# Parvus® DuraNET 20-11

### Rugged 8-Port Managed Layer 2+ Gigabit Ethernet Switch

**CURTISS – WRIGHT**

## Disclaimer

Although the information contained herein has been carefully verified, Curtiss-Wright assumes no responsibility for errors that might appear in this document or for damage to property or persons resulting from improper use of this manual or related software. Curtiss-Wright reserves the right to change the contents and form of this document, as well as the features and specifications of its products, at any time without notice. The information in this publication does not represent a commitment on the part of Curtiss-Wright. This document contains proprietary information that is protected by copyright. All rights are reserved. No part of this document may be photocopied, reproduced, or translated into another language without the prior written consent of Curtiss-Wright.

## Contact Information

Defense Solutions Division
Curtiss-Wright
3222 S. Washington St.
Salt Lake City, Utah, USA 84115

| | |
|---|---|
| Phone: | +1 (801) 483-1533 |
| Toll-Free: | +1 (800) 483-3152 |
| Fax: | +1 (801) 483-1523 |

Email:

| | |
|---|---|
| Sales: | slp_sales@curtisswright.com |
| Support: | slp_tsupport@curtisswright.com |
| Web-site: | www.curtisswrightds.com |

Send us your comments and feedback: slp_feedback@curtisswright.com

## Trademarks

Parvus is a brand of Curtiss-Wright Corporation.

All trademarks, both marked and not marked, appearing in this document are the property of their respective owners.

## Copyright

# TABLE OF CONTENTS

# LIST OF FIGURES

# CHAPTER 1  INTRODUCTION

The DuraNET 20-11 is an ultra-miniature, rugged, 8-port managed Layer 2 Gigabit network switch.  It contains a MIL-STD-1275/704 power supply in an IP67 (dust/water proof) sealed aluminum chassis with micro-miniature MIL-DTL-38999 like connectors.

## ABOUT THIS DOCUMENT

This manual provides functional and technical descriptions of the DuraNET 20-11 hardware, instructions on connecting the system to test equipment, connector descriptions and pinouts, and specifications.

### DESCRIPTION OF SAFETY SYMBOLS

The following symbols are used in this manual to indicate important information and potentially dangerous situations.

| | |
|---|---|
| | **Warning! Danger, electrical shock hazard!**<br>Personal injury or death could occur.  Also damage to the system, connected peripheral devices, or software could occur if the warnings are not followed carefully. |

| | |
|---|---|
| | **Caution! Hazard to individuals, environment, devices, or data!**<br>If you do not adhere to the safety advice next to this symbol, there is obvious hazard to individuals, to environment, to materials, or to data. |

| | |
|---|---|
| | *Note:  This symbol highlights important information or instructions that should be observed.* |

## FUNCTIONAL DESCRIPTION

The DuraNET 20-11 is a rugged Commercial Off the Shelf (COTS) Gigabit Ethernet switch subsystem optimized for Size, Weight, Power and Cost (SwaP-C) sensitive embedded military and civilian computer network systems applications

Featuring advanced Layer 2+ networking features with 8 ports of non-blocking wire-speed 10/100/1000Mbps connectivity, an integrated management processor, and extremely low power consumption, the DuraNET 20-11 enables reliable local area network (LAN) switching across extended operating temperature ranges (-40 to +85C) and extreme shock/vibration conditions for technology refresh and new platforms, including mobile, tactical, aerospace, and ground vehicle applications

Featuring micro-miniature MIL-DTL-38999 like connectors in a sealed IP67 (dust/water proof) aluminum chassis, the unit serves as an ideal solution for connecting a large number of IP-enabled embedded devices, including computers, cameras, sensors, and command-and-control equipment deployed in digital networked architectures of manned and unmanned system platforms at the network edge. To enhance reliability, the unit features no moving parts, a near cable-less internal design, industrial temperature grade components, EMI filtering, and a MIL-STD- 1275/704 power supply that protects against vehicle/aircraft voltage surges, spikes and transients. The unit is designed to meet (and will be qualification tested) to extreme MIL-STD-461F, RTCA/DO-160G, MIL-STD-810G thermal, shock, vibe, humidity, altitude, ingress, and EMI/EMC conditions

This fully managed, Layer 2 Gigabit switch provides a powerful set of carrier-grade networking features, including support for IPv4 and IPv6 multicast traffic, Virtual Local Area Networks (VLANs), port control (speed / mode / statistics, flow control), Quality of Service (QoS) traffic prioritization, Link Aggregation (802.3ad), SNMPv1/v2/v3 management, secure authentication (802.1X, ACLs, Web/CLI), redundancy (RSTP/MSTP), precision timing (IEEE-1588v2), port monitoring, IGMP Snooping, Built in Test (BIT), and data zeroization. The unit also supports Layer 3 IPv4 unicast static routing for IP routing to attached WAN / radio ports.

## *FEATURES*

### Small Form Factor Ethernet Switch

- 8 ports of 10/100/1000Mbps Gigabit Ethernet in size, weight & power (SWaP) optimized chassis: approx. 0.5 lbs. weight, less than 10.0 cubic inches, and less than 8 watts max power

- Carrier Ethernet Switch Engine with embedded 32-bit management processor

- Robust Layer 2 switching and network management software support

- Extremely low power design: Energy Efficient Ethernet (IEEE-802.3az) support with low-power PHYs and Smart Cable Reach technology

### Management

- Carrier Ethernet Services software deliver rich Layer 2 switch features, Layer 3 Aware packet processing, service classification and traffic policing; IEEE-1588 precision timing protocol and hardware accurate timestamping

- Layer 2 network management: 10/100/1000 Mbps Gigabit Ethernet connectivity, IPv4 / IPv6 Multicast, VLAN, QoS/CoS Traffic Prioritization, Multiple/Rapid Spanning Tree, Link Aggregation, IEEE-1588 Precision Timing Protocol

- Layer 3 IPv4 / IPv6 Unicast Static Routing support for IP routing to attached WAN / radios

- SNMPv3, HTTP Server, web GUI, RS-232 console CLI, Port Monitoring, RMON, Syslog, Network Access Server (NAS), 802.1X Authentication, IGMP Snooping, Access Control Lists (ACLs), zeroization, built-in test (BIT) diagnostics

### Rugged MIL-STD Design

- Designed to meet harsh MIL-STD-810G & DO-160G conditions (temp, shock, vibration, humidity, altitude, dust/water ingress)

- Designed to meet DO-160G & MIL-STD-461F EMI/EMC (Conducted & Radiated Emissions & Susceptibility) and MIL-STD-1275 & 704 Power Input and Transient Protections

- -40 to +85C fanless extended temp operation with no moving parts

- Corrosion-resistant, aluminum chassis sealed against water, dust, EMI

- Circular MIL-DTL-38999 connectors for reliable network connections

- Filtered, transient-protected power supply for aircraft and vehicle use

- Data zeroization support to sanitize configuration information

## CONFIGURATIONS

The DuraNET 20-11 is available with electroless-nickel-plated micro-miniature MIL-DTL-38999 like connectors and the 20-12 is available with standard Amphenol quadrax inserts for enhanced signal integrity.  The DuraNET 20-12 is documented in a separate manual.

| Product Number | Description |
|---|---|
| NET-20-11-01 | DuraNET 20-11, 8-Port Gigabit Ethernet Switch, MIL Circular Connectors |
| NET-20-12-02 | NET 20-12, 6-Port Ethernet Switch, Amphenol Quadrax Connector |

## SYSTEM BLOCK DIAGRAM

The block diagram in Figure 1 illustrates the DuraNET 20-11 interfaces.

