD-5106Y	061000078	Hours:Minutes:Seconds, No GPS, and Yellow
NTD-5206Y	061000079	Hours:Minutes:Seconds, GPS, and Yellow



Revision History

REVISION	DATE	COMMENTS
NC	07-30-04	Original release of NTD user guide.
A	08-17-04	Revised all diagrams.
B	09-08-04	Revised serial port pin connections.
C	11-22-04	Revised entire NTD user guide.
D	05-02-05	Added the UDP port used by IPSetup and AutoUpdate.
E	05-27-05	Revised section 2.3.1 of the user guide.



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1 Overview

The Brandywine Communications Network Time Display's (NTD) purpose is to display time with accuracy. The NTD uses a Proportional Integral (PI) algorithm to set/synchronize its clock once and control its internal clocks with a reference. The most used references are NTP Time Server, Serial Port Input, and GPS (optional). When the NTD connects to the reference, the NTD will resynchronize its time and internal clocks with the reference's time. Using a closed loop control system, the NTD will correct its clocks based on the time difference between its internal clocks and the reference. A second order digital phase lock loop (PLL) is used to adjust the internal clocks of the NTD to match the time of the reference over long time intervals.



2 Specifications

2.1 Inputs

The Network Time Display may receive its input from three references. The three references the NTD receives input from are the NTP Time Server, Serial Port Input, and GPS (optional).

2.1.1 NTP Time Server

The Network Time Display may receive time from the NTP Time Server through the Ethernet. To receive time from the NTP Time Server, connect one end of an Ethernet cable to the NTD Ethernet and connect the other end of the Ethernet cable to a hub.

2.1.2 Serial Port Input

The Network Time Display may receive time from the Serial Port Input through the Serial Port. To receive time from the Serial Port Input, connect one end of a Serial cable to the NTD Serial Port and connect the other end of the Serial cable to the serial port of a computer or modem.

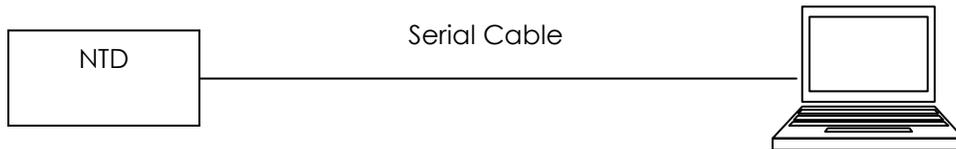
2.1.3 GPS (Optional)

The Network Time Display may receive time from the GPS through the Antenna. To receive time from the GPS, connect the cable to the NTD Antenna.

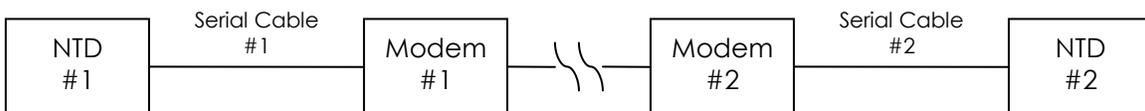
2.2 Outputs

The Network Time Display may output its time through the Serial Port. To output its time through the Serial Port, connect one end of the Serial cable to the NTD Serial Port and connect the other end of the Serial cable to the serial port of the computer. **OR** connect one end of the Serial cable (1) to the NTD Serial Port (1), connect the other end of the Serial cable (1) to the serial port of the modem (1), connect the modem (1) to another modem (2), connect one end of another Serial cable (2) to the serial port of the modem (2), and connect the other end of the Serial cable (2) to another NTD Serial Port (2). Using a communications program such as HyperTerminal the user may output the time of the NTD to the display terminal.

2.2.1 Computer Output Example



2.2.2 Modem Output Example





2.3 Button and Indicators

The Network Time Display has one button, the Brightness and three indicators, the Power, Link, and Speed.

2.3.1 Brightness Button – Brightness, IP Address, and Test Mode

The Brightness button functions as the brightness button, IP address button, and test mode button. The NTD has eight levels of brightness. To increase the level of brightness, press the Brightness button one time.

To display the IP address of the NTD, press the Brightness button two times. Use the same speed you would use to double click a mouse when pressing the Brightness button two times.

To get to the test mode, press and hold down the Brightness button for more than a second and all lights in the display window will glow. The test mode is useful because the user may test the lights in the display window to see if all of them are currently working.



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2.3.2 Brightness Button – Default Mode

To get to the default mode, press and hold down the Brightness button for more than ten seconds and all lights in the display window will flicker. The default mode will default the unit's memory to factory default settings.

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2.3.3 Power Indicator

The Power Indicator indicates that the power cord for the NTD is currently plugged into an electrical socket by glowing green.

2.3.4 Link Indicator

The Link Indicator indicates that the NTD is currently connected to a hub by glowing green.

2.3.5 Speed Indicator

The Speed Indicator indicates that the network speed is 100 MB by glowing green.



3 Unpacking and Installation

3.1 Unpacking

Remove the Network Time Display from the shipping carton. The following items should be included in the shipment:

- 1 NTD-XXXX[X]
- 1 user guide
- 1 wall mount template sheet

3.2 Installation

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

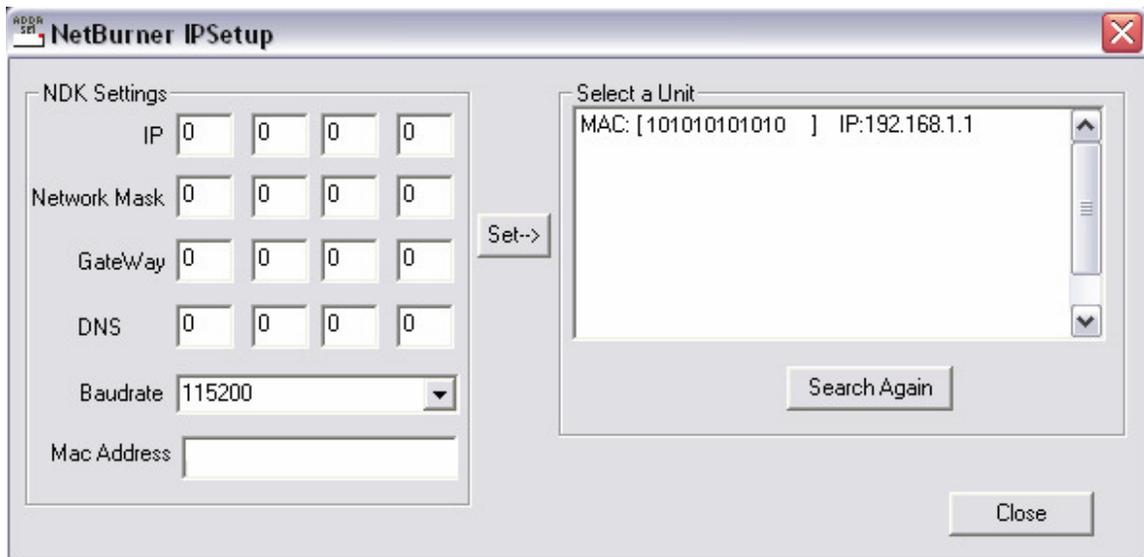
- IP Address: 192.168.1.1
- Subnet Mask: 255.255.255.0
- Gateway: 0.0.0.0

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

3.2.1 IPSetup.exe

To setup 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/downloads.html>.
2. Double click on the IPSetup.exe icon and the NetBurner IPSetup screen will be displayed.



3. Verify that the "Select a Unit" displays the current MAC and IP address of the NTD connected to the network.
4. Click on the NTD that needs to be configured.
5. Enter the NDK Settings (IP, Network Mask, GateWay, and DNS).
6. To transfer the NDK Settings to the selected NTD, click the Set → button.
7. Wait 15 seconds for the NDK Settings to be loaded into the NTD and for the NTD to restart.
8. Verify that the NTD 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 NTD in the Address bar, and press <Enter>. For example, type 192.168.1.1 or http://192.168.1.1 and press <Enter>.
11. The Setup screen will be displayed.
12. Configure the NTD. For more information on NTD configuration, refer to the Configuration section of the user guide.

3.2.2 Web Browser

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

1. Connect one end of an Ethernet cable to the NTD Ethernet.
2. Connect the other end of the Ethernet cable to a hub. Within a few seconds the IP address of the device is displayed and the time currently being displayed is automatically corrected.
3. Open your Internet browser and type the IP address of the device in the Address bar. For example, if the IP address of the device is 192.168.1.1 then type either 192.168.1.1 or <http://192.168.1.1> and press <Enter>.
4. Configure the NTD. For more information on NTD configuration, refer to the Configuration section of the user guide.

3.2.3 Latest Version of Java Software

To properly control and monitor the NTD 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 & Technologies link.
4. Click on the Java 2 Platform, Standard Edition link.
5. Click on the Download J2SE SDK link.
6. Complete the installation process.

Please note that the oldest acceptable Java software version number is 1.4.2_05. To check the Java software version number installed on your computer, follow the steps given below.

1. Go to 'Start'.
2. Go to 'Control Panel'.
3. Go to 'Add or Remove Programs'.
4. Scroll through the 'Currently installed programs' list.
5. Locate the 'Java 2 Runtime Environment, SE' program.
6. The version number follows the program's name in step 5.



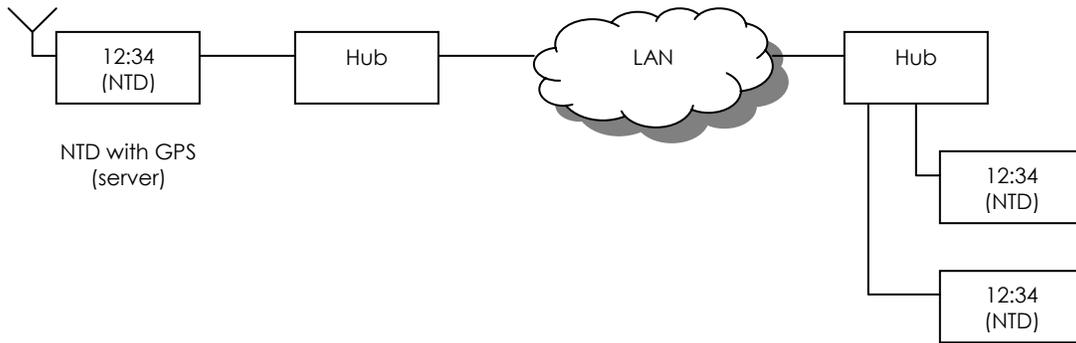
3.2.4 Mounting

The NTD may have cables entering the top or the bottom of the cable box. The cable box is the part of the NTD with the power cord. To change the location of the cables entering the NTD from top to bottom or bottom to top, the user must unscrew the screws holding the cable box to the NTD. Flip the cable box so that the cables are either located on the top or on the bottom of the cable box. Then attach the cable box to the NTD by screwing in the removed screws.

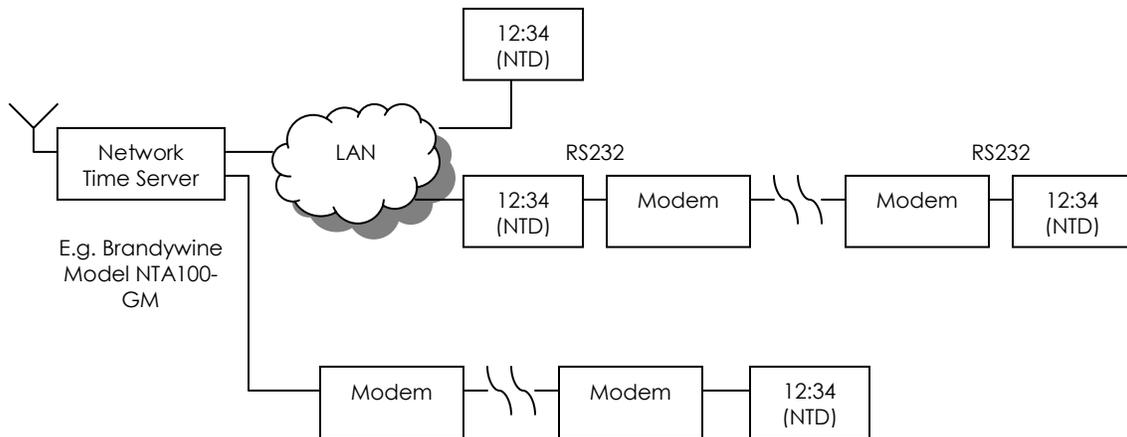
Moreover, the NTD may be mounted onto a wall. To mount the NTD onto a wall, the user will need the wall mount template sheet and four 6-32 pan head screws. The wall mount template sheet will be used to accurately mark the placement of each 6-32 pan head screw into the wall. Insert each 6-32 pan head screw into the wall. The NTD has slotted mounting holes on its rear panel that should be placed over the screws. Now slide the NTD down so that the screws engage with the mounting holes on the rear panel of the NTD.

