

User Guide

Enhanced Network Time Appliance

Model ENTA-R

P/N 001-XXXX (0226/0286)

Revision B

August 2011

Brandywine Communications 1153 Warner Ave. Tustin, CA 92780 (714) 755 1050 (714) 755 0175

http://www.brandywinecomm.com



REVISION	DATE	COMMENTS
A	July 2011	Initial Release
В	August 2011	Added new FPGA load procedure.



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.

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

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1 Specifications

- 1.1 GPS Receiver
- 1.1.1 Receiver Type

	Describes	Architecture	12 parallel channels
•	Dynamics	Velocity	1000 knots everywhere
-		Acceleration Jerk	 From Knots at annuades < 60000 ft. 4 g 5 m/s³
•	Acquisition Time	Hot (with the current almanac, position, time, and	< 20 s typical
		Warm (with the current almanac, position, and time) Cold	< 50 s typical < 300 s typical
•	Positioning Accuracy	Fix mode Site Survey mode	< 25 m SEP < 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 (typical)	$< 5x10^{-10}$ per month when free running
1.0	1	Design lifetime	± 2x10* ;-20 C t0 +50 C > 20 years
1.3	Inputs		
1.3.1	Antenna	Type Connector Pre-amp power	Active patch antenna BNC 5 VDC @ 80 mA via center conductor
1.3.2	1 PPS		
		Signal used Connector Level	1 PPS BNC 2.0 V min & 5.0 V max (TTL compatible)
1 2 2		Impedance Minimum pulse width On time	50Ω 5 microseconds Rising edge
1.3.3	ΙΚΙΟ-Ď	Signal used	IRIG B122 and B123 per IRIG 215.98 2 – 5 Vpp
		Connector	BNC



1.4.1 Reference Frequency Output Frequency Connector Output level 10 MHz BNC TTL INTO 502 1.4.2 Time Code - IRIG B + IRIG E Code format IEEE 1344 Ext. IRIG B modulated DC Level Shit Amplitude 1.4.2 Time Code - IRIG B + IRIG E Code format IEEE 1344 Ext. IRIG B modulated DC Level Shit Amplitude 1.4.3 Serial Time Code RS 232/ RS 422 (Not Used) BNC 1.4.4 Pulse Rates BNC 1.4.4 Pulse Rates 0-5 V logic compatible Volget wolds 1.4.4 Pulse Rates 0-5 V logic compatible Volget wolds 1.5 Network Ports BNC 1.6 Status Indicators 2 Prit type Protects supported Connector 0-5 V logic compatible Volget compatible Volget impedance 50 ohm BNC 1.6 Status Indicators 2 Prit type Protects supported Connector 2 Element 10/100BaseT Protects supported Connector 2 Prit type Protects supported Connector 2 Prit type Protects supported Connector 2 Prit type Protects supported Connector 2 Prit type Protects supported Connector 2 Prit type Protect supported Connector 2 Prit type Protect Supported Connector 2 Prit type Protect Supported Connector 2 Prit type Prit C 130(N Teine (RFC B54) Prit C 150°C Operating -20°C to i 50°C Operating -20°C to i 50°C Operating -20°C to i 50°C Operating -20°C to i 50°C Prit manage - 3 to -85°C 1.6	1.4	Outputs		
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1.4.2 Time Code - IRIG B + IRIG E Code format IEEE 1344 Ext. IRIG B modulated DC Level Shift Modulation ratio Amplitude 3 Vip pilot 600 of modulated) 3 Vip pilot 600 of modulated) T Link 50 ofm (DC Level Shift) DC driset voltage < 0.05 V			Connector	BNC
1.4.2 Time Code - IRIG B + IRIG E Code format IEEE 134 Ext. Modulation ratio Amplitude 31 Vpp Into 600 ohm (modulated DC Level Shift 31 nominal 3 Vpp Into 600 ohm (modulated) 3 Vpp Into 600 ohm (modulated) 4 Vp Into 600 ohm (modulated) 4 Vpi Into 62 Vpl Vpe Power (Dual redundant PSU; Hot swappable) Range Power (Connector Incore			Output level	ΤΤL ΙΝΤΟ 50Ω
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 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 Unit Operating 20, 000 ft Transport 40, 000 ft Power (Dual redundant PSU; Hot swappable) Range Power Qownector EC 320 with integrated switch and fuse Fuse A 5x20mm slo-blo 	1.0	Tomporoturo	1	
Antenna Operating -20 c to +30 c Antenna Operating -20 c to +30 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 Transport 40, 000 ft Power (Dual redundant PSU; Hot swappable) Range 85-264 VAC 50/60 Hz Power 40W Nom. Connector IEC 320 with integrated switch and fuse Fuse 1A 5x20mm slo-blo	•	remperature	Unit	Operating 20%C to E0%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 Transport 40, 000 ft Power (Dual redundant PSU; Hot swappable) Range 85-264 VAC 50/60 Hz Power 40W Nom. Connector IEC 320 with integrated switch and fuse Fuse 1A 5x20mm slo-blo			Antenna	Operating -20 \pm to +50 \pm
 Humidity Unit Up to 95% RH non-condensing Not limited Altitude Unit Operating 20,000 ft Transport 40,000 ft Power (Dual redundant PSU; Hot swappable) Range Power Agree 40W Nom. Connector Fuse Fuse 1A 5x20mm slo-blo 			All units	Storage -55 to +85°C
Unit Up to 95% RH non-condensing Antenna Not limited • Altitude Unit Operating 20, 000 ft Transport 40, 000 ft • Power (Dual redundant PSU; Hot swappable) Range 85-264 VAC 50/60 Hz Power 40W Nom. Connector IEC 320 with integrated switch and fuse Fuse 1A 5x20mm slo-blo	•	Humidity		
Antenna Not limited Not limited Altitude Unit Operating 20, 000 ft Transport 40, 000 ft Transport 40, 000 ft Range 85-264 VAC 50/60 Hz Power 40W Nom. Connector IEC 320 with integrated switch and fuse Fuse 1A 5x20mm slo-blo			Unit	Up to 95% RH non-condensing
 Attrude Unit Operating 20, 000 ft Transport 40, 000 ft Power (Dual redundant PSU; Hot swappable) Range Power AWW Nom. Connector Fuse 1A 5x20mm slo-blo 			Antenna	Not limited
Power (Dual redundant PSU; Hot swappable) Range 85-264 VAC 50/60 Hz Power 40W Nom. Connector IEC 320 with integrated switch and fuse Fuse 1A 5x20mm slo-blo	•	Alliude	Unit	Operating 20, 000 ft
Power (Dual redundant PSU; Hot swappable) Range 85-264 VAC 50/60 Hz Power 40W Nom. Connector IEC 320 with integrated switch and fuse Fuse 1A 5x20mm slo-blo			Orat	Transport 40, 000 ft
Range85-264 VAC 50/60 HzPower40W Nom.ConnectorIEC 320 with integrated switch and fuseFuse1A 5x20mm slo-blo	•	Power (Dual redund	lant PSU; Hot swappable)	•
Power40W Nom.ConnectorIEC 320 with integrated switch and fuseFuse1A 5x20mm slo-blo		•	Range	85-264 VAC 50/60 Hz
Fuse 1A 5x20mm slo-blo			Power	40W Nom.
			Fuse	1A 5x20mm slo-blo