**Figure 1.  DuraNET 20-11 Block Diagram**
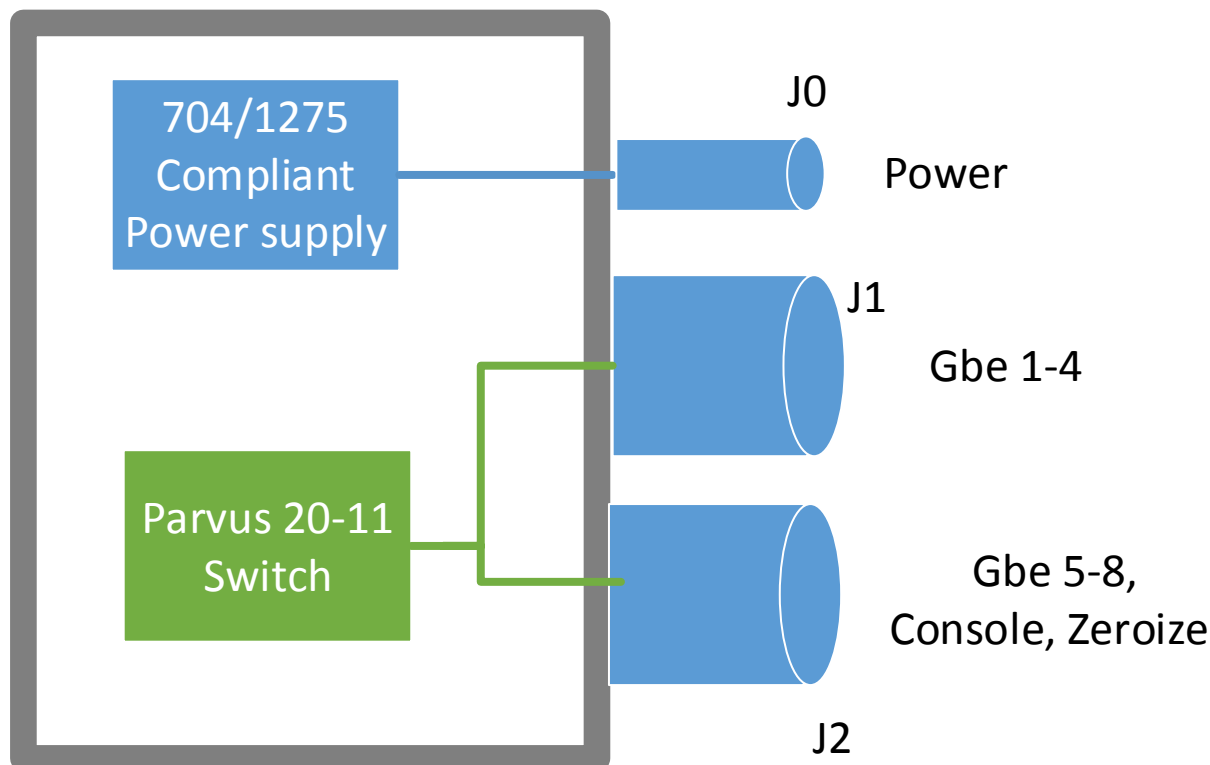
## MANAGEMENT INTERFACE OVERVIEW

The DuraNET 20-11 provides two types of user interfaces for switch configuration and management:  a serial command line interface (CLI) via RS-232 serial port, and a Web GUI via Ethernet.  Each management interface on the card connects to a host PC which acts as the console.

- Serial CLI:  Connect to the host PC via a serial connector.

- Web GUI:  Connect to the host PC via any one of the Ethernet ports.

Figure 2 illustrates the DuraNET 20-11 management interfaces.  Chapter 4 explains how to use each interface.

### Figure 2.  Management Interface Block Diagram
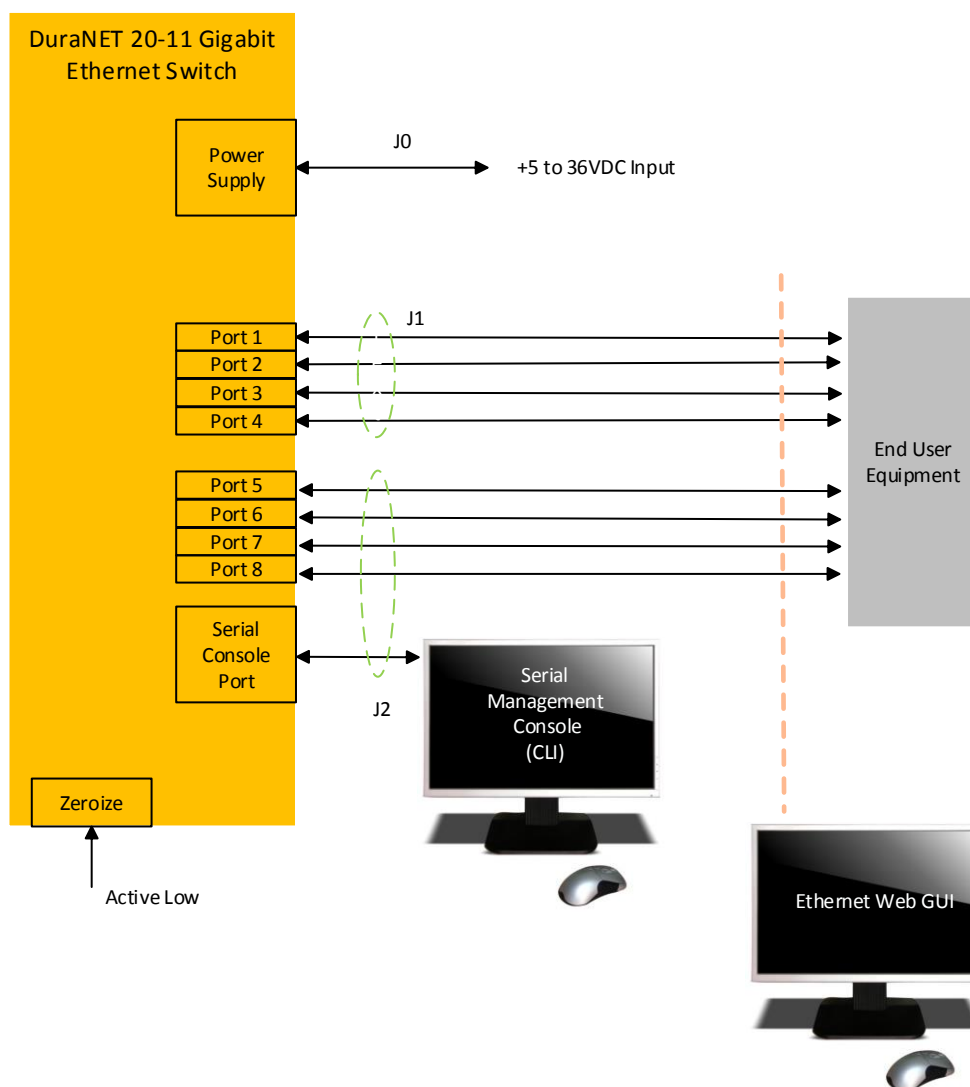
# CHAPTER 2  OPERATIONAL DESCRIPTION

This chapter describes how to connect and power-up the DuraNET 20-11.