3.3 Connections

3.3.1 Hub Connection Example



3.3.2 Modem Connection Example





3.3.3 Serial Port Pin Connections

The NTD serial port uses either RS232 or RS422 standard pinout. The RS232 Pinout (DB-9 Connector) Table lists the pins used by the NTD serial port for RS232. The RS422 Pinout (DB-9 Connector) Table lists the pins used by the NTD serial port for RS422.

RS232 Pinout (DB-9 Connector) Table

PIN	DESCRIPTION
1	---
2	Receive Data
3	Transmit Data
4	---
5	Signal Ground
6	---
7	---
8	---
9	---

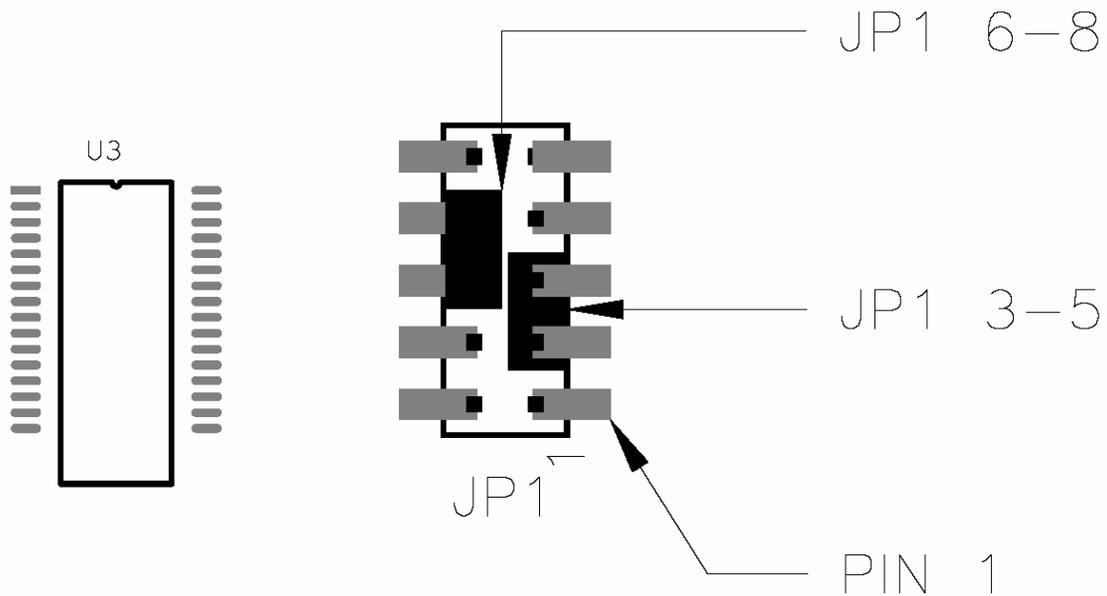
RS422 Pinout (DB-9 Connector) Table

PIN	DESCRIPTION
1	---
2	---
3	---
4	---
5	---
6	---
7	Transmit/Receive Data B (-)
8	Transmit/Receive Data A (+)
9	---

3.3.4 Serial Port Link Configurations

To configure the links, remove the back cover of the unit, locate the links, and configure them using the Link Location Drawing and Link Configuration Table.

Link Location Drawing



Link Configuration Table

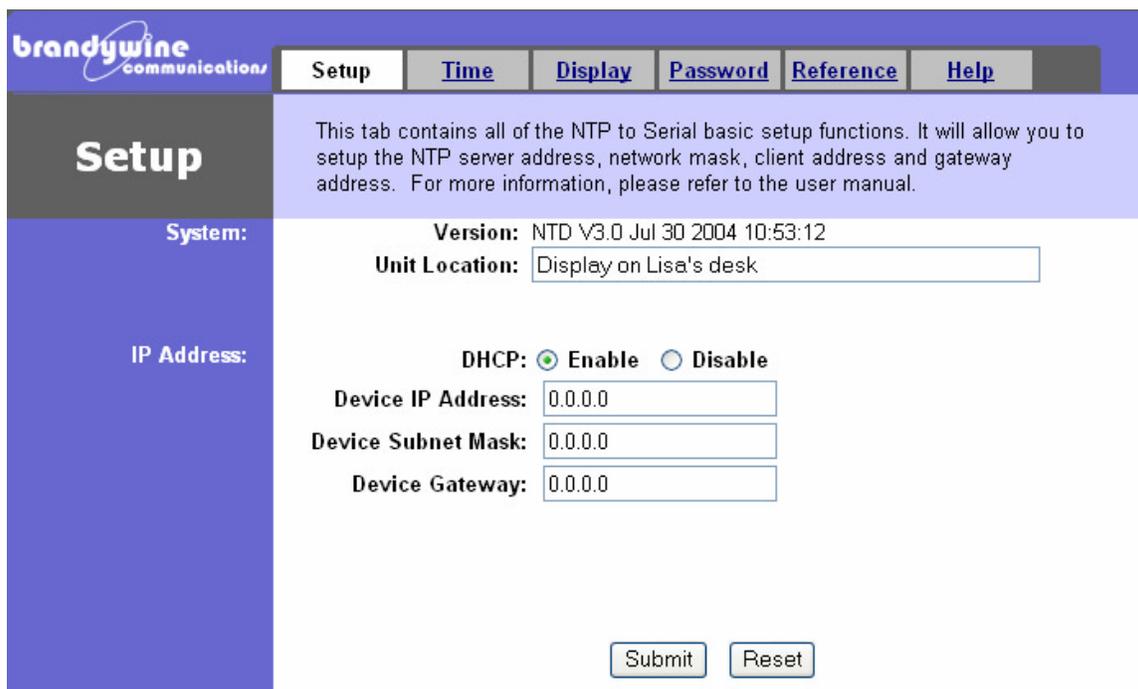
LINK SETTING	DESCRIPTION
JP1 1 - 3	RS422
JP1 6 - 8	RS422 transmit data
JP1 8 - 10	RS422 receive data
JP1 3 - 5	RS232

Please note that two links need to be set for RS422 configuration. To receive only, set link 1-3 and link 8-10. To receive and transmit, set link 1-3 and link 6-8.

4 Configuration

4.1 Setup

The Setup tab consists of two sections, the System and IP Address. This tab allows you to modify setup information for the Network Time Display. Please note that the Class C Network is being used therefore valid IP addresses are between 192.0.0.0 to 223.255.255.0. To save all modifications made to the Setup screen, click the Submit button. To undo all modifications made to the Setup screen, click the Reset button.



The screenshot shows the 'Setup' tab in the Brandywine Communications web interface. The interface has a blue header with the logo and navigation tabs: Setup, Time, Display, Password, Reference, and Help. The 'Setup' tab is active. Below the header, there is a description: 'This tab contains all of the NTP to Serial basic setup functions. It will allow you to setup the NTP server address, network mask, client address and gateway address. For more information, please refer to the user manual.' The main content area is divided into two sections: 'System:' and 'IP Address:'. The 'System:' section includes a 'Version:' field with the value 'NTD V3.0 Jul 30 2004 10:53:12' and a 'Unit Location:' text input field containing 'Display on Lisa's desk'. The 'IP Address:' section includes a 'DHCP:' section with 'Enable' selected (radio button) and 'Disable' unselected. Below this are three text input fields: 'Device IP Address:' (0.0.0.0), 'Device Subnet Mask:' (0.0.0.0), and 'Device Gateway:' (0.0.0.0). At the bottom right, there are 'Submit' and 'Reset' buttons.

4.1.1 System

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



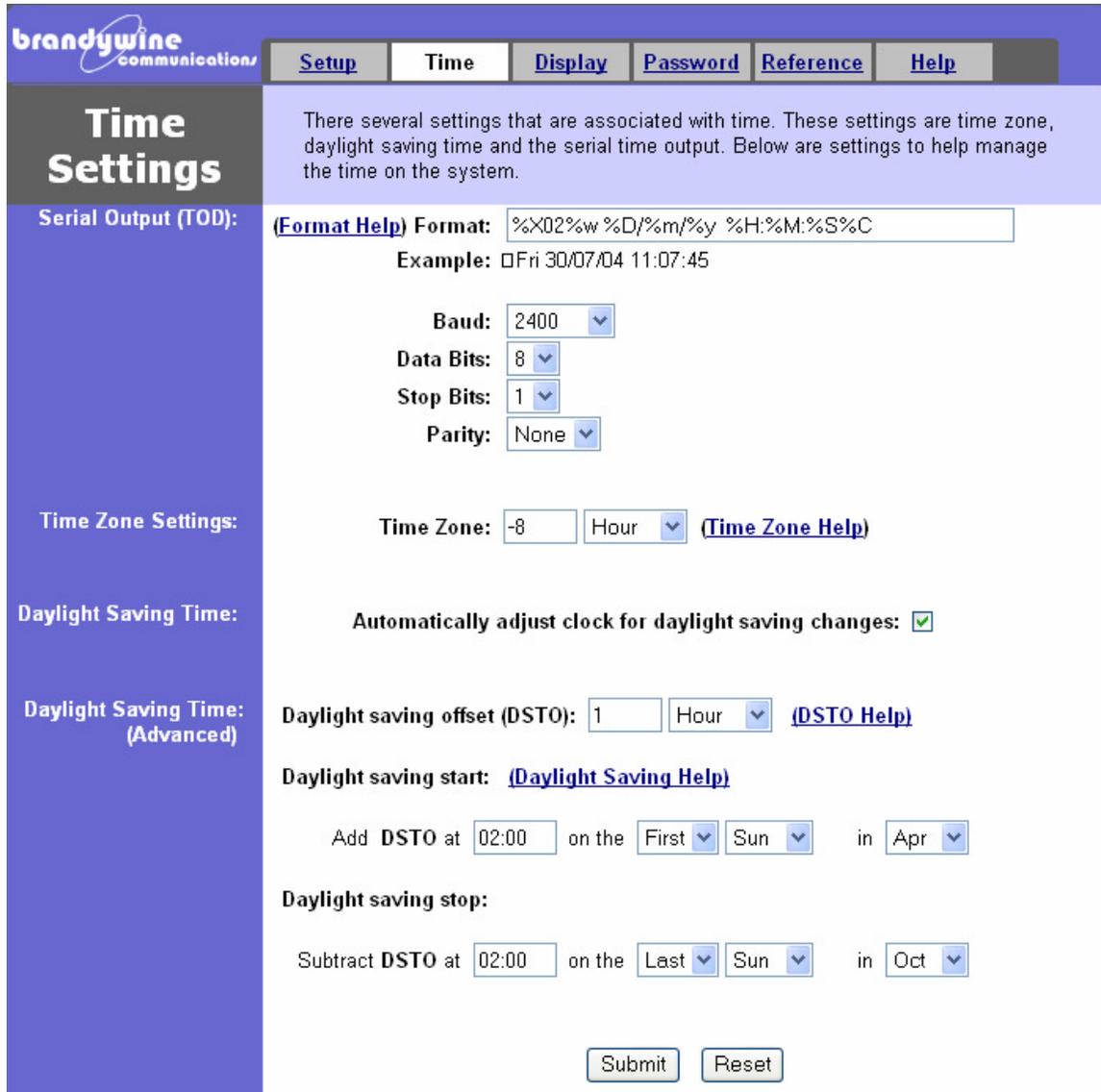
4.1.2 IP Address

The IP Address section consists of two radio buttons, the DHCP Enable and DHCP Disable and three fields, the Device IP Address, Device Subnet Mask, and Device Gateway. If the DHCP Enable radio button is selected, the NTD will retrieve its configurations from the DHCP server. If the DHCP Disable radio button is selected, the user must manually enter the configurations for the device.

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.

4.2 Time

The Time tab consists of four sections, the Serial Output (TOD), Time Zone Settings, Daylight Saving Time, and Daylight Saving Time (Advanced). This tab allows you to modify the time settings for the Network Time Display. To save all modifications made to the Time Settings screen, click the Submit button. To undo all modifications made to the Time Settings screen, click the Reset button.