MIL-STD_461E RE101 RE102 CE102

1.9 Mechanical

Size (unit)

17" x 1.72" x 9" excluding the connectors and handles. Front panel width 19".

Weight

5 lbs. nominal

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1.10 Rear Panel Connections

J-Number	Connector Type	Connector Name	Pin	Pin Description	Jumper Defaults	Signal Levels
J1	SMA-Female	1PPS GPS 1	Center	1PPS A input		TTL levels
			Shield	1PPS A return		
J2	SMA-Female	HQ GPS 1	Center	HQ A input		TTL levels
			Shield	HQ A return		
J3	SMA-Female	1PPS GPS 2	Center	1PPS B input		TTL levels
			Shield	1PPS B return		
J4	SMA-Female	HQ GPS 2	Center	HQ B input		TTL levels
			Shield	HQ B return		
J5	SMA-Female	Output 1	Center	1PPS/ HQ output 1	1PPS	TTL levels
			Shield	GND		
J6	SMA-Female	Output 2	Center	1PPS/ HQ output 2	1PPS	TTL levels
			Shield	GND		
J7	SMA-Female	Output 3	Center	1PPS/ HQ output 3	1PPS	TTL levels
			Shield	GND		
J8	SMA-Female	Output 4	Center	1PPS/ HQ output 4	1PPS	TTL levels
			Shield	GND		
J9	DB9-Female	Diff Outputs 5-7	1	1PPS/HQ output 5	1PPS	LVDS + levels
			2	/1PPS/HQ output 5	1PPS	LVDS - levels
			3	1PPS/HQ output 6	1PPS	LVDS + levels
	+		4	/TPPS/HQ output 6	1222	LVDS - levels
			5		IPPS	LVDS + Ieveis
			7			
			8	GND		
			9	/1PPS/HQ output 7	1PPS	LVDS - levels
110	DB9-Female	Diff Outputs 8-10	1	1PPS/HO output 8	1PPS	LVDS + levels
510	DD71 ciliaic	Diri Odipuls o To	2	/1PPS/HQ output 8	1PPS	LVDS - levels
			3	1PPS/HQ output 9	1PPS	LVDS + levels
			4	/1PPS/HQ output 9	1PPS	LVDS - levels
			5	1PPS/HQ output 10	1PPS	LVDS + levels
			6	GND		
			7	GND		
			8	GND		
			9	/1PPS/HQ output 10	1PPS	LVDS - levels
J11	DB9-Female	Diff Outputs 11-13	1	1PPS/HQ output 11	1PPS	LVDS + levels
			2	/TPPS/HQ output TT	1005	LVDS - levels
			3	1PPS/HQ output 12		LVDS + levels
			4 5	1PPS/HQ output 12	1DDS	LVDS - levels
			6	GND	1113	LVD3 + IEVEIS
			7	GND		
			8	GND		
			9	/1PPS/HQ output 13	1PPS	LVDS - levels
J12	DB9-Female	Diff Outputs 14-16	1	1PPS/HQ output 14	1PPS	LVDS + levels
			2	/1PPS/HQ output 14	1PPS	LVDS - levels
			3	1PPS/HQ output 15	1PPS	LVDS + levels
			4	/1PPS/HQ output 15	1PPS	LVDS - levels
			5	1PPS/HQ output 16	1PPS	LVDS + levels
			0			
			/	GND	+	
			9	/1PPS/HQ output 16	1PPS	I VDS - Jevels
113	DB15-HD-Male	Diff Inputs/Alm Outputs	1	1PPS Innut A+		I VDS + levels
510			2	HO Input A+	1	LVDS + levels
	1	1	3	1PPS Input B+	1	LVDS + levels
			4	HQ Input B+		LVDS + levels
			5	Alarm Out NO		Potential free
						Relay Contact
			6	Alarm Out Common		Potential free
						Relay Contact