## CONNECTOR IDENTIFICATION

### FRONT PANEL

Figure 3 shows the front view of the DuraNET 20-11 and the three connectors.

**Figure 3.  Front View**



| Connector | Name | Description |
|---|---|---|
| J0 | Power | Input power:  5-36VDC, |
| J1 | Gbe | Gigabit Ethernet Ports 1-4 |
| J2 | GbE / Console / Zeroize | Gigabit Ethernet ports 5-8, console port, Zeroize |

### BOTTOM VIEW

Figure 4 shows the rear view of the system with the mounting screw locations that are also used for grounding.  Refer to "Alternate Mounting

Optional mounting brackets may be designed to attach to the unit (examples shown)
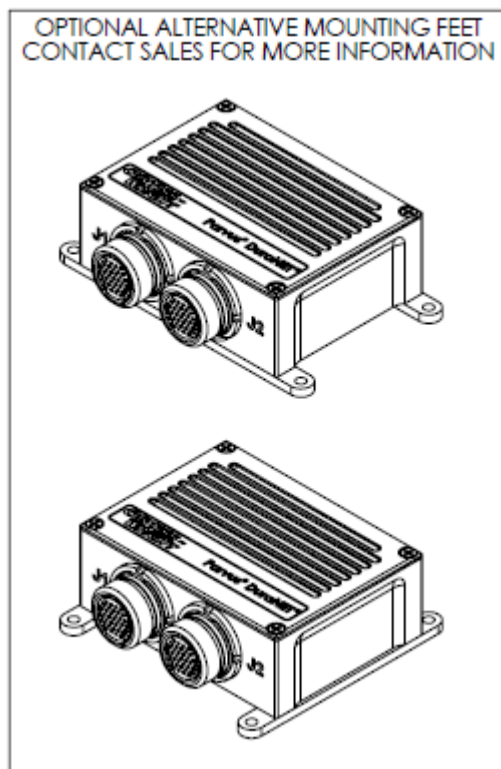
**Figure 7 Alternate Mounting Feet**

Grounding" for grounding instructions.

**Figure 4.  Rear View**
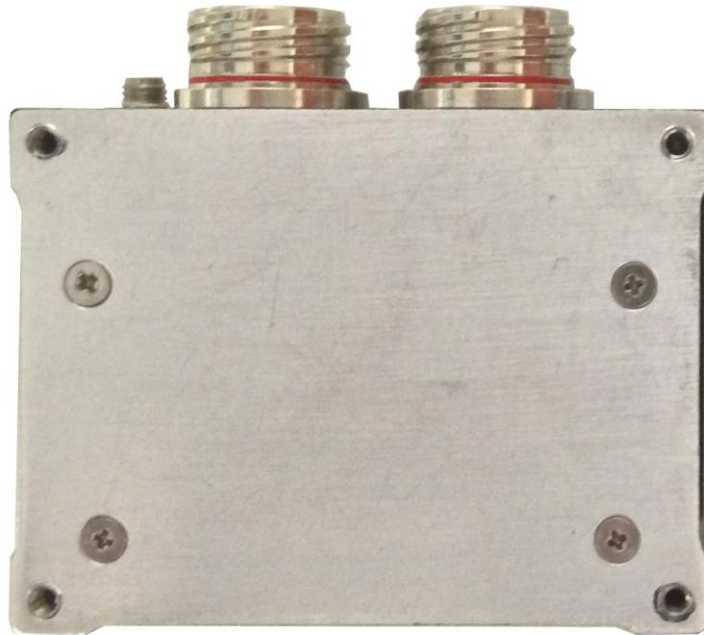
# TEST EQUIPMENT INSTALLATION

To use the DuraNET 20-11 in a lab environment, recommended equipment includes:

- Appropriate cables, such as the CBL-NET-20-11-01 Breakout Cable Set

- A power source applied at connector J1, 5-36VDC input, 28V nominal.  A power cable is included with the Breakout Cable Set.

- A host PC with a free RS-232 port and/or an Ethernet port

## BREAKOUT CABLE SET

You can test the DuraNET 20-11 interfaces and cabling prior to installation in the target system to ensure full operational capability.  Full bench-top testing can be performed by using an appropriate cable set for this system.  CBL-NET-20-11-01 is available for purchase from Parvus to support lab or bench testing purposes.  You can also create a custom set of cables made specifically for the intended target system, vehicle, or craft; refer to Chapter 4 for connector pinouts and descriptions.

The cable set (shown in Figure 5) includes the following cables:

| Cable Part # | From Type | To Type | Quantity | Description |
|---|---|---|---|---|
| CBL-2649-01 | Circular | Banana Plug | 2 | J0      (28V nominal voltage input.  Red +, Black -) |
| | | | | |
| CBL-2611-02 | MIL Circular | | | J1 |
| | | RJ-45 | 4 | Gigabit Ethernet ports 1-4 |
| | | | | |
| CBL-2612-02 | MIL Circular | | | J2 |
| | | RJ-45 | 4 | Gigabit Ethernet ports 5-8 |
| | | DB-9 | 1 | Console |
| | | Push Button | 1 | Zeroize |

**Figure 5.  Breakout Cable Set (CBL-NET-20-11-01)**

## POWER-ON SEQUENCE

To configure the DuraNET 20-11, you need a serial or Ethernet connection to a host PC.  These instructions cover both types of connections.

> **i**  Note:  These instructions explain how to set up the DuraNET 20-11 using the cables from the Parvus DuraNET 20-11 cable set (CBL-NET-20-11-01).  If you have a custom setup and customer-designed cables, modify these instructions as needed.

Follow these steps:

1. Connect a power cable to port J0 on the DuraNET 20-11 (use CBL-2649-01 from the breakout cable set, or an equivalent).

2. Connect the other end of the power cable to the **unpowered** DC power source.

> ⚠ **Caution!  Make sure that the DC power source is set to provide 5 to 36VDC (28V nominal).**

3. Connect CBL-2611-02 (or equivalent) to J1

4. Connect CBL-2612-02 (or equivalent) to J2.

5. Connect the DuraNET 20-11 to the host PC.

   - To use the web GUI management interface, attach one of the RJ-45 connectors from either cable to the host Ethernet port.