The screenshot shows the 'Time Settings' page in the Brandywine Communications web interface. The page has a blue header with the company logo and navigation tabs for Setup, Time, Display, Password, Reference, and Help. The 'Time' tab is selected. The main content area is titled 'Time Settings' and contains a descriptive paragraph about time-related settings. Below this, there are four sections: 'Serial Output (TOD)', 'Time Zone Settings', 'Daylight Saving Time', and 'Daylight Saving Time (Advanced)'. Each section contains various input fields, dropdown menus, and checkboxes. At the bottom of the page, there are 'Submit' and 'Reset' buttons.

Time Settings

There several settings that are associated with time. These settings are time zone, daylight saving time and the serial time output. Below are settings to help manage the time on the system.

Serial Output (TOD): [\(Format Help\)](#) Format:
 Example: Fri 30/07/04 11:07:45

Baud:
 Data Bits:
 Stop Bits:
 Parity:

Time Zone Settings: Time Zone: [\(Time Zone Help\)](#)

Daylight Saving Time: Automatically adjust clock for daylight saving changes:

Daylight Saving Time (Advanced): Daylight saving offset (DSTO): [\(DSTO Help\)](#)
 Daylight saving start: [\(Daylight Saving Help\)](#)
 Add DSTO at on the in
 Daylight saving stop:
 Subtract DSTO at on the in

4.2.1 Serial Output (TOD)

The Serial Output (TOD) consists of one field, the Format and four combo boxes, the Baud, Data Bits, Stop Bits, and Parity. The Format refers to the format of the time outputted from the Network Time Display when the serial port is being used. The Format Characters Table lists the characters and descriptions used in the Format field. The Baud refers to the number of bits transmitted per second. The Data Bits and Stop Bits follow RS232 standard. The Parity enables the user to check the validity of the data by using either odd or even parity checking.

Format Characters Table

CHARACTER	DESCRIPTION
%A	AM/PM
%C	Carriage return (ASCII 13)
%D	Day of the month
%H	24 hour format
%h	12 hour format
%L	Shows locked, 1 = locked, 0 = not locked
%M	Minutes
%m	Number of the month
%N	Full name of the month
%n	3 character name of the month
%O	3 digit day of the year starting at 0
%o	3 digit day of the year starting at 1
%R	Line feed (ASCII 10)
%S	Seconds
%W	Full day of the week
%w	3 character day of the week
%X	Any hexadecimal value (%X20 = ASCII space)
%y	2 digit year (2004 = 04)
%Y	4 digit year (2004 = 2004)
%%	% symbol

4.2.2 Time Zone Settings

The Time Zone Settings consists of two fields, the Time Zone text field and Time Zone combo box. The Time Zone text field 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

4.2.3 Daylight Saving Time

The Daylight Saving Time consists of the “automatically adjust clock for daylight saving changes” check box. If the user clicks the check box, the system will automatically adjust the time of the Network Time Display when daylight saving time occurs. If the user does not click the check box, the system will not automatically adjust the time of the Network Time Display when daylight saving time occurs.

4.2.4 Daylight Saving Time (Advanced)

The Daylight Saving Time (Advanced) consists of three fields, the Daylight saving offset (DSTO), Daylight saving start, and Daylight saving stop. The Daylight saving offset is a number that is added to or subtracted from the time zone setting. The Daylight saving offset entered by the user may be either in hours or minutes.

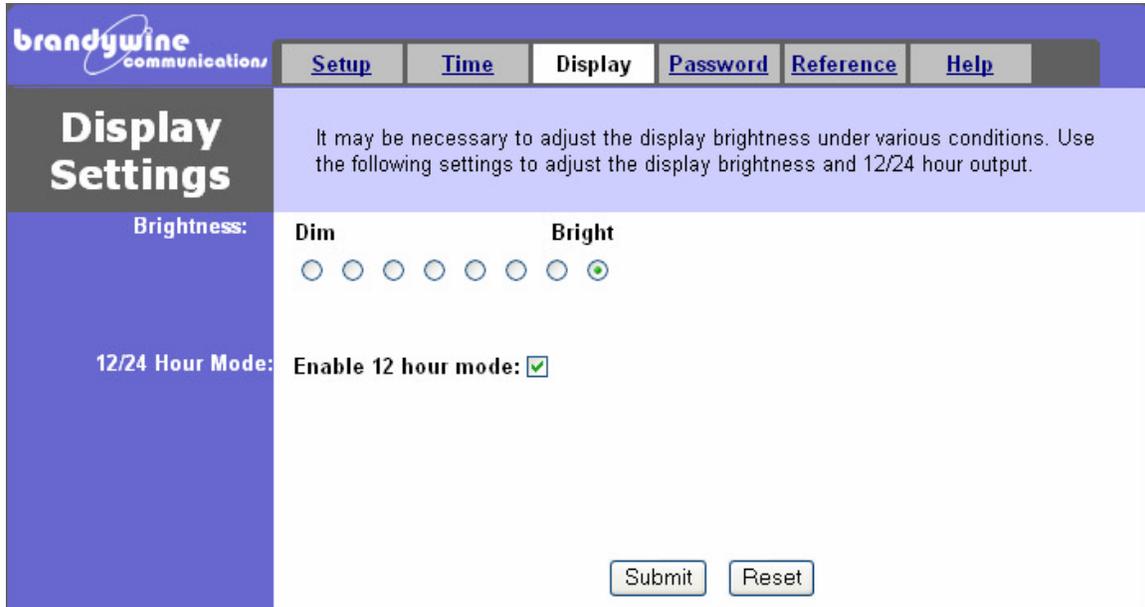
The Daylight saving start allows the user to add the daylight saving offset to the time the daylight saving should start. The user must enter the daylight saving start time, the occurrence of the specific day, the day of the week, and the month that the daylight saving should start. For example, Pacific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

The Daylight saving stop allows the user to subtract the daylight saving offset to 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 last Sunday of October.

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.

4.3 Display

The Display tab consists of two sections, the Brightness and 12/24 Hour Mode. This tab allows you to modify display settings for the Network Time Display. To save all modifications made to the Display Settings screen, click the Submit button. To undo all modifications made to the Display Settings screen, click the Reset button.



The screenshot shows the 'Display Settings' page in a web browser. At the top, there is a navigation bar with tabs for 'Setup', 'Time', 'Display', 'Password', 'Reference', and 'Help'. The 'Display' tab is selected. Below the navigation bar, the page title is 'Display Settings'. A message states: 'It may be necessary to adjust the display brightness under various conditions. Use the following settings to adjust the display brightness and 12/24 hour output.' Under the 'Brightness:' section, there are eight radio buttons labeled 'Dim' on the left and 'Bright' on the right. The eighth radio button is selected. Under the '12/24 Hour Mode:' section, there is a checkbox labeled 'Enable 12 hour mode:' which is checked. At the bottom right, there are two buttons: 'Submit' and 'Reset'.

4.3.1 Brightness

The Brightness consists of eight radio buttons from Dim to Bright. The user may modify the level of brightness for the Network Time Display by selecting one of the eight radio buttons.

4.3.2 12/24 Hour Mode

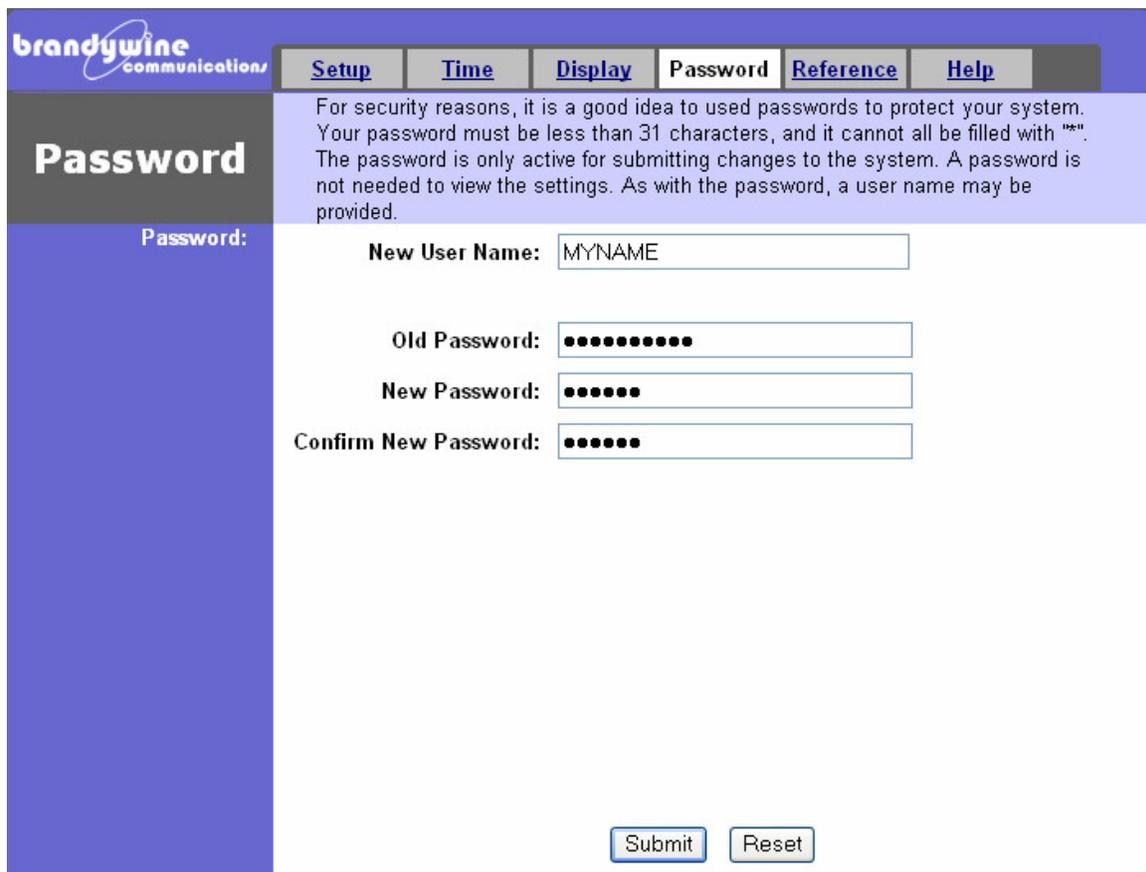
The 12/24 Hour Mode consists of a check box, the enable 12 hour mode. If the user clicks the check box the time for the Network Time Display will be displayed in 12 hour mode. If the user does not click the check box the time for the Network Time Display will be displayed in 24 hour mode.

4.4 Password

The Password tab consists of one section, the Password. This tab allows you 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:

Please note that the default user name and password for the system is BRANDYWINE and the user must always enter a user name and password when submitting changes to the system.