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J-Number	Connector Type	Connector Name	Pin	Pin Description	Jumper Defaults	Signal Levels
			7	GND		
			8	GND		
			9	GND		
			10	GND		
			11	Alarm Out NC		Potential free
						Relay Contact
			12	HQ Input B-		LVDS - levels
			13	1PPS Input B-		LVDS - levels
			14	HQ Input A-		LVDS - levels
			15	1PPS Input A-		LVDS - levels
J14	DB9-Male	Console Port	1			
			2	Receive Data		RS232 levels
			3	Transmit Data		RS232 levels
			4			
			5	GND		
			6			
			7			
			8			
			9			
J15	RJ45	Ethernet Port 1	1	Transmit +		Ethernet 10/100
			2	Transmit -		Ethernet 10/100
			3	Receive +		Ethernet 10/100
			4			
			5			
			6	Receive -		Ethernet 10/100
			7			
			8			
J16	RJ45	Ethernet Port 2	1	Transmit +		Ethernet 10/100
			2	Transmit -		Ethernet 10/100
			3	Receive +		Ethernet 10/100
			4			
			5			
			6	Receive -		Ethernet 10/100
			7			
			8			
J17	MS3102A-10SL-3P	Power Input B	A	AC Neutral		
			В	AC GND		
			С	AC Live		
J18	MS3102A-10SL-3P	Power Input B	A	AC Neutral		
			В	AC GND		
			С	AC Live		

Table 1 Connector Pin-outs



2 General Description





The main PCB assembly uses a microprocessor module and an FPGA to do input signal decoding, clock disciplining, frequency division, delay generation, output signal encoding, fault detection and display control. The processor further handles all dual-port ethernet communications and memory management. A fifth overtone 5.014MHz OCXO (ovenized crystal oscillator) is used as the timing oscillator. An accurate 10MHz frequency is synthesized by a DDS, and used as the control frequency. The control frequency is divided down to 1PPS and compared to the 1PPS input signal from the GPS. The phase error between these 2 signals drive the DDS control, which keeps the control system locked to the GPS. *The GPS in the ENTA-R is the equivalent of 1PPS and HQ*.



3 Unpacking and Installation

3.1 Unpacking

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

- 1 ENTA-R
- 2 power cords (optional)
- 1 user guide

3.2 Installation

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

3.3 Connections

3.3.1 Power

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

3.3.2 GPS Connections

Connect the GPS signals, HQ and 1PPS to the GPS 1 inputs, J1 and J2 on the rear panel of the ENTA-R. Contact Brandywine Communications for more details on suitable cables. Connect the second set of GPS signals to J3 and J4 respectively. The ENTA-R will automatically select the GPS input signals that exhibit the best TFOM (Time Figure Of Merit).

3.3.3 RF Loss (Talk about cable lengths and input impedances)

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-R. 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-R 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



3.3.4 Network Connection

Connect one end of the network cable to the RJ-45 10/100 BaseT Network port (J15 PORT 1/J16 PORT 2) and connect the other end of the network cable to your network. The ENTA-R configuration process is described in Section 4 and Section 5.

3.3.5 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-R

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

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

Once the GPS has locked to the input GPS signals time will be displayed on the front panel in the format: DDD: HH:MM: SS.

4.2 Setting the Network Address

The ENTA-R is shipped with DHCP (Dynamic Host Configuration Protocol) enabled.

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-R unit connected to the network.
- 4. Click on the ENTA-R unit that needs to be configured. Please note that the ENTA-R 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-R unit, click the $\frac{\text{Set->}}{\text{button}}$ button.
- 7. Wait 15 seconds for the NDK Settings to be loaded into the ENTA-R unit and for the ENTA-R unit to restart.
- 8. Verify that the ENTA-R 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-R unit in the Address bar, and press <Enter>. For example, type 192.168.1.240 or <u>http://192.168.1.240</u> and press <Enter>.
- 11. Figure 3 will be displayed.
- 12. Configure the ENTA-R unit. For more information on ENTA-R configuration, refer to the Configuration section of the user guide.