   - To use the serial management interface (CLI), connect the DB-9 connector on CBL-2612-02 to the host serial port.

> **i**  Note:  You can connect to both ports and alternate between the CLI and web GUI as needed.

6. Apply power.

7. Use the management interface (CLI or web GUI) to configure the switch. Chapter 4 explains how to use each interface.

8. Connect Ethernet devices to the ports on J1 and/or J2.

   - Use CBL-2611-02 to connect Gigabit Ethernet ports 1-4 on J1.

   - Use CBL-2612-02 to connect Gigabit Ethernet ports 5-8 on J2.

# MOUNTING THE DURANET 20-11

After testing is complete, you can mount the DuraNET 20-11 vertically or horizontally.

## THERMAL CONSIDERATIONS FOR CHOOSING A MOUNTING LOCATION

The DuraNET 20-11 enclosure is highly efficient at removing heat from the components inside of the unit to the case. The highest power consumption components are heat sunk directly to the bottom of the unit where it is expected to be mounted.  It is best to mount the unit on a thermally cool, thermally conductive location to keep the overall temperature as low as possible.  Every effort has been made to meet stringent thermal performance criteria as outlined in the specifications.  However, it is always good practice to keep the DuraNET 20-11 as cool as possible, avoiding external temperature environments which will not allow the thermal conduction of heat away from the unit.

## MOUNTING

To install the DuraNET 20-11 on a mounting surface:

1.  Create a hole pattern on the mounting surface that matches the pattern shown in Figure 6.

2.  Attach the baseplate to the mounting surface using the four mounting holes.  Attachment screws should be 6x32.

> **Important!**
> Ensure that mounting screw length allows proper thread engagement of the mounting hardware.

### Figure 6.  Mounting Holes
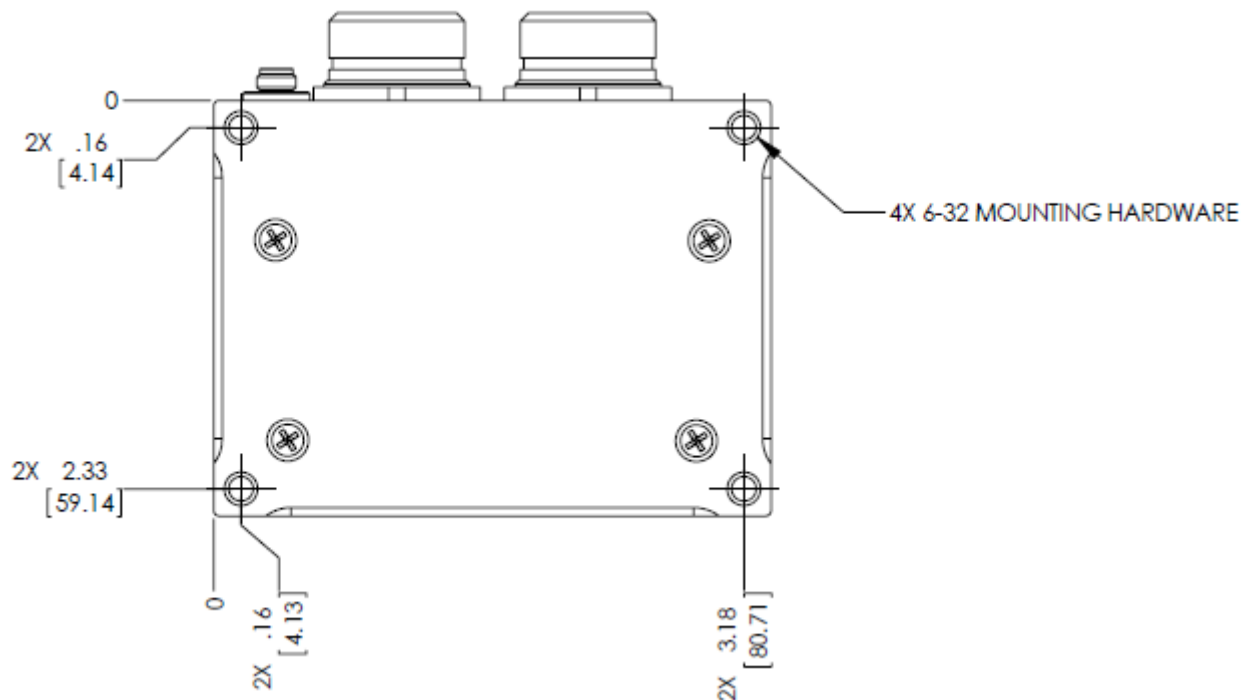
## ALTERNATE MOUNTING

Optional mounting brackets may be designed to attach to the unit (examples shown)

**Figure 7 Alternate Mounting Feet**

## GROUNDING

- The bottom of the baseplate is conductive to allow the system to be grounded via the baseplate.

- Four holes are provided for grounding/mounting.  Refer to figure 8 below.  These are 6-32 holes are 1.5 diameter (approximately 0.2") deep.

### Figure 8.  Bottom View

# CHAPTER 3  MANAGEMENT INTERFACE DESCRIPTION

The DuraNET 20-11 management interfaces provide the network administrator with a set of comprehensive management functions.  The network administrator has a choice of two easy-to-use management interfaces:

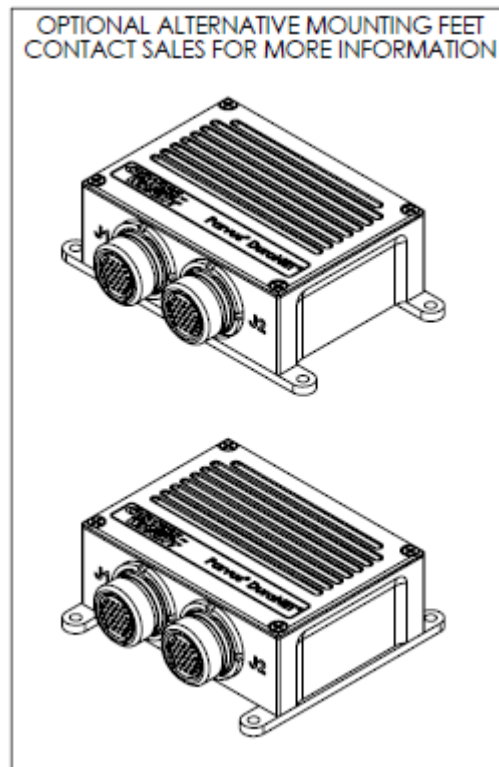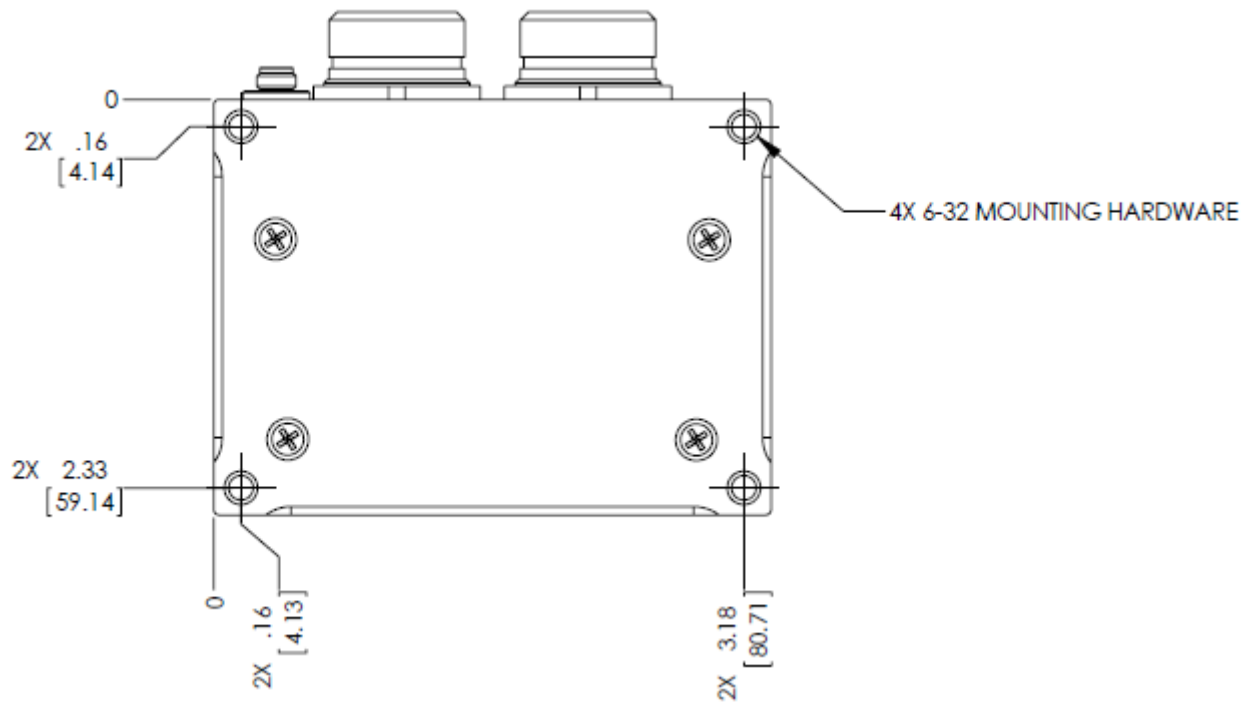- Serial CLI (command line interface)
    - Manages all switch features, including CLI enhancements.
    - Must be used to change the switch IP address from the factory default.
    - Can be used even if there is no network connectivity.
    - Provides brief help on syntax for each command.
- Web GUI (graphical user interface)
    - Manages all switch features except the switch IP address and CLI enhancements.
    - Requires network connectivity.
    - Provides extensive help on functions and parameters.

For centrally managed networks, the switch also supports SNMP Management (not described in this manual).

This chapter explains the switch configuration files that store switch parameters, and then provides step-by-step quick starts for each of the interfaces.  The CLI is described in detail in Appendix A.  The Software User's Manual for the switch describes both interfaces in detail, and is available for download from the Parvus site.

> *i*    *Note:  If the Software User's Manual is not available, use the GUI's extensive help system.*

# USING THE CLI

This section describes basic usage and configuration of the command line interface (CLI) for the DuraNET 20-11.

The CLI interface is an industry-standard CLI and consists of configuration commands which provide the ability to configure and view the configuration using the serial console, or Telnet or SSH access.  Even if there is no network connectivity, you can still manage the switch using a serial connection.

## SERIAL CLI SETUP

1.  Connect the DuraNET 20-11 to a serial port on the host PC.

2.  Power-on the DuraNET 20-11.

3.  Open a terminal emulator on the host PC, such as TeraTerm or PuTTY on Windows, or Minicom on Linux.

4.  In the PC terminal emulation software, configure the serial port to 115200 baud, 8 data bits, 1 stop bit, no parity, no flow control.

## CLI QUICK START

The instructions in this section provide step-by-step instructions on how to use some of the CLI commands.

Remember that **bold** identifies what you should type exactly as shown; **_bold italic_** marks a parameter you should provide, such as **_<address>_**.

### Log In

When the card powers on, the switch boots through RedBoot to the switch CLI and the following messages are displayed on the console:

```
RedBoot> go
Parvus version 1.X.X
Press ENTER to get started
```

1.  Press Enter one or more times until the Username: prompt appears.

```
Username:
```

1.  Type **admin** and press Enter.

```
Username: admin
Password:
```

2.  At the Password prompt, press Enter.  (There is no default password.)  This completes the login sequence.  The prompt changes to SWITCH-XXXX#, where XXXX is the serial number of your DuraNET 20-11.

```
Username: admin
Password:
SWITCH-XXXX#
```

At this point the admin user is operating at the highest privilege level, level 15. This means the admin has full control over the switch and its configuration.

## ZEROIZATION

For data security, the DuraNET 20-11 provides zeroization capability which erases all user configurable data on the system.  Not all data contained in Non-volatile memory is erased, the system software persists through zeroization.

Note: In the event that the admin password is lost, zeroization is the only way to regain access.

### CLI COMMANDS

Enabling/Disabling the zerioization feature.  By default, zeroization is enabled.

```
!  This example assumes the session is initially unprivileged.

!  Step 1: Raise privilege level:
> enable
Password: ***

!  Step 2: Enter Global Configuration mode:
# configure terminal

!  Step 3 (To Enable Zeroization): Input configuration command
(config)# parvus zeroize

-or-

!  Step 3 (To Disable Zeroization): Input configuration command
(config)# no parvus zeroize
```

### ZEROIZATION INTERFACE

The ZEROIZE pin is internally pulled to +3.3v so to initialize zeroize, short the ZERIOZE pin to ZEROIZE_GND pin.  Alternately, the system can be zeroized via the CLI:

```
!  This example assumes the session is initially unprivileged.

!  Step 1: Raise privilege level:
> enable
Password: ***

!  Step 2: trigger zeroization
# parvus dozeroize
```

## CLI COMMAND GROUPS

CLI commands can be grouped into the following functional categories:

- Manage and show switch settings.

- Manage configuration and firmware files.

- Manage system.

- Manage Parvus extensions.

Figure 9 shows the list of Exec commands and the commands available in each group.  Appendix A provides more information on the first three command groups, with multiple examples of their use. Appendix B describes the Parvus extensions, which are specialized commands for viewing board status and enabling optional board features like zeroization.