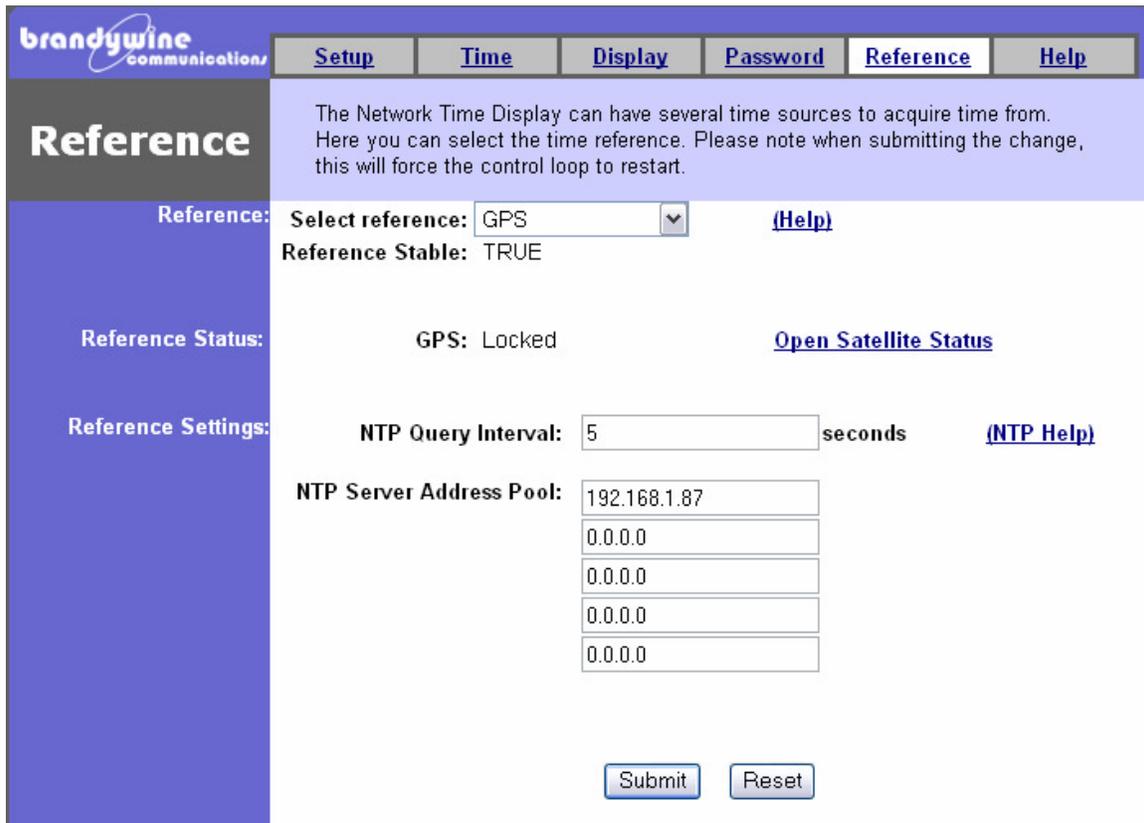
The screenshot shows the Brandywine communications web interface. At the top left is the logo. A navigation bar contains tabs for Setup, Time, Display, Password (selected), Reference, and Help. The main content area is titled "Password" and contains a text box with security instructions: "For security reasons, it is a good idea to use passwords to protect your system. Your password must be less than 31 characters, and it cannot all be filled with '*'. The password is only active for submitting changes to the system. A password is not needed to view the settings. As with the password, a user name may be provided." Below this are four input fields: "New User Name:" with the value "MYNAME", "Old Password:" with 10 asterisks, "New Password:" with 6 asterisks, and "Confirm New Password:" with 6 asterisks. At the bottom right are "Submit" and "Reset" buttons.

4.4.1 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 system is case sensitive.

4.5 Reference

The Reference tab consists of three sections, the Reference, Reference Status, and Reference Settings. This tab allows you to modify the reference for the Network Time Display. Please note that while the Network Time Display is acquiring time from the reference the colons on the Network Time Display will be flashing. Once the Network Time Display has acquired time from the reference the colons on the Network Time Display will stop flashing. To save all modifications made to the Reference screen, click the Submit button. To undo all modifications made to the Reference screen, click the Reset button.



The screenshot shows the 'Reference' configuration page in the Brandywine web interface. The page has a blue header with the Brandywine logo and navigation tabs for Setup, Time, Display, Password, Reference, and Help. The 'Reference' tab is selected. The page is divided into three sections: Reference, Reference Status, and Reference Settings. The Reference section includes a dropdown menu for 'Select reference' (set to GPS) and a 'Reference Stable' checkbox (checked). The Reference Status section shows 'GPS: Locked' and a link to 'Open Satellite Status'. The Reference Settings section includes an 'NTP Query Interval' of 5 seconds and an 'NTP Server Address Pool' with five entries: 192.168.1.87 and four 0.0.0.0 addresses. There are 'Submit' and 'Reset' buttons at the bottom.

Section	Field	Value	Notes
Reference	Select reference:	GPS	(Help)
	Reference Stable:	TRUE	
Reference Status	GPS:	Locked	Open Satellite Status
	NTP Query Interval:	5	seconds (NTP Help)
Reference Settings	NTP Server Address Pool:	192.168.1.87	
		0.0.0.0	
		0.0.0.0	
		0.0.0.0	
		0.0.0.0	



4.5.1 Reference

The Reference consists of two fields, the Select reference and Reference Stable. The Select reference allows the user to select one of the three references to acquire time from. The three references used by the system are NTP Time Server, Serial Port Input, and GPS (optional).

The NTP Time Server reference uses the Network Time Protocol to synchronize the internal clocks of a computer to the reference's time. The stratum level may vary depending on the current reference setting. To use this reference the NTP Server Address Pool must be setup.

The Serial Port Input reference continuously receives an update every second. The stratum level for this reference is 2.

The serial time format is [STS][DOW][0x20][DAY]/[MONTH]/[YEAR][0x20 0x20][HOUR]:[MINUTE]:[SECOND][0x0D]. The Serial Time Format Table lists the data and descriptions used.

Serial Time Format Table

DATA	DESCRIPTION
STS	Start of the message 0x02 and this character acts as the 1PPS timing mark
DOW	Day of the week written as three letters: Sun, Mon, Tue, Wed, Thu, Fri, and Sat
0x20	Space character
DAY	Two digit number of the day (01 - 31)
0x2F	Slash character '/'
MONTH	Two digit number of the month (01 - 12)
0x2F	Slash character '/'
YEAR	Two digit number of the year (00 - 99)
0x20	Space character
0x20	Space character
HOUR	Two digit number of the hour (00 - 23)
0x3A	Colon character ':'
MINUTE	Two digit number of the minute (00 - 59)
0x3A	Colon character ':'
SECOND	Two digit number of the second (00 - 59)
0x0D	End of message - carriage return

The optional GPS reference uses a GPS receiver to synchronize the internal clocks. The stratum level for this reference is 1. To use the optional GPS reference, the GPS option must be installed.

The Reference Stable may be either 'TRUE' or 'FALSE'. It is 'TRUE' when the Network Time Display has acquired time from a reference. It is 'FALSE' when the Network Time Display has yet to acquire time from a reference.

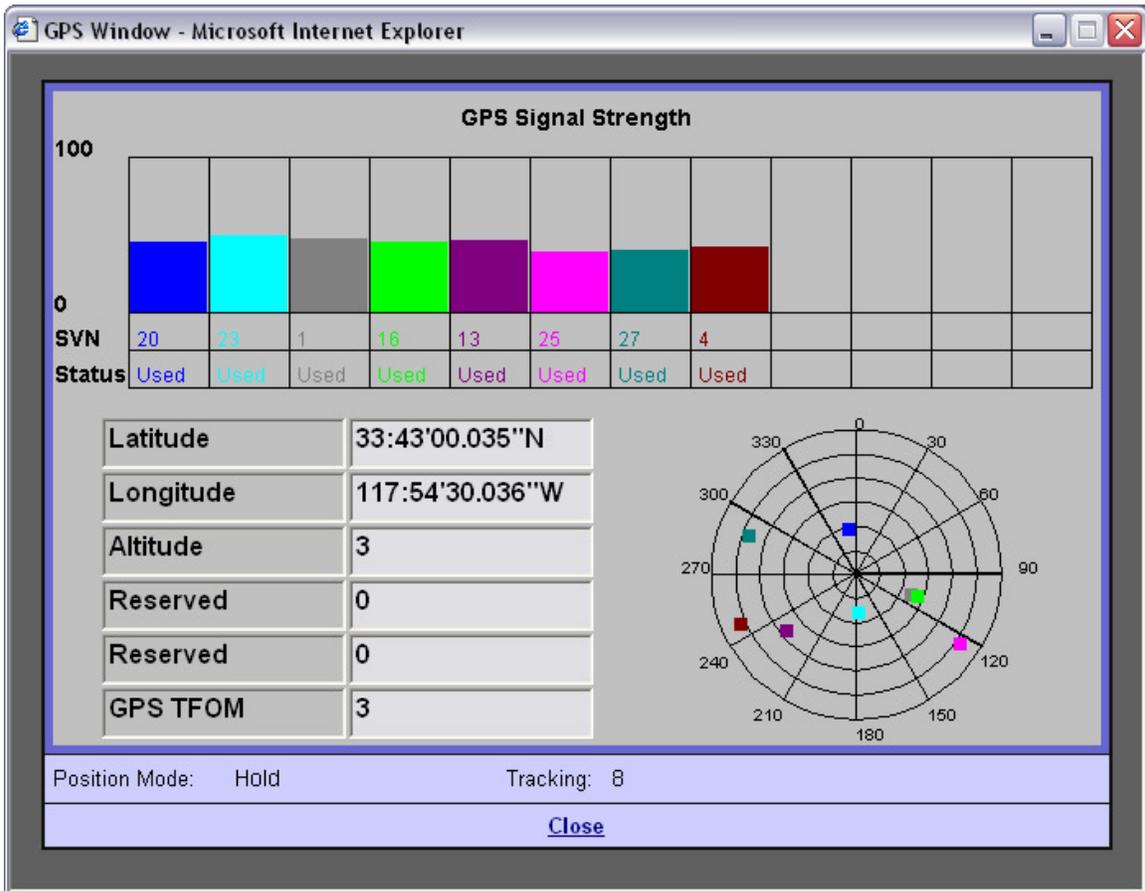


4.5.2 Reference Status

The Reference Status consists of two fields, the GPS and Open Satellite Status. If the GPS reference is not selected, then GPS will display 'Fault'. If the GPS reference is selected and not ready, then GPS will display 'Acquiring'. If the GPS reference is selected and ready, then GPS will display 'Locked'. The Open Satellite Status link is available for the GPS reference only. The following section describes the link.

4.5.2.1 Open Satellite Status

The system provides a comprehensive view of the GPS receiver. A typical GPS receiver screen is displayed below.



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.



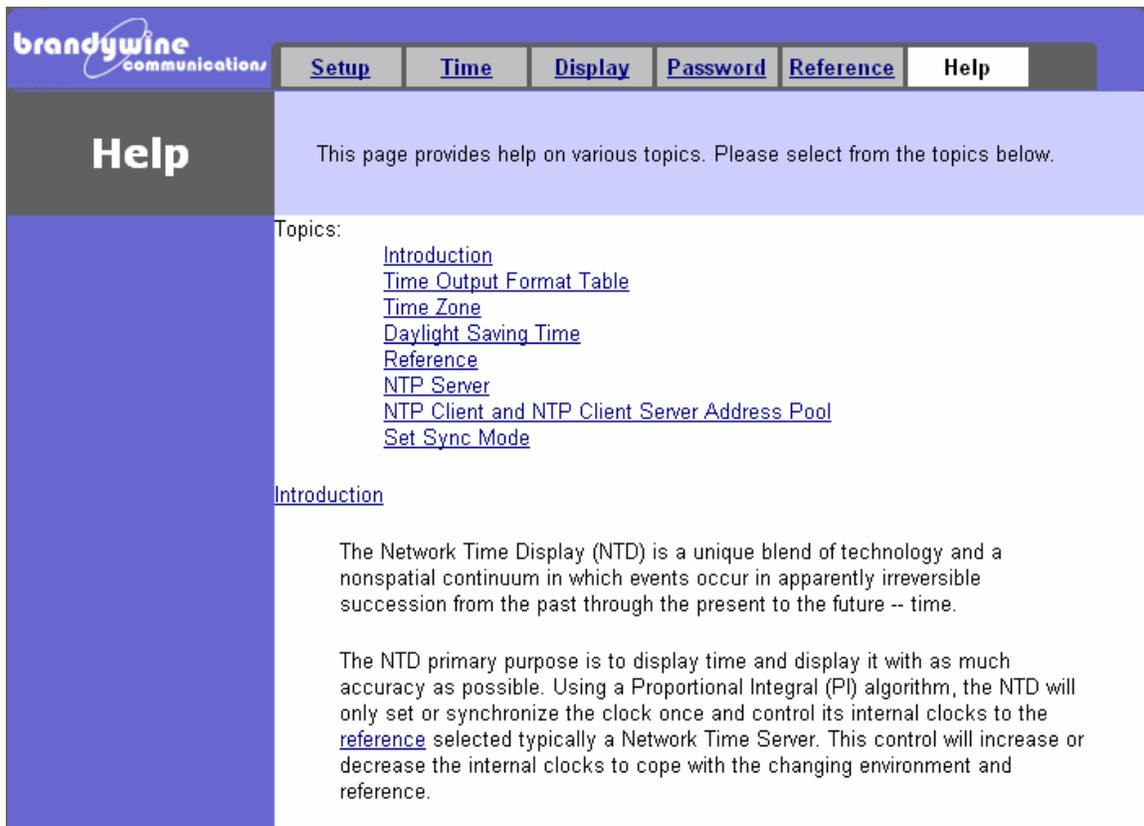
4.5.3 Reference Settings

The Reference Settings consists of six fields, a NTP Query Interval and five NTP Server Address Pool entries. The NTP Query Interval is a number (in seconds) entered by the user. The NTP Query Interval will be invalid for the first 300 seconds because the NTP client will be sampling the time once every second and adjusting the internal clocks in the NTP servers using the internal Proportional Integral algorithm. After the first 300 seconds, the NTP client will begin repeatedly querying the server after every query interval.