IMPORTANT INFORMATION:

If the new NDK Settings make the ENTA-R unit inaccessible from the setup computer, the IP Setup program won't be able to locate the ENTA-R 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-R 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-R unit in the Address bar, and press <Enter>. For example, type 192.168.1.240 or <u>http://192.168.1.240</u> and press <Enter>.
- 4. Figure 3 will be displayed.
- 5. Configure the ENTA-R unit.

brandywine	About	Statue 💌	Configuration T	Contact	Help
About	This page des	scribes the system a	nd displays the system info	rmation.	neip
		SYSTEM DES	CRIPTION		
using a GPS reference to d The ENTA inputs are two G The ENTA outputs are 1 PP The ENTA also supplies tim	iscipline an (PS and 1 PP S and/or Ha e to a netwo	OCXO oscillator. S references. veQuick. ork using the Network	k Time Protocol (NTP).		
System L	ocation:	Location needs to	be set!	Set	
Firmware \ FPGA \ Serial N	Version: Version: Number:	ENTA-R V1.2.1001 FPGA Rev:0.39 01/ 29858	- Mar 3 2011 13:57:33 27/2011 15:47		

Figure 3 ENTA-R System Screen



To properly control and monitor the ENTA-R 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 <u>http://www.sun.com/</u>.
- 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-R configuration may be completed in one of two ways.

- Via the web browser (recommended)
- Via SNMP

5.1 Web Browser Configuration

5.1.1 *About*

The About tab, Figure 4, describes the system and displays the system information.

The About tab allows the location of the unit to be set and displays the firmware and FPGA versions as well as the Serial Number of the ENTA-R.

and wine communication	About	Status ▼	Configuration v	Contact	Help
About	nis page de	scribes the system ar	nd displays the system infor	mation.	
		SYSTEM DES	CRIPTION		
The Enhanced Network Time using a GPS reference to dis	e Appliance scipline an	's (ENTA) primary pu OCXO oscillator.	rpose is to provide time and	l frequency refere	nces
		C astronom			
The ENTA inputs are two GP	PS and 1 PP	5 references.			
The ENTA inputs are two GP The ENTA outputs are 1 PPS	♀S and 1 PP S and/or Ha	veQuick.			
The ENTA inputs are two GP The ENTA outputs are 1 PPS The ENTA also supplies time	PS and 1 PP S and/or Ha e to a netwo	veQuick. ork using the Network	Time Protocol (NTP).		
The ENTA inputs are two GP The ENTA outputs are 1 PPS The ENTA also supplies time	PS and 1 PP S and/or Ha e to a netwo	veQuick. ork using the Network SYSTEM INFO	Time Protocol (NTP).	_	
The ENTA inputs are two GP The ENTA outputs are 1 PPS The ENTA also supplies time System Lo	PS and 1 PP S and/or Ha to a netwo cation:	Stereferences. veQuick. ork using the Network SYSTEM INFO Location needs to t	Time Protocol (NTP). RMATION	Set	
The ENTA inputs are two GP The ENTA outputs are 1 PPS The ENTA also supplies time System Lo Firmware V	S and 1 PP S and/or Ha a to a netwo ocation: ecrition:	STEPERENCES. veQuick. ork using the Network SYSTEM INFO Location needs to I ENTA-R V1.2.1001 -	Time Protocol (NTP). RMATION De set! Mar 3 2011 13:57:33	Set	
The ENTA inputs are two GP The ENTA outputs are 1 PPS The ENTA also supplies time System Lo Firmware V FPGA V	PS and 1 PP and/or Ha to a netwo cation: ersion: ersion:	STEPERENCES. veQuick. ork using the Network SYSTEM INFO Location needs to N ENTA-R V1.2.1001 - FPGA Rev:0.39 01/2	RMATION Pe set! Mar 3 2011 13:57:33 27/2011 15:47	Set	