**Figure 9.  CLI Functional Groups**
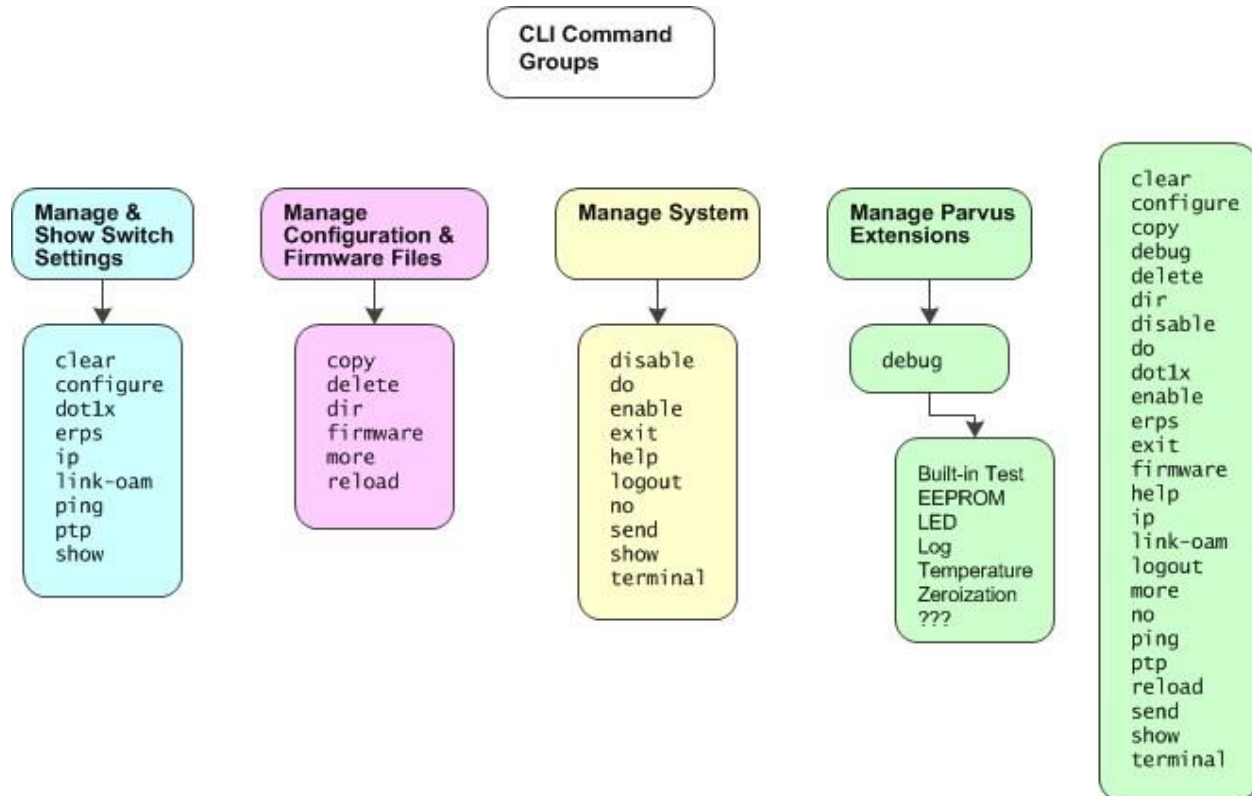
## USING THE WEB GUI

The web-based software management method allows the network administrator to configure, manage, view, and control the switches remotely. The GUI also provides help pages to assist the switch administrator in understanding GUI configuration. SNMP management is standards-based, with configuration parameters specified in the supported MIBs.

The supported web browsers are:

- Internet Explorer 7.0 and above

- Firefox 3.6 and above

- Google Chrome 8.0

- Safari S5

- Opera 11

## WEB GUI INTRODUCTION

This section explains how to access the web GUI, navigate to pages, access help, and display details.

### Accessing the Web Interface

Once the IP address of the switch VLAN 1 is set up, you can use the Web GUI to manage the switch. The default VLAN 1 address is 192.168.1.13 and the default subnet mask is 255.255.255.0.

1.  Connect the switch to a host computer via an Ethernet port.  The computer must exist on the same subnet as the switch IP address.

2.  Type the switch URL (IP address) into the address bar of a web browser on the host computer; for example:  **10.33.15.2**

3.  The Password popup is displayed.  Type **admin** in the User name box.



4.  If you've already set an admin password, type it in the password box.  Otherwise leave the box empty—there is no default password--and click OK.

5.  The GUI home page is displayed.

    The standard parts of the GUI are the navigation pane on the left, the large work area, and system buttons in the upper right corner of the window.  The default view for the GUI is the Port State Overview (navigation path = Monitor > Ports > States).
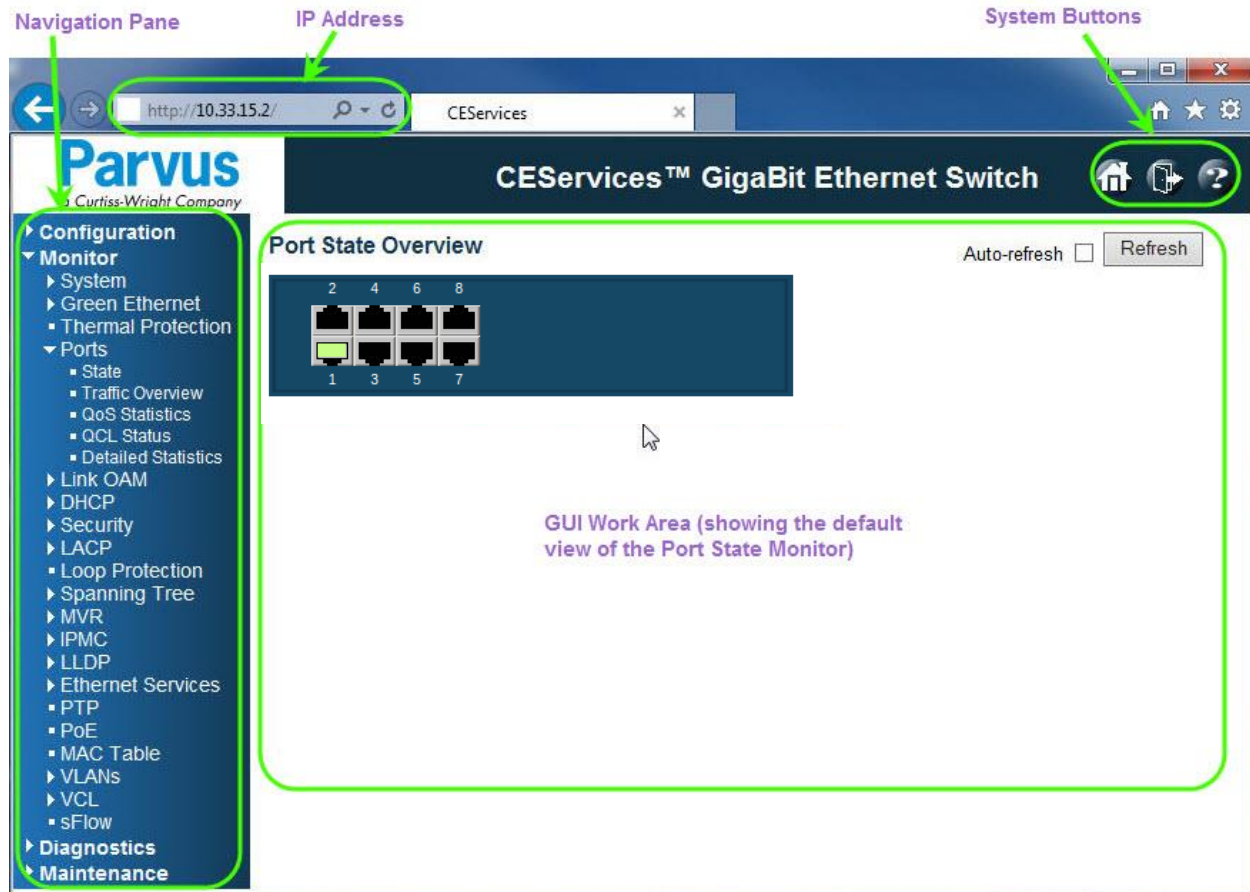
## Navigation Pane