The NTP Server Address Pool allows the user to enter up to five NTP server addresses. The system will read the five NTP server addresses and any non-zero address. The system will try to connect to each address to get its time. Then the system will calculate the average time for all retrieved times to get a more accurate final time.

4.6 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. Topics discussed in the Help screen include an introduction, theory of operation, time zone, daylight saving time, daylight saving time (DSTO), time output format table, reference, NTP server, and NTP client and server address pool.



The screenshot shows the Brandywine Communications Help screen. At the top, there is a navigation bar with tabs for Setup, Time, Display, Password, Reference, and Help. The Help tab is selected. Below the navigation bar, the word "Help" is displayed in a large font. The main content area contains a message: "This page provides help on various topics. Please select from the topics below." followed by a list of topics: Introduction, Time Output Format Table, Time Zone, Daylight Saving Time, Reference, NTP Server, NTP Client and NTP Client Server Address Pool, and Set Sync Mode. Below this list, the "Introduction" topic is expanded, showing a paragraph about the Network Time Display (NTD) and its primary purpose.

Help

This page provides help on various topics. Please select from the topics below.

Topics:

- [Introduction](#)
- [Time Output Format Table](#)
- [Time Zone](#)
- [Daylight Saving Time](#)
- [Reference](#)
- [NTP Server](#)
- [NTP Client and NTP Client Server Address Pool](#)
- [Set Sync Mode](#)

[Introduction](#)

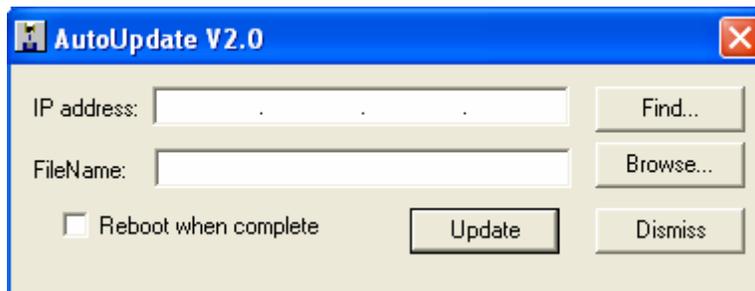
The Network Time Display (NTD) is a unique blend of technology and a nonspatial continuum in which events occur in apparently irreversible succession from the past through the present to the future -- time.

The NTD primary purpose is to display time and display it with as much accuracy as possible. Using a Proportional Integral (PI) algorithm, the NTD will only set or synchronize the clock once and control its internal clocks to the [reference](#) selected typically a Network Time Server. This control will increase or decrease the internal clocks to cope with the changing environment and reference.

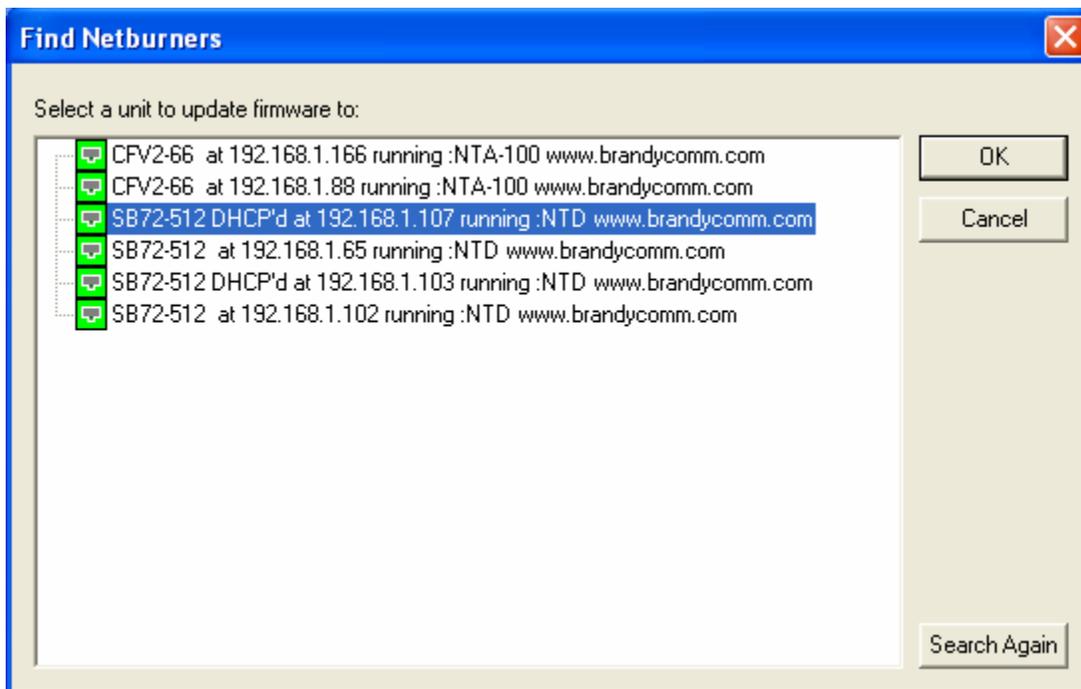
5 Uploading Firmware

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

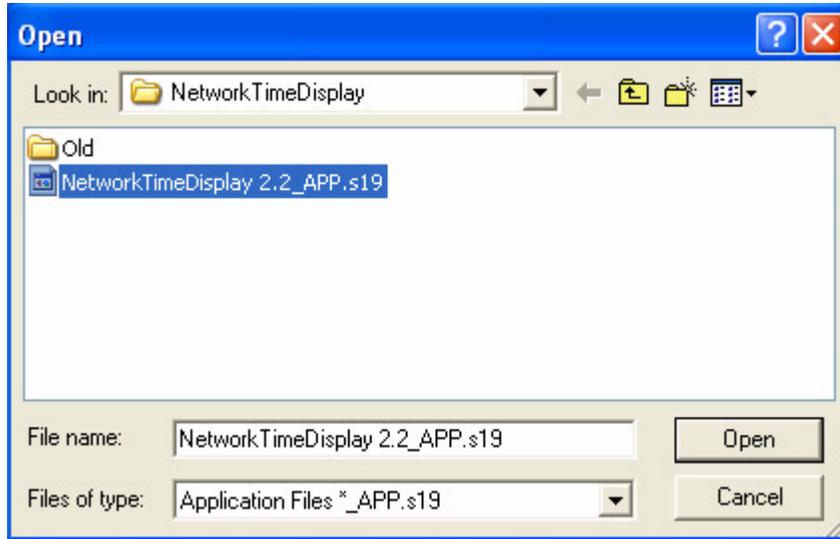
1. Double click on the AutoUpdate icon and the AutoUpdate V2.0 screen will be displayed.



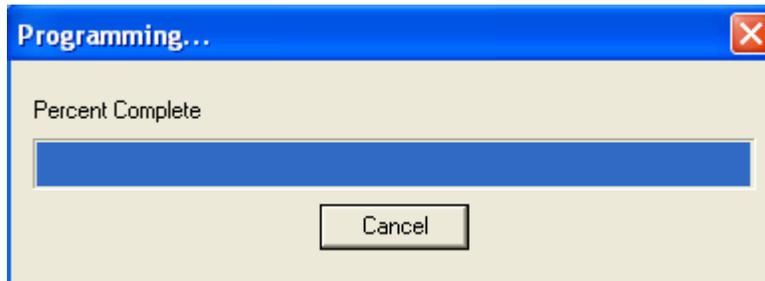
2. Enter the IP address of the NTD in the IP address field. If the user does not know the IP address, press the Find button and the Find Netburners screen will be displayed. Locate and click on the IP address of the unit and click the OK button. The IP address field will be completed for you. If the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



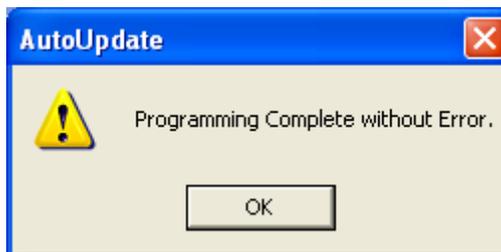
3. Enter the path name to the new released file. If the user does not know the path name, press the Browse button and the Open screen will be displayed. Locate and click on the file and click the Open button. The File Name field will be completed for you.



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 the Programming screen will be displayed for a few seconds.



7. After the Programming screen automatically closes, the AutoUpdate screen will be displayed. Click the OK button and now the uploading firmware process is completed.



6 Drawings

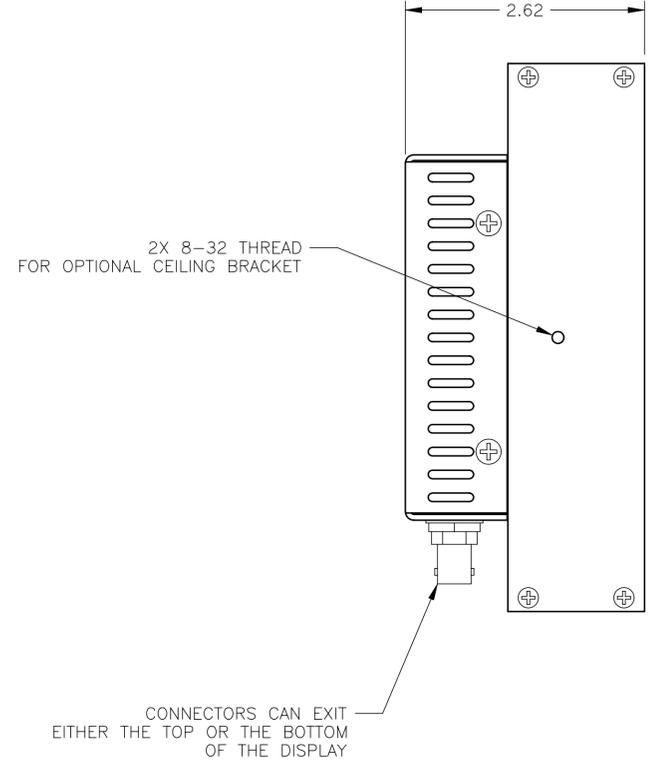
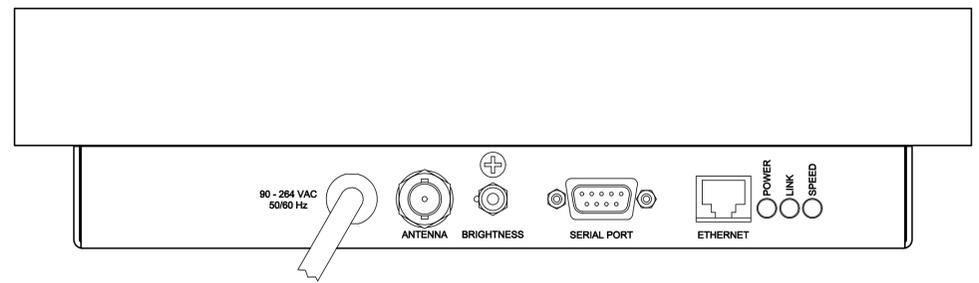
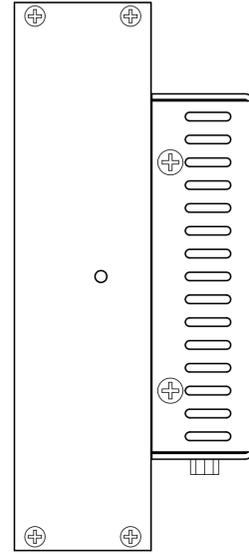
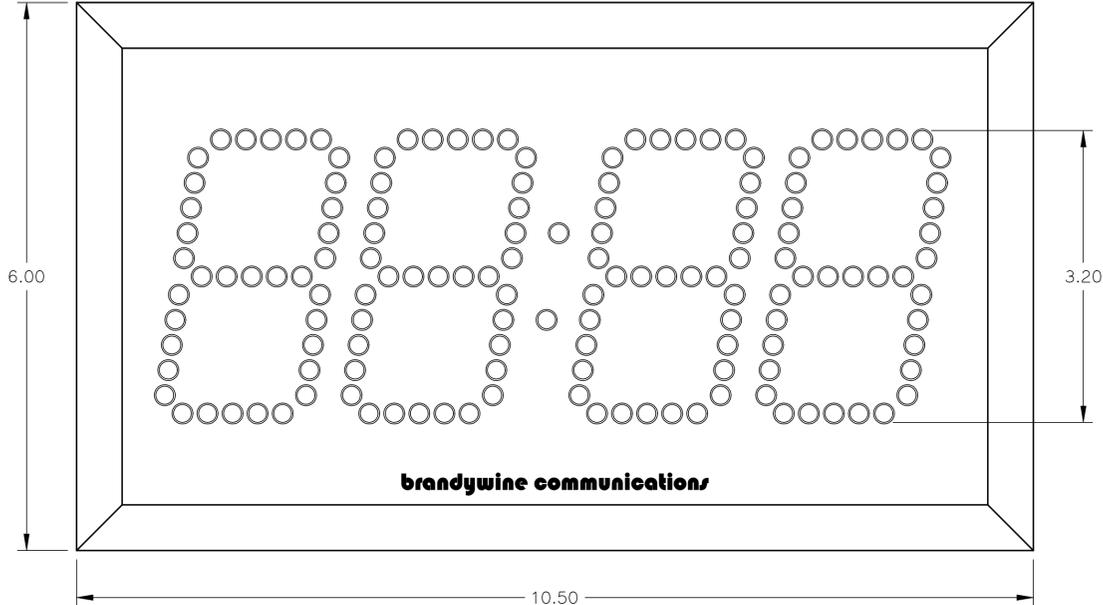
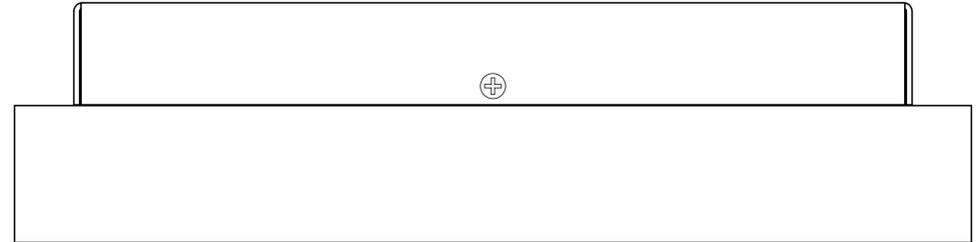
FIGURE	DESCRIPTION
1	NTD-104 and NTD-204 Mechanical Outline
2	NTD-106 and NTD-206 Mechanical Outline
3	NTD-5104 and NTD-5204 Mechanical Outline
4	NTD-5106 and NTD-5206 Mechanical Outline