Figure 4 ENTA-R About Screen



5.1.2 **Status**

Communication/	About	Statiling 🔻	Configuration V	Contact	Help
		General Status	Phase Error Plot		
About	This page de	scribes the system	and displays the system info	rmation.	
		SYSTEM DE	SCRIPTION		
The Enhanced Network Tin using a GPS reference to c	ne Appliance discipline an	e's (ENTA) primary OCXO oscillator.	purpose is to provide time an	d frequency <mark>r</mark> efere	nces
he ENTA inputs are two G	PS and 1 PF	PS references.			
The ENTA inputs are two G	PS and 1 PF	PS references.			
The ENTA inputs are two G The ENTA outputs are 1 PF	PS and 1 PF S and/or Ha	PS references, aveQuick,			
The ENTA inputs are two G The ENTA outputs are 1 PF The ENTA also supplies tim	PS and 1 PF S and/or Ha ne to a netwo	?S references. aveQuick. ork using the Netwo	ork Time Protocol (NTP).		
The ENTA inputs are two G The ENTA outputs are 1 PF The ENTA also supplies tim	PS and 1 PF S and/or Ha	25 references. aveQuick. ork using the Netwo	ork Time Protocol (NTP).		
The ENTA inputs are two G The ENTA outputs are 1 PF The ENTA also supplies tim	PS and 1 PF S and/or Ha	PS references. aveQuick. ork using the Netwo SYSTEM INI	ork Time Protocol (NTP).		
The ENTA inputs are two G The ENTA outputs are 1 PF The ENTA also supplies tim System L	PS and 1 PF PS and/or Ha ne to a netwo ocation:	25 references. aveQuick. ork using the Netwo SYSTEM ING	ork Time Protocol (NTP).	Set]
The ENTA inputs are two G The ENTA outputs are 1 PF The ENTA also supplies tim System L	PS and 1 PF PS and/or Ha ne to a netwo ocation:	SYSTEM INI	FORMATION	Set]
The ENTA inputs are two G The ENTA outputs are 1 PF The ENTA also supplies tim System L Firmware	PS and 1 PF PS and/or Ha ne to a netwo ocation: Version: Version:	25 references. aveQuick. ork using the Netwo SYSTEM INI ENTA-R V1.3.100 EPGA Rev:0.39.0	ORMATION	Set 2:19]
The ENTA inputs are two G The ENTA outputs are 1 PF The ENTA also supplies tim System L Firmware FPGA Serial I	PS and 1 PF PS and/or Ha ne to a netwo ocation: Version: Version: Number:	25 references. aveQuick. ork using the Netwo SYSTEM INI ENTA-R V1.3.100 FPGA Rev:0.39 0. Engineering Unit	ORMATION 3 (BETA) - Jun 29 2011 09:57 1/27/2011 15:47 DON'T TOUCH	Set]
The ENTA inputs are two G The ENTA outputs are 1 PF The ENTA also supplies tim System L Firmware FPGA Serial I	PS and 1 PF PS and/or Ha ne to a netwo ocation: Version: Version: Number:	25 references. aveQuick. ork using the Netwo SYSTEM INI ENTA-R V1.3.100 FPGA Rev:0.39 0 Engineering Unit I	FORMATION 3 (BETA) - Jun 29 2011 09:57 L/27/2011 15:47 DON'T TOUCH	Set]

Under the Status tab there are two drop down tabs, *General Status* and *Phase Error Plot*. The Phase Error Plot is not utilized in this module.

5.1.2.1 General Status



Figure 5 General Status 20 MANUAL P/N 900000124 REV B



The General Status consists of 13 fields which indicate the Time, Hour Meter, Up Time, System State, System TFOM, System Alarms, Reference Mode, Selected Reference, GPS-1 Reference Status, GPS-2 Reference Status, System 12V A, System 12V B and Connection Status.

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

5.1.2.2 Status Phase Error Plot



Figure 6 Status Phase Error Plot

Not used.



5.1.3 **Configuration**

communication	About	Status 🔻	Configu	uration ▼	Conta	Contact	
About	This page de	scribes the system a	IP Settings Outputs	SNMP Password	Reference Display	Alarms	•
, 150 LL							
		SYSTEM DES	SCRIPTION				
The Enhanced Network Tir using a GPS reference to	me Appliance discipline an	's (ENTA) primary p OCXO oscillator.	urpose is to p	rovide time ar	nd frequency	referenc	es
The Enhanced Network Tir using a GPS reference to The ENTA inputs are two C The ENTA outputs are 1 Pl The ENTA also supplies tin	me Appliance discipline an GPS and 1 PP PS and/or Ha ne to a netwo	's (ENTA) primary p OCXO oscillator. S references. veQuick. ork using the Networ	nurpose is to p rk Time Protoc	rovide time ar	nd frequency	referenc	es
The Enhanced Network Tir using a GPS reference to The ENTA inputs are two C The ENTA outputs are 1 PI The ENTA also supplies tin	me Appliance discipline an GPS and 1 PP PS and/or Ha ne to a netwo	's (ENTA) primary p OCXO oscillator. S references. veQuick. ork using the Networ SYSTEM INF	ourpose is to protocorrection or the protocorrection of the protocor	rovide time an	nd frequency	referenc	es
The Enhanced Network Tir using a GPS reference to The ENTA inputs are two C The ENTA outputs are 1 Pl The ENTA also supplies tin System L	me Appliance discipline an GPS and 1 PP PS and/or Ha ne to a netwo ocation:	's (ENTA) primary p OCXO oscillator. S references. veQuick. ork using the Networ SYSTEM INF	ourpose is to protoco	rovide time an	nd frequency	Set	es
The Enhanced Network Tir using a GPS reference to The ENTA inputs are two C The ENTA outputs are 1 Pf The ENTA also supplies tin System L Firmware	me Appliance discipline an GPS and 1 PP PS and/or Ha ne to a netwo .ocation: Version:	's (ENTA) primary p OCXO oscillator. S references. veQuick. ork using the Networ SYSTEM INF	rk Time Protoc ORMATION	rovide time an ol (NTP). 29 2011 09:5	nd frequency	Set	es
The Enhanced Network Tir using a GPS reference to The ENTA inputs are two C The ENTA outputs are 1 Pl The ENTA also supplies tin System L Firmware FPGA	me Appliance discipline an GPS and 1 PP PS and/or Ha ne to a netwo cocation: Version: Version:	's (ENTA) primary p OCXO oscillator. S references. veQuick. ork using the Networ SYSTEM INF ENTA-R V1.3.1003 FPGA Rev:0.39 01	ork Time Protoc ORMATION (BETA) - Jun /27/2011 15:4	rovide time a ol (NTP). 29 2011 09:5 7	nd frequency	Set	es