The navigation pane selects what is displayed in the work area. The pane is organized into categories (Configuration, Monitor, Diagnostics, and Maintenance) and subcategories (such as System, Green Ethernet, and Ports under Monitor). The categories and subcategories are just navigation tools—they aren't displayed in the work area. Only the work pages, represented by square bullets, are displayed.



- To expand or collapse a category, click the name, not the symbol. Expanding does not affect what's displayed in the work area.

    ▸ indicates a collapsed topic.

    ▾ indicates an expanded topic. Topics remain expanded until you collapse them.

    ▪ indicates a work page.

- The page displayed in the work area doesn't change until you select a different command page.

- Only pages have help.

- 

To help you understand how the navigation pane works, the examples in this chapter show the expanded navigation pane that leads to each of the pages discussed here.

## System Buttons

The system buttons are circled in this example page.



- Home: A shortcut to quickly display the home page without using the navigation pane. Any unsaved changes are lost.

- Logout: Closes the GUI.

# CHAPTER 4  CONNECTOR DESCRIPTIONS

This chapter identifies connector part numbers, locations, and pinouts to facilitate fabrication of cables that can connect to the DuraNET 20-11.

## CONNECTOR PART NUMBERS

The following table shows the manufacturer part numbers for the DuraNET 20-11 connectors (identified in Figure 10), together with the suggested mating connectors.

| Connector | Manufacturer | Part Number | Mating Connector |
|---|---|---|---|
| J0 | Omnetics | MNCP-11-WD-18.0-PP-N-OR-IP68 (see Omnetics website for options) | MNCS-11-WD-XX-C-IS-N-SR-OR (see Omnetics website for options) |
| J1 | Amphenol | 2M801-011-07M13-37SA | 2M801-008-16M13-37PA |
| J2 | Amphenol | 2M801-011-07M13-37SB | 2M801-008-16M13-37PB |

**Figure 10.  Front Panel Connector Spacing**
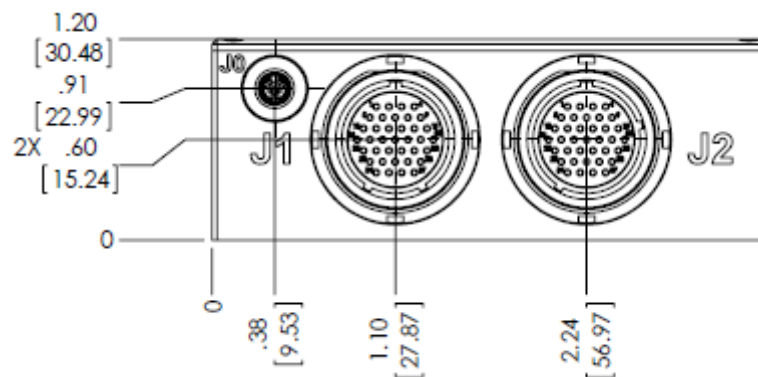
## PINOUTS

This section provides the pinouts necessary for creating cables that connect properly to this assembly. If custom cabling is not designed and built by Curtiss-Wright, all EMI and EMC considerations must be handled by the customer.

### J0 POWER CONNECTOR

J0 is an 11 pin socket connector for power and ground.
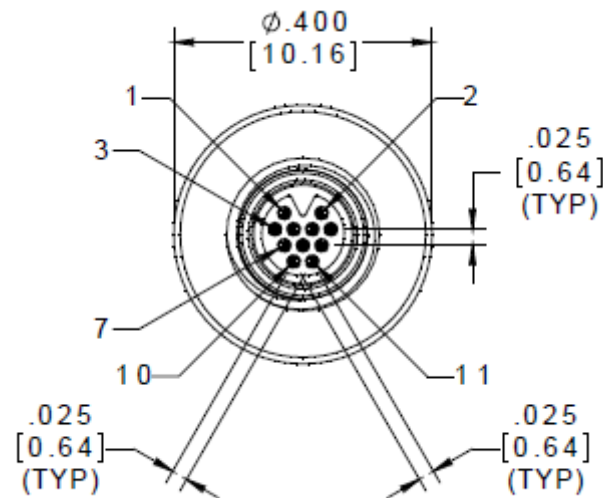


| Pin # | Color | Signal |
|---|---|---|
| 3 | RED | +28VDC |
| 4 | ORANGE | +28VDC |
| 1 | BLACK | RTN |
| 11 | BLACK | RTN |

### J1 GIGABIT ETHERNET (PORT 1-4)

J1 is a 37 pin socket connector used to bring out four GigE ports.  Four twisted pairs are used for each GigE port (8 pins total). This documentation refers to these pairs as a pair (GbEn_A_P / GbEn_A_N, GbEn_B_P / GbEn_B_N, GbEn_C_P / GbEn_C_N, GbEn_D_P / GbEn_D_N) where n = a port number from 1 to 4.
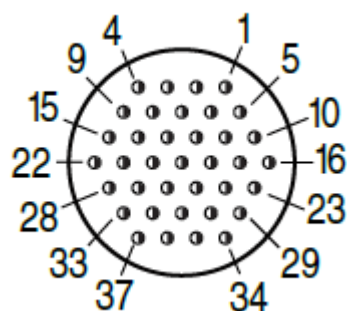
| Pin # | Signal Name | | Pin # | Signal Name |
|---|---|---|---|---|
| 1 | GBE3_D_N | | 20 | GBE4_C_P |
| 2 | GBE3_C_N | | 21 | GBE4_D_N |
| 3 | GBE3_B_N | | 22 | GBE4_A_N |
| 4 | GBE3_A_N | | 23 | GBE2_C_P |
| 5 | GBE3_D_P | | 24 | GBE2_C_N |
| 6 | GBE3_C_P | | 25 | GBE2_B_N |
| 7 | GBE3_B_P | | 26 | GBE2_A_N |
| 8 | GBE3_A_P | | 27 | GBE4_D_P |
| 9 | GBE4_B_N | | 28 | GBE4_A_P |
| 10 | GBE1_B_N | | 29 | GBE2_D_N |
| 11 | GBE1_A_N | | 30 | GBE2_B_P |
| 12 | GBE1_C_N | | 31 | GBE2_A_P |
| 13 | GBE1_D_N | | 32 | Reserved |
| 14 | GBE4_C_N | | 33 | Reserved |
| 15 | GBE4_B_P | | 34 | GBE2_D_P |
| 16 | GBE1_B_P | | 35 | Reserved |
| 17 | GBE1_A_P | | 36 | Reserved |
| 18 | GBE1_C_P | | 37 | Reserved |
| 19 | GBE1_D_P | | | |

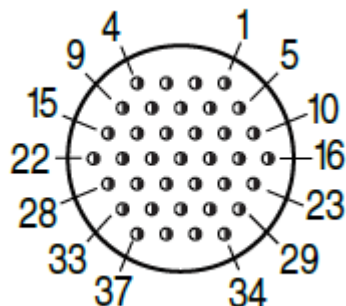## J2 GIGABIT ETHERNET (4 PORT), CONSOLE & ZEROIZE

J2 is a 37 pin socket connector with four GigE ports brought out on it.  Four twisted pairs are used for each GigE port (8 pins total). This documentation refers to these pairs as a pair (GbEn_A_P / GbEn_A_N, GbEn_B_P / GbEn_B_N, GbEn_C_P / GbEn_C_N, GbEn_D_P / GbEn_D_N) where n = a port number from 5 to 8.  J2 also has a serial console port on two pins (plus a signal ground return) and a zeroize port on one pin (plus the same signal ground return).



| Pin # | Signal Name | | Pin # | Signal Name |
|---|---|---|---|---|
| 1 | GBE7_D_N | | 20 | GBE8_C_P |
| 2 | GBE7_C_N | | 21 | GBE8_D_N |
| 3 | GBE7_B_N | | 22 | GBE8_A_N |
| 4 | GBE7_A_N | | 23 | GBE6_D_N |
| 5 | GBE7_D_P | | 24 | GBE6_C_N |
| 6 | GBE7_C_P | | 25 | GBE6_B_N |
| 7 | GBE7_B_P | | 26 | GBE6_A_N |
| 8 | GBE7_A_P | | 27 | GBE8_D_P |
| 9 | GBE8_B_N | | 28 | GBE8_A_P |
| 10 | GBE5_B_N | | 29 | GBE6_D_P |
| 11 | GBE5_A_N | | 30 | GBE6_C_P |
| 12 | GBE5_C_N | | 31 | GBE6_B_P |
| 13 | GBE5_D_N | | 32 | GBE6_A_P |
| 14 | GBE8_C_N | | 33 | CONSOLE_GND |
| 15 | GBE8_B_P | | 34 | Zeroize_GND |
| 16 | GBE5_B_P | | 35 | Zeroize |
| 17 | GBE5_A_P | | 36 | CONSOLE_TXD |
| 18 | GBE5_C_P | | 37 | CONSOLE_RXD |
| 19 | GBE5_D_P | | | |

# CHAPTER 5  SPECIFICATIONS

## TECHNICAL SPECIFICATIONS

### ARCHITECTURE

- Packet processor:  Vitesse Carrier Grade Ethernet Switch Engine
- Switching:  Non-Blocking OSI Data Layer 2, IPv4 / IPv6 Multicast, Low-Latency, Auto-MDI/MDIX, Auto- Negotiation, Auto-Detect; Speed Auto-Sensing, Auto-Crossover, Full/Half Duplex Modes, QoS
- Management processor:  Embedded MIPS CPU with DDR-2 Memory
- Networking software:  Vitesse CE Services Carrier Ethernet Application

### PORTS

- 8x 10/100/1000BaseT Gigabit Ethernet ports
- RS-232 management console
- Power input & data zeroize

### LAYER 2 SWITCHING

- Port control:  port-speed, duplex mode, flow control, port frame size (jumbo frames), port state, port status (link monitoring), port statistics (MIB counters)
- Quality of Service (QoS) traffic prioritization and queuing:  8 priorities,8 CoS queues per port, dtrict or deficit-weighted RR scheduling, shaping/policing per queue and per port, Storm Control
- VLAN:  8K MAC addresses, 4K VLANs, 802.1Q Static VLAN, Protocol-Based VLAN, MRP, MVRP, MVR, IEEE-80210ad Provider Bridge, Link Aggregation (IEEE-802.3ad)
- IEEE-802.1 D/w/s (Spanning Tree, Rapid Spanning Tree, Multiple Spanning Tree Protocol)
- L2 IEEE-1588v2 Precision Timing Protocol (PTP)

### LAYER 3 ROUTING

- Layer 3 IPv4 / IPv6 Unicast static routing support for IP routing to attached WAN/radio ports

## MANAGEMENT

- In-band Ethernet management using Web GUI, Simple Network Management Protocol (SNMP), or command line interface (CLI) over RS-232 console for Telnet / SSH / Terminal

- HTTP/HTTPS Web Server, SNMP v1 / v2 / v3 Client, DHCP Client, IEEE 802.1X Authentication, System Syslog, SSHv2, IPv6 Management, IGMP/MLD/DHCP Snooping , Access Control Lists, Port Mirroring, BPDU Guard, RMON, Cisco Discovery Filtering, IEEE-802.10AB LLDP

- Built-in test (BIT) functionality to detect system faults

## SECURITY

- Network Access Server (NAS) IEEE-802.1X, RADIUS Accounting, MAC address limit, TACACS, Web & CLI authentication, ACLs, IP Source Guard

- Declassification:  data zeroization support to erase non-volatile flash memory and restore board to factor default configuration (initiated by offboard signal trigger)

## RELIABILITY

- 83,426 Ground Mobile 25$^o$C: calculated per MIL-HDBK-217F

- Workmanship: assembled to IPC-A-610 Class III workmanship

- No moving parts; no active cooling required

- Conformal-coated PCBs for humidity/tin-whisker mitigation, staked components, underfilled BGA

## BREAKOUT CABLE SET

Optional breakout cable set mates with MIL-DTL-38999 connectors for Ethernet, console, and power signals, transitioning to traditional RJ-45/DB-9/power (for lab/testing purposes)

# MECHANICAL SPECIFICATIONS

## POWER

- Power input: 28 VDC nominal steady state; input range: 5-36VDC

- MIL-STD-704F & MIL-STD-1275D compliant: steady state voltage, ripple, surges, spikes

- Power consumption (estimated): < 8 watts maximum

- Support for Energy Efficient Ethernet (IEEE 802.3az), ActiPHY, and Vitesse PerfectReach technologies to reduce active Ethernet power for unused/idle links and/or shorter cable lengths

## DIMENSIONS

Figures 10-13 provide the physical dimensions of the DuraNET 20-11 from several angles.

- Dimensions (HxDxW):  1.2" x 2.49" x 3.34" excluding connectors