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REVISION				
REV	DESCRIPTION	DRFT	DATE	APPROVED



QTY REQD	QTY REQD	ITEM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	CODE
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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		PROG/PROJ	NTD
DIMENSIONS APPLY AFTER FINISH		DRAWN	Lind
TOLERANCES		ENGINEERING	GHS
HOLE DIA±	.xx ±		
ANGLES±	xxx ±		
MATERIAL			
FINISH			
QTY NEXT ASSEMBLY USED ON	APPLICATION		
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brandywine communications			
2230 South Fairview, Santa Ana, California 92704			
TITLE OUTLINE DRAWING NETWORK TIME DISPLAY (HM)			
SIZE	CAGE CODE	DWG NO.	REV
D	03NF8	850000014	N/C
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NOTE: UNLESS OTHERWISE SPECIFIED.

D

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B

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850000014 N/C/B

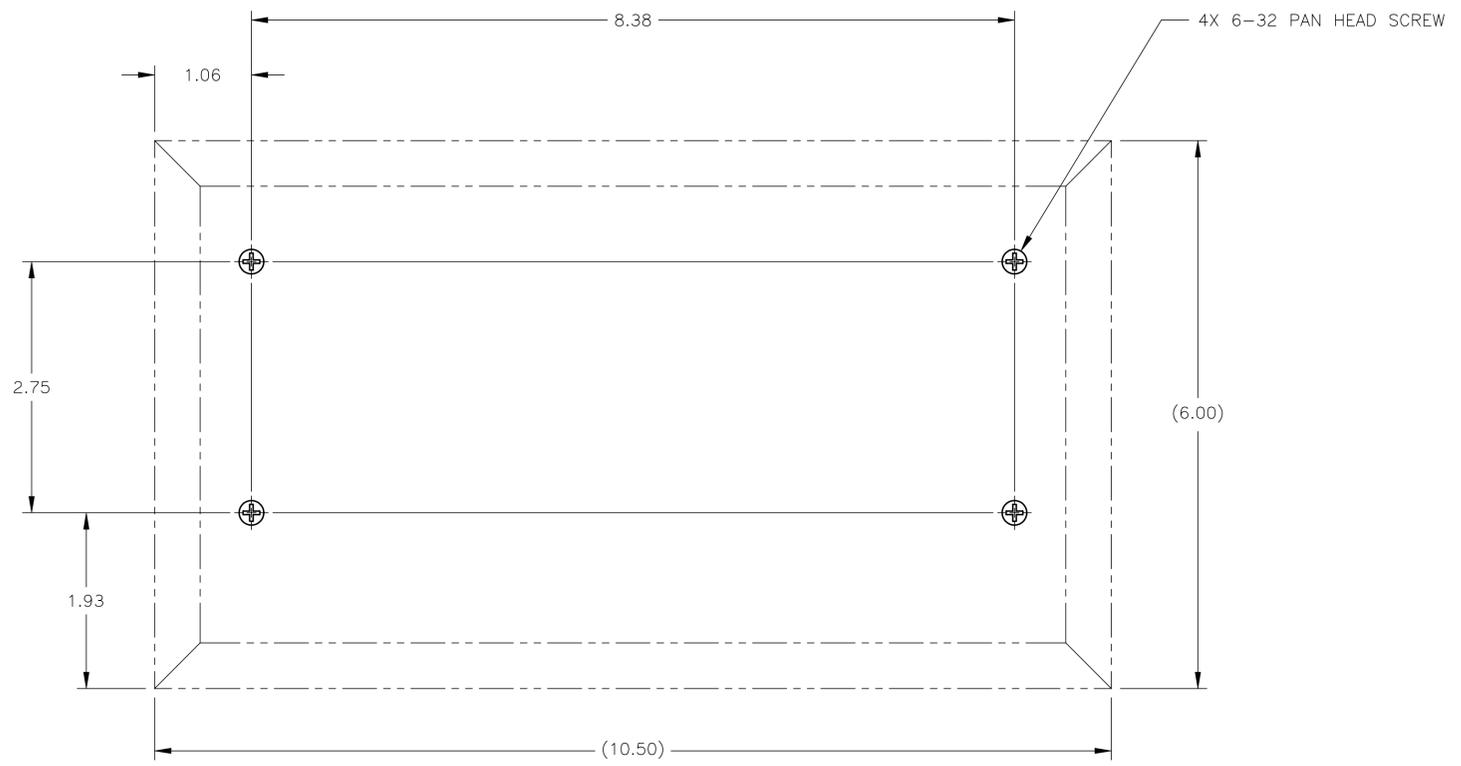
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3

2

1

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WALL MOUNTING DETAIL
 AS VIEWED FROM FRONT OF DISPLAY

SIZE	CAGE CODE	DWG. NO.	REV
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SCALE	1/1	DO NOT SCALE DRAWING	SHEET 2 OF 2

850000014 N/C

4

3

2

1

4

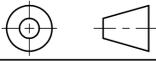
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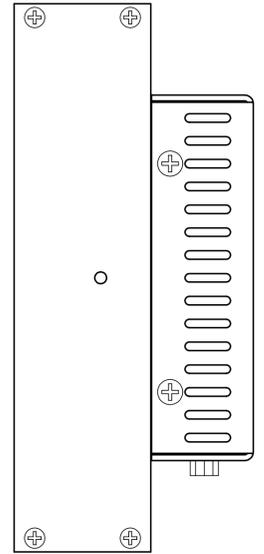
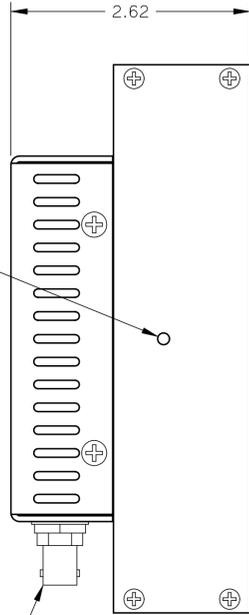
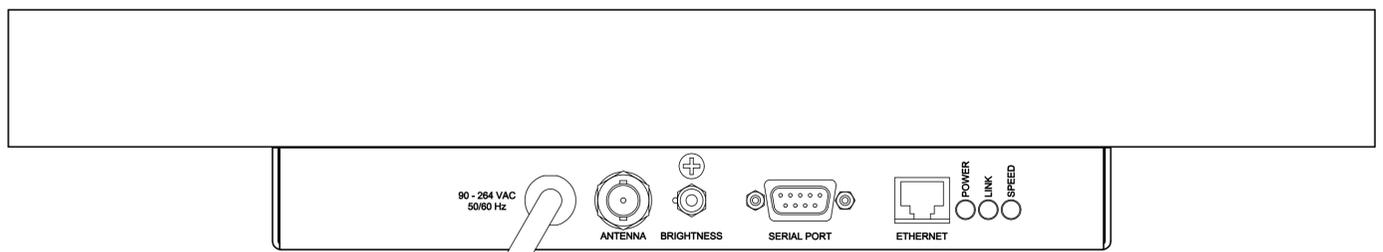
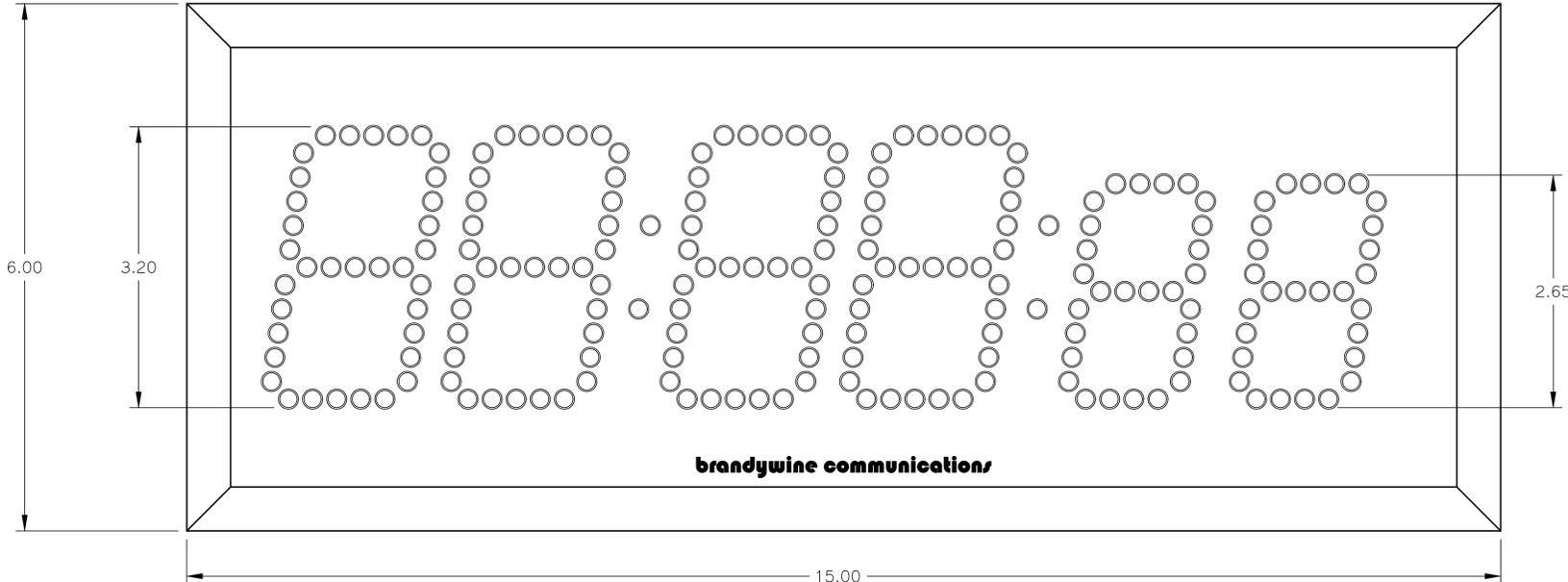
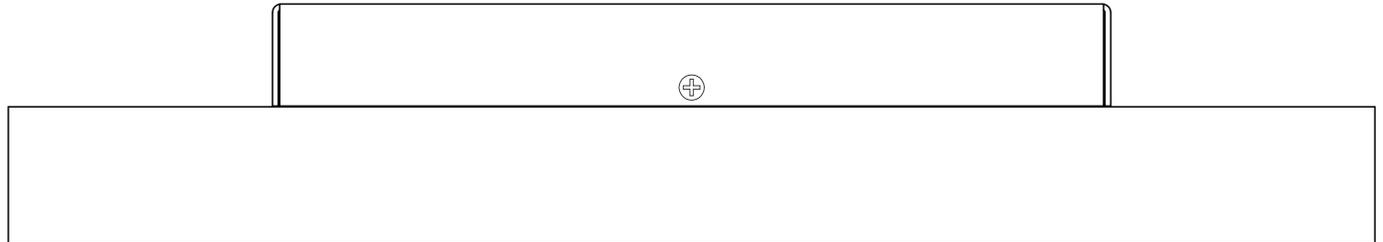
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THIRD ANGLE PROJECTION



REVISION				
REV	DESCRIPTION	DRFT	DATE	APPROVED



2X 8-32 THREAD FOR OPTIONAL CEILING BRACKET

CONNECTORS CAN EXIT EITHER THE TOP OR THE BOTTOM OF THE DISPLAY

NOTE: UNLESS OTHERWISE SPECIFIED.