Under the Configuration tab there are eight drop down tabs; *IP Settings, SNMP, Reference, Alarms, Outputs, Password, Display, and NTP.*



5.1.3.1 IP Settings

The IP Settings tab consists of 8 fields which include IP Address, Subnet Mask, Gateway, DHCP Enabled, IP Address, Subnet Mask, DHCP enabled with a Submit button and a Reset button.

broodunia					
communication/	About	Status ▼	Configuration v	Contact	Help
IP Setup	This page cor	ntains the basic TCP	/IP address, subnet mask, an	d gateway addres	s.
		IP SET	TINGS		
IP	Address:	192.168.1.113			
Subi	net Mask:	255.255.255.0			
1	Gateway:	192.168.1.1			
DHCP	Enabled:	V			
IP	Address:	192.168.1.149			
Subi	net Mask:	255.255.255.0			
	Gateway:	192.168.1.1			
DHCP	Enabled:	$\mathbf{\nabla}$			
		Submit Reset			

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Figure 7 IP Settings



5.1.3.2 SNMP

The SNMP tab consists of 4 fields Read Community, Write Community, Trap IP Address and Download MIB file with 2 buttons; Submit and Reset.

r network e e to set up ual.

Figure 8 SNMP



5.1.3.3 Reference

communication About	Status 🔻	Configuration v	Contact	Help
Reference	may acquire time from n the available time re Please note when su or more information, pl	several time sources. Only of ferences. Also, the status an bmitting changes to the syst ease refer to the user manual	one time reference m d setting for the time em the control loop v al.	ay be reference vill be foro
	REFERENCE S	ELECTION		
Automatic Mode:	w.			
Manual Mode:	6			
Select Reference:	GPS - 1 🔻			
	Submit Reset			
	MANUAL TIM	E SETTINGS		
(Manually set the	e time and date when i	n Manual Reference Selectio	n Mode)	
Month / Day / Year:	7 / 1	/ 2011		
Hour : Minute : Second:	16 _ 6	. 6		
	Submit Reset			
	INPUT DELAY	SETTINGS		
(Set	the 1 PPS input delays	in 5 nanosecond units)		
GPS-1 Input 1PPS Delay;	0	x 5ns		
GPS-2 Input 1PPS Delay:	0	× Sns		
	Submit Reset			
Press stability		and another all subtransport		
			£	

The Reference tab consists of three fields, the Reference Selection, Manual Time Settings and the Input Delay Settings.

5.1.3.3.1 *Reference Selection*

The Reference Selection section has two radio buttons, Automatic Mode of Manual Mode and a Select Reference drop down box; free run, GPS-1 and GPS-2.

5.1.3.3.2 Manual Time Settings

The Manual Time Settings section has manual settings for the month, day, year and for the hour, minute, seconds if the Manual Reference Selection mode is used.

5.1.3.3.3 Input Delay Settings

The Input Delay Settings is used to set the 1PPS input delays in 5 nanosecond units for both inputs; GPS-1 Input 1PPS Delay and GPS-2 Input 1PPS Delay.



5.1.3.4 Alarms

Alarms Alarms	Status v nanagement allows the u ay toggle the alarm and a nable PPS compare, which for more information, ple	Configuration T Contact ser to set the alarm output to active high or active ctivate the analog inputs to detect an alarm. Also h triggers an alarm if the compared value exceeds see refer to the user manual.
ALARM TYPE	STATUS	ENABLE
GPS-1 1PPS Input:	No Fault	2
GPS-1 HQ Input:	No Fault	EZI
GPS-2 1PPS Input;	Fault	121
GPS-2 HQ Input:	Fault	1ZI
12V Power Supply A:	Fault	
12V Power Supply B:	No Fault	121
1.2V Power:	No Fault	121
2.5V Power:	No Fault	121
3.3V Power:	No Fault	22
5V Power:	No Fault	1ZI
Output 1 (J5) Single ended:	No Fault	121
Output 2 (J6) Single ended:	No Fault	121
Output 3 (J7) Single ended:	No Fault	121
Output 4 (J8) Single ended:	No Fault	2
Output 5 (J9) Differential:	No Fault	22
Output 6 (J9) Differential:	No Fault	121
Output 7 (J9) Differential:	No Fault	121
Output 8 (J10) Differential:	No Fault	22
Output 9 (J10) Differential:	No Fault	2
Output 10 (J10) Differential:	No Fault	
Output 11 (J11) Differential:	No Fault	22
Output 12 (J11) Differential:	No Fault	2
Output 13 (J11) Differential:	No Fault	2
Output 14 (J12) Differential:	No Fault	52
Output 15 (J12) Differential:	No Fault	2
Output 16 (J12) Differential:	No Fault	
	Submit Reset	
Connection Status:	Connected	

Figure 10 Alarms

The Alarm tab indicates all the Alarm States as shown in Figure 10 Alarms.



5.1.3.5 Outputs

randywine	About	Status 🔻	Configuration 🔻	Contact	Help	
Outputs	The 1 PPS ou nanosecond (tput allows the user units. For more infor	to set the 1 PPS output delay mation, please refer to the us	time and pulse wi er manual.	dth in 5	
		Output S	ettings			
Output 1P	PS Offset:	0	x 5ns			
Output 1P	rs width:	Submit Rese	t sns			
	Copyright @ 2	907-2010 Brandwine	Communications All rights receive			

Figure 11 Outputs

The Outputs tab allows the user to set the 1PPS output delay time and pulse width in 5 nanosecond units.

5.1.3.6 Password

Communications	About	Status 🔻	Configuration v	Contact	Help
assword	To protect the than 31 chara only required to the user m	system, a userna cters and cannot c when submitting c anual.	me and password is required. ontain any asterisks (*). The hanges to the system. For mo	The password m username and pa re information, pl	ust be le ssword a ease ref
	USE	RNAME AND PAS	SSWORD SETTINGS		
New U	sername:	[]	
Old F	assword:				
New F	Password:				
Confirm New F	assword:	1]		
		Submit Rese	t		

Figure 12 Password 27 MANUAL P/N 900000124 REV B



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.

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.

Communication	About	Statu	is ▼ (Configurati	on ▼		Cor	ntact	He
isplay a	Below are th	ne configura	ition settings for t	he Front P	anel D	isplay.			
		FRONT PA	NEL DISPLAY :	SETTING	s				
Brig	ghtness:	8 🔹 (Least bright = 0	to Most bri	ight <mark>=</mark> .	15)			
Tin	ne zone:	0	Hours -						
DST	l Offset:	1	Hours -						
DS	ST Start:	2	Hours on the	2nd 👻	Sun	▼ in	Mar	•	
C	ST End:	2	Hours on the	First 🔻	Sun	▼ in	Nov	•	
Ena	ble DST:								
		Submit	Reset						

5.1.3.7 Display

Figure 13

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

5.1.3.7.1 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.

5.1.3.8 NTP

server allows the user al, the manual leap indi on, please refer to the	to set the leap indicator to be	automatic or man	ual If set				
	user manual.	completed. For mo	ire				
NTP SE	TTINGS						
: 0	۲						
: ©	0						
No Warning	No Warning						
Submit Rese	t						
	NTP SE	NTP SETTINGS	NTP SETTINGS				

Figure 14 NTP

Figure 14 is displayed when the NTP sub-tab is selected. The NTP sub-tab consists of three sections, the Automatic mode radio button, the Manual mode radio button and the Select Leap Indicator Mode. To save all modifications made to the NTP Server screen, click the Submit button.

The Select Leap Indicator has four drop down selections No Warning, Last minute has 61 seconds, last minute has 59 seconds and Alarm Condition.

The Manual Mode Settings consist of one combo box, the Select Leap Indicator. This allows the user to manually set the leap indicator setting used. The table below 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 4 Leap Indicator Settings



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

5.1.3.9 Contact

brandywine	About	Status ▼	Configuration ▼	Contact	Help				
Contact	Below is the c	contact information	for Brandywine Communicatio	ns.					
	CONTACT DETAILS								
	Brandywine Communications 1153 Warner Ave Tustin CA, 92780								
Phone 714.755.1050 Fax 714.755.0175									
Email info@brandywinecomm.com									
	Copyright © 2007-2010 Brandywine Communications All rights reserved								

The Contact tab provides the Brandywine Communications address and contact phone, fax and email numbers.



5.1.4 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.

brandywine communication	About	Status ▼	Configuration ▼	Contact	Help
Help	This page pro may select a	vides the user with topic from the list (help while using difficult sect of topics below.	ions of the system	n. The user
	1. IN 2. TII 3. DA 4. RE 5. OU 6. AL 7. NT 8. <u>GR</u> 9. <u>SN</u>	HELP CO TRODUCTION MEZONE Y LIGHT SAVING: FERENCE TPUT OFFSET AN ARMS MANAGEME P APH MP	NTENTS 5 ID WIDTH NT		

Figure 15 Help



6 Uploading Firmware

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

1. Double click on the AutoUpdate icon and Figure 16 will be displayed.

AutoUpda	ate V2.0				×
IP address:	192	. 168 .	1.	155	Find
FileName:					Browse
🔽 Rebo	ot when co	mplete	(Up	idate	Dismiss

Figure 16 AutoUpdate Screen

 Enter the IP address of the ENTA-R in the IP address field. If the user does not know the IP address, press the Find button and figure below 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.

Find Netburners		x
Select an NNDK	SB72-512 at 192.168.1.170 running :NTD CFV2-66 at 192.168.1.188 running :PTS II www.brandycomm.c	^
Search Again		ш
		•
	OK Cancel	

Figure 17 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 18 will be displayed. Locate and click on the file and click the Open button.



The file will be in the form '925000062A ENTA-R2v1.00Build 1129_APP.s19'. The File Name field will be completed for you.

🔛 Open			×
Look in:	🕌 Release 🗨	← 🗈 💣 📰 ▾	
	Name	Date modified	Туре
Recent Places	BWProtocol ControlLoop	6/29/2011 9:56 AM 6/29/2011 9:56 AM	File folder File folder
	Drivers	6/29/2011 9:56 AM	File folder
Desktop	MAC-2	6/29/2011 9:56 AM 6/29/2011 9:56 AM	File folder File folder
	NVM	6/29/2011 9:56 AM	File folder
Libraries		6/29/2011 9:56 AM	File folder
		0/25/2011 10.00 AW	3131116
Computer			
Network			
			•
	File name: ENTA-R_APP.s19	-	<u>O</u> pen
	Files of type: Application Files *_APP.s19	•	Cancel

Figure 18 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 19 will be displayed for a few seconds.

Program Netburner	×
Percent Complete	
	Cancel

Figure 19 Programming Screen

7. After above figure automatically closes, Figure 20 will be displayed. Click the OK button and now the uploading firmware process is completed.





Figure 20 AutoUpdate Complete Screen



7 Uploading FPGA

To upload the FPGA for the ENTA-R, the user will need a software application called FPGA Update provided by Brandywine. Follow the steps listed below to upload new FPGA for the ENTA-R.

7.1 FPGA Update

岁 FPGAUpdate
Welcome to the FPGAUpdate Setup Wizard
The installer will guide you through the steps required to install FPGAUpdate on your computer.
WARNING: This computer program is protected by copyright law and international treaties. Unauthorized duplication or distribution of this program, or any portion of it, may result in severe civil or criminal penalties, and will be prosecuted to the maximum extent possible under the law.
Cancel < Back Next >

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

гголоровсе	And the second second second	
Select Installation Folde	F	
he installer will install FPGAUpdate to th	e following folder.	
o install in this folder, click "Next". To in	utall to a different felder of	nter it below or click "Browse"
	istali to a dillerent folder, e	TREFIC DEIDWOT CIICK DIOWSE .
Folder	istali to a unerent folder, e	
Eolder: C:\Program Files\BrandywineComm\F	PGAUpdate\	Browse
Eolder: C:\Program Files\BrandywineComm\F	PGAUpdate\	Browse
Eolder: C:\Program Files\BrandywineComm\F	PGAUpdate\	Browse
Eolder: C:\Program Files\BrandywineComm\F	PGAUpdate\	Browse Disk Cost

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".

J FPGAUpdate	
Confirm Installation	
The installer is ready to install FPGAUpdate on your computer.	
Click "Next" to start the installation.	
Cancel	/ Back Nevt \
Calcel	

Confirm by clicking "Next" to start the installation.

Tranopulate	Sector States and	-	
Installing FPGAUpdate			
PGAUpdate is being installed.			
Please wait			
			1

FPGAUpdate will be installed.

B FPGAUpdate		-	
Installation Complete			
FPGAUpdate has been successfully ins	talled.		
Click "Close" to exit.			
	Cancel	< <u>B</u> ack	Close

FPGAUpdate is installed. Click "Close" to exit.



7.2 FPGA Upload



Start FPGA Update

FPGAUpdate	
	IP Address:
	File Name:
	Y:\ReleasedFiles\927xxxxx-Programable Logic\927000083 E
	Compress FPGA Code File
III	Upload FPGA
LEBEERE	
CCC CEEEEE	

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 <u>not</u> checked. Click the "Upload FPGA" button.*

Working		×
Erasing FPGA NVM		
	20%	
	Cancel	

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



FPGAUpda	te Pastran	X
i	FPGA upload successfull. Would you like to reset the unit? Unit Version = ENTA-R V1.3.1003 Previous FPGA Version = FPGA Rev:0.39 01/27/2011 15:47 FPGA Size = 283776 FPGA Max Size = 1048576 FPGA Block Size = 4096	
	<u>Y</u> es <u>N</u> e	•

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.



8 Maintenance and Troubleshooting

There is no required preventive maintenance for the ENTA-R. To troubleshoot the problems, refer to Table 5.

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



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9 Drawings

FIGURE	DESCRIPTION
21	ENTA-R Front Panel
22	ENTA-R Rear Panel

Table 21 ENTA-R Drawings





Figure 21 Front Panel



Figure 22 Rear Panel