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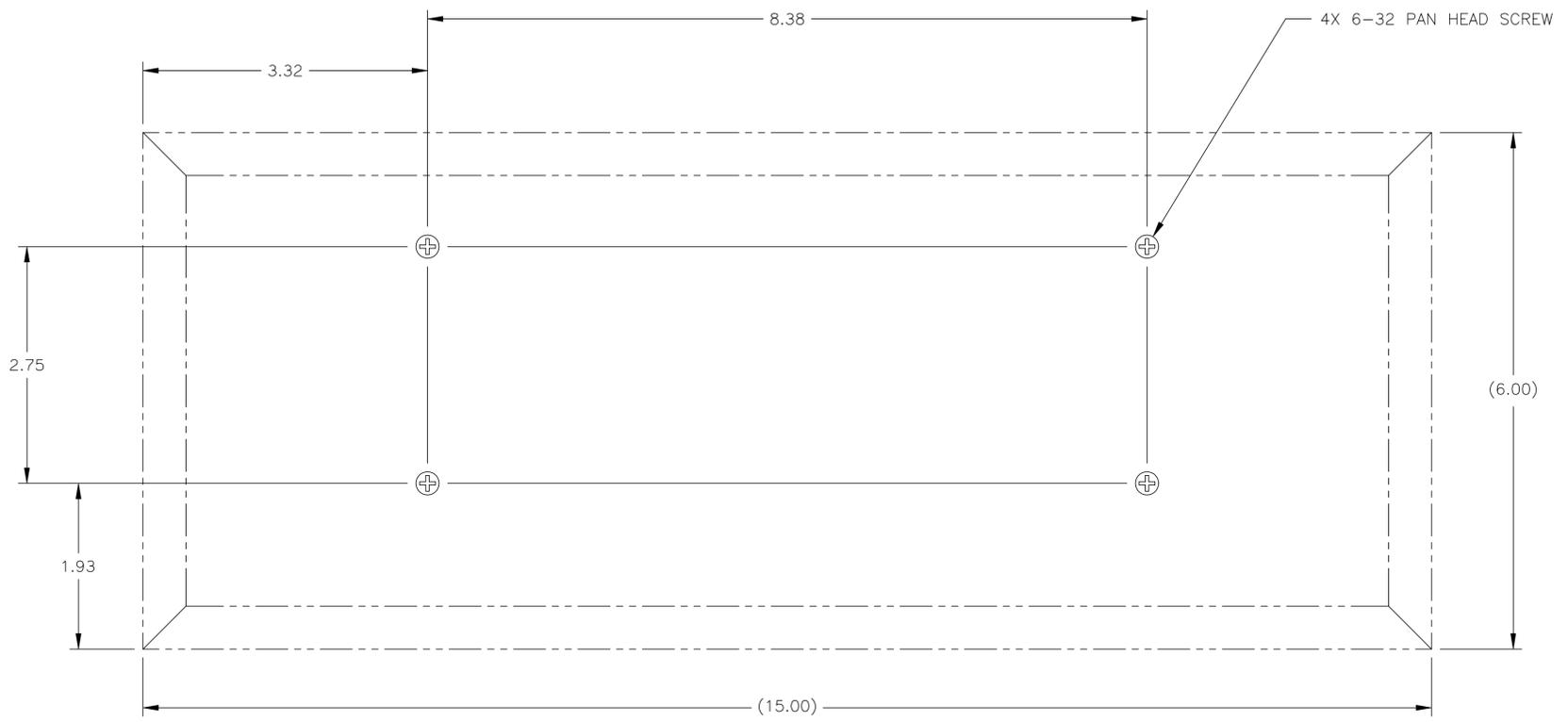
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HOLE DIA±	.xx ±		
ANGLES±	xxx ±		
MATERIAL			
FINISH			
QTY	QTY	NEXT ASSEMBLY	USED ON
N/A	U/O	APPLICATION	SURFACE ROUGHNESS ✓

brandywine communications		2230 South Fairview, Santa Ana, California 92704	
TITLE			
OUTLINE DRAWING NETWORK TIME DISPLAY (HMS)			
SIZE	CAGE CODE	DWG NO.	REV
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SCALE	1/1	DO NOT SCALE DRAWING	SHEET 1 OF 2

850000015 N/C/B

A

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 AS VIEWED FROM FRONT OF DISPLAY

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SCALE	1/1	DO NOT SCALE DRAWING	SHEET 2 OF 2

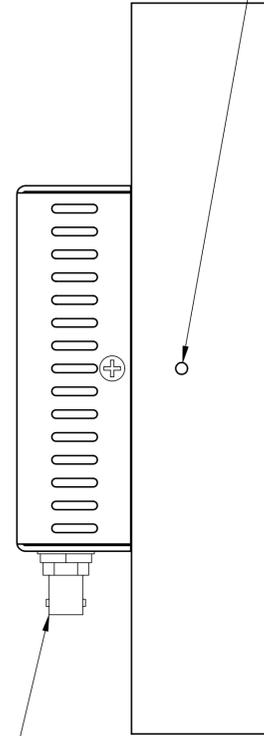
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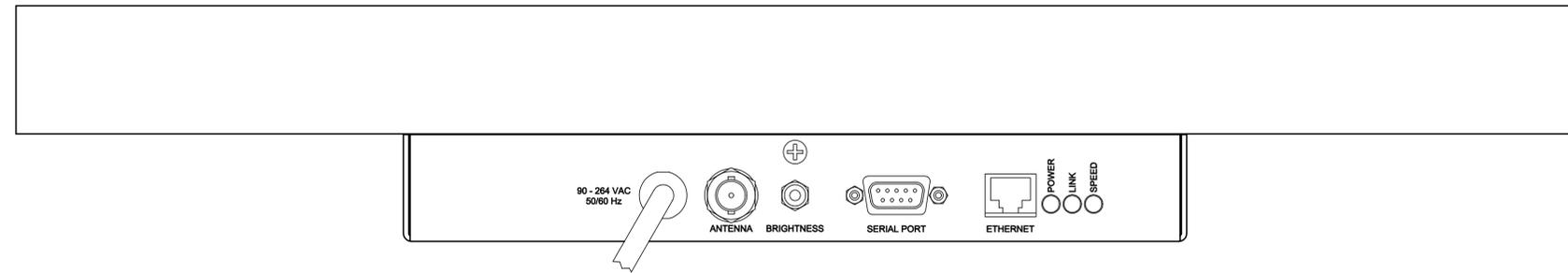
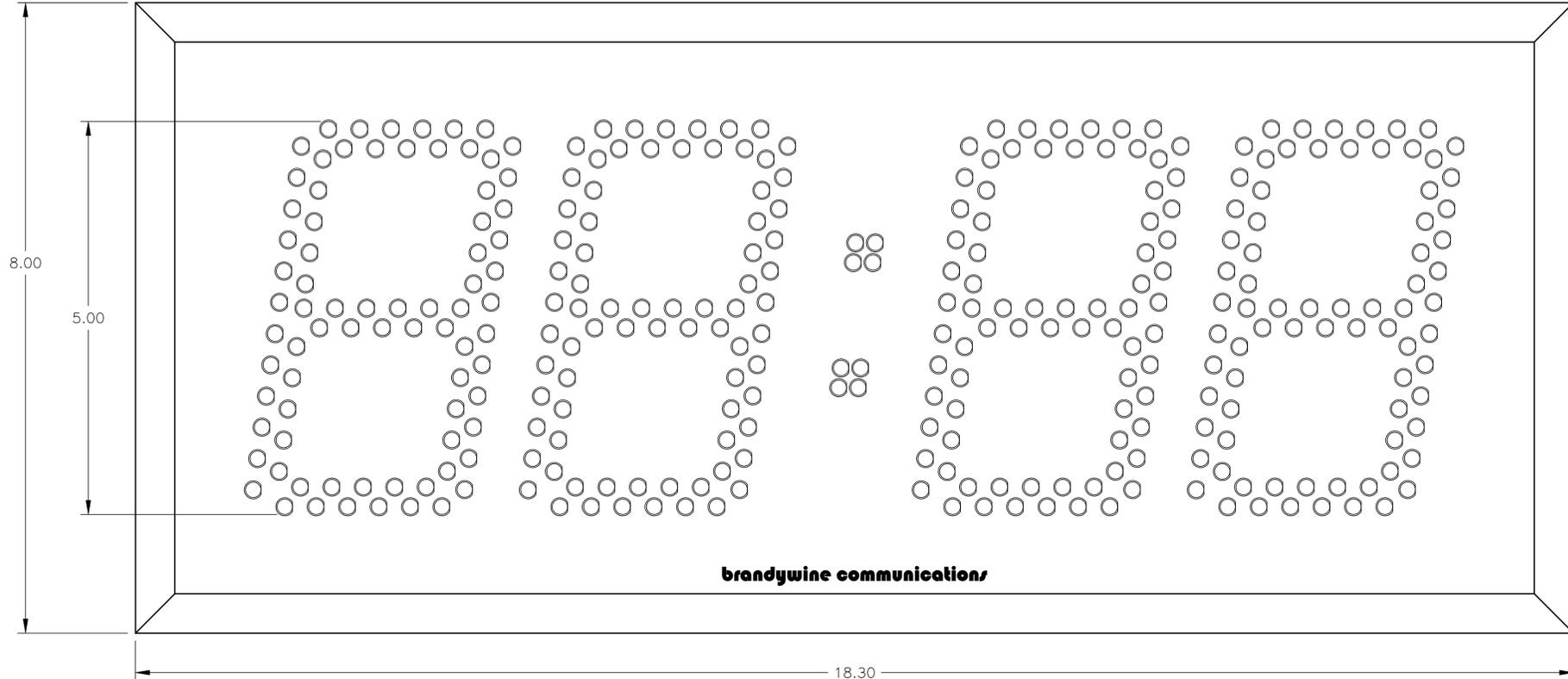


REVISION				
REV	DESCRIPTION	DRFT	DATE	APPROVED

2X 8-32 THREAD
FOR OPTIONAL CEILING BRACKET



CONNECTORS CAN EXIT
EITHER THE TOP OR THE BOTTOM
OF THE DISPLAY



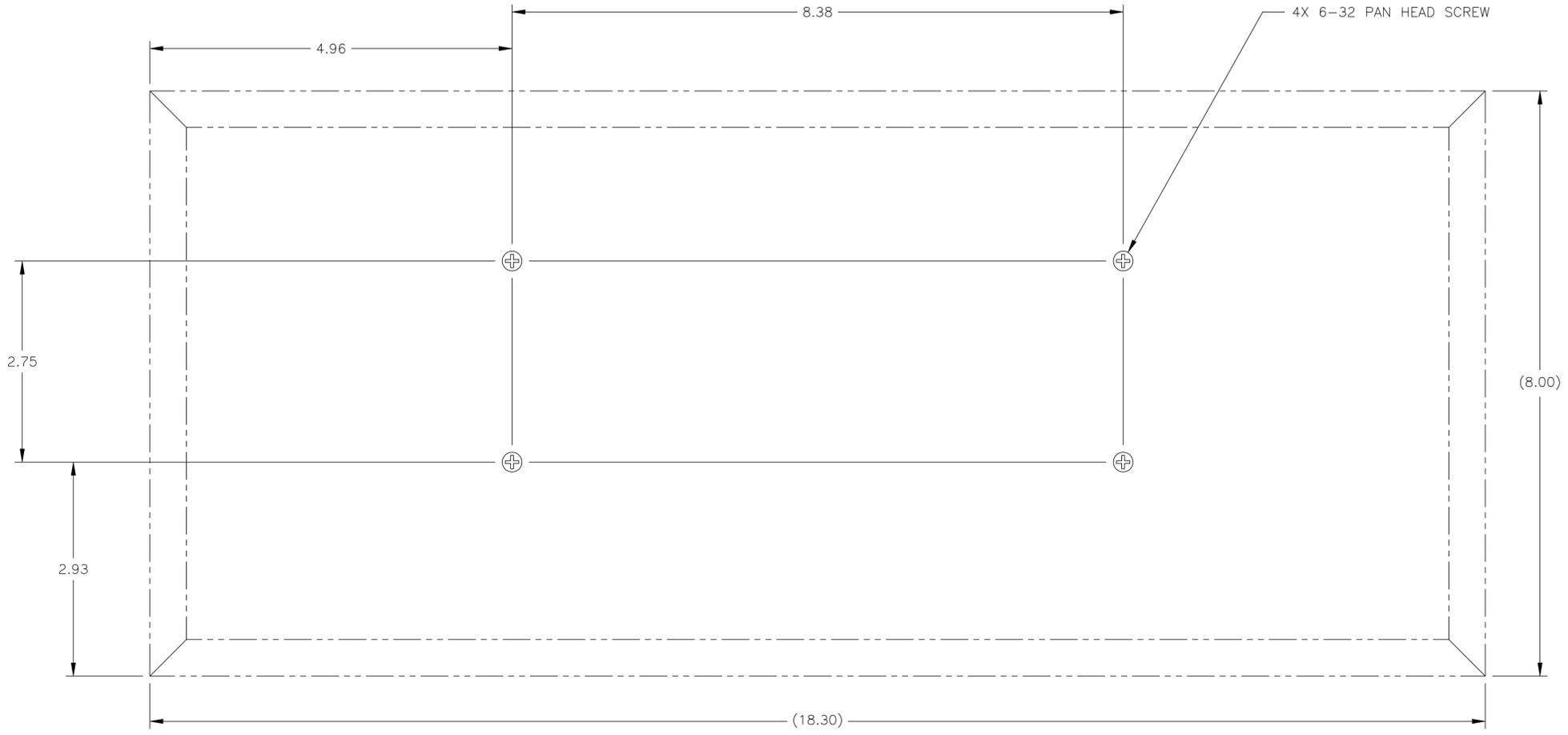
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DIMENSIONS APPLY AFTER FINISH				DRAWN	Lind	7/23/04	
TOLERANCES				ENGINEERING	GHS	JUL 04	
HOLE DIA±				.xx ±			
ANGLES±				xxx ±			
MATERIAL							
FINISH							
QTY	QTY	NEXT ASSEMBLY	USED ON				
N/A	U/O		APPLICATION	SURFACE ROUGHNESS ✓			
brandywine communications 2230 South Fairview, Santa Ana, California 92704				TITLE OUTLINE DRAWING - 5.0" NETWORK TIME DISPLAY (HM)			
SIZE	CAGE CODE	DWG NO.	REV				
D	03NF8	850000035	N/C				
SCALE	1/1	DO NOT SCALE DRAWING	SHEET 1 OF 2				

850000035 N/C/B

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 AS VIEWED FROM FRONT OF DISPLAY

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SCALE 1/1	DO NOT SCALE DRAWING	SHEET 2 OF 2	

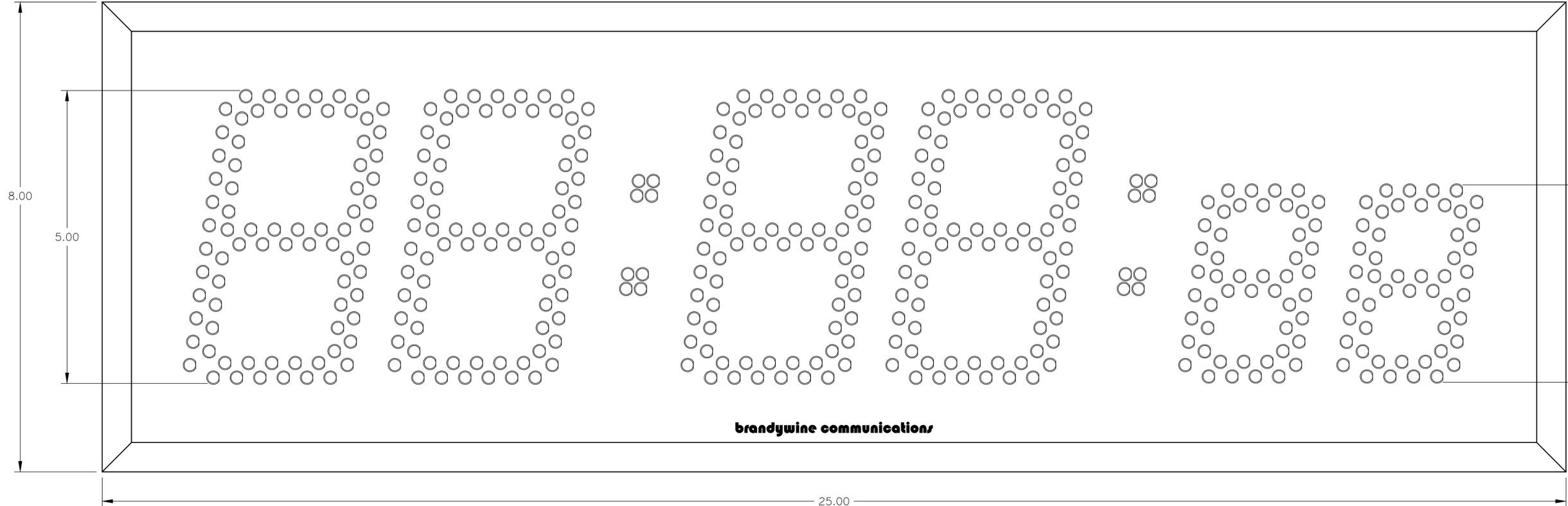
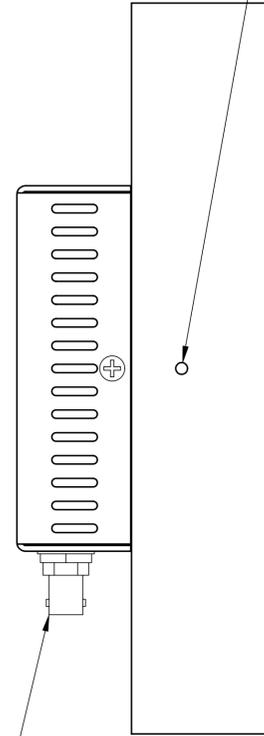
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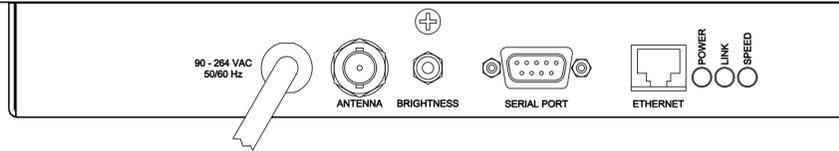
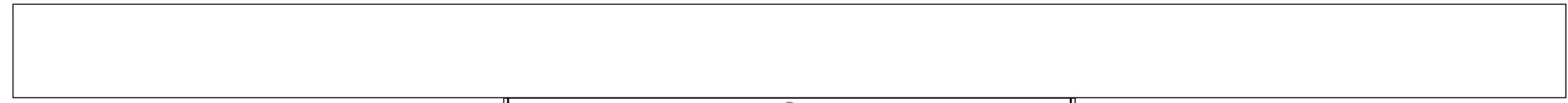


REVISION				
REV	DESCRIPTION	DRFT	DATE	APPROVED

2X 8-32 THREAD FOR OPTIONAL CEILING BRACKET



CONNECTORS CAN EXIT EITHER THE TOP OR THE BOTTOM OF THE DISPLAY



QTY REQD	QTY REQD	ITEM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	CODE
-2	-1						

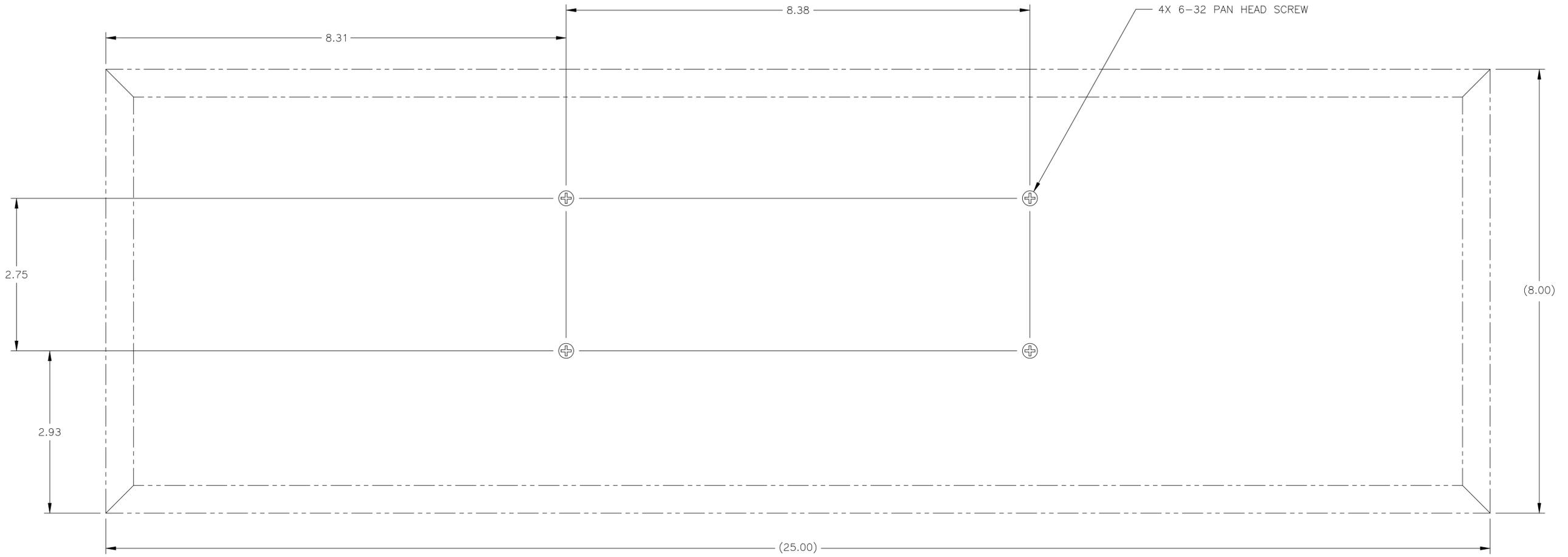
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DIMENSIONS APPLY AFTER FINISH		DRAWN	Lind 7/23/04
TOLERANCES		ENGINEERING	GHS JUL 04
HOLE DIA±	.xx ±		
ANGLES±	xxx ±		
MATERIAL			
FINISH			
QTY	QTY	NEXT ASSEMBLY	USED ON
N/A	U/O	APPLICATION	
		SURFACE ROUGHNESS	✓

brandywine communications			
2230 South Fairview, Santa Ana, California 92704			
TITLE			
OUTLINE DRAWING - 5.0" NETWORK TIME DISPLAY (HMS)			
SIZE	CAGE CODE	DWG NO.	REV
D	03NF8	850000036	N/C
SCALE	1/1	DO NOT SCALE DRAWING	SHEET 1 OF 2

NOTE: UNLESS OTHERWISE SPECIFIED.

D C B A 850000036 N/C B

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WALL MOUNTING DETAIL
 AS VIEWED FROM FRONT OF DISPLAY

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SCALE 1/1	DO NOT SCALE DRAWING	SHEET 2 OF 2	

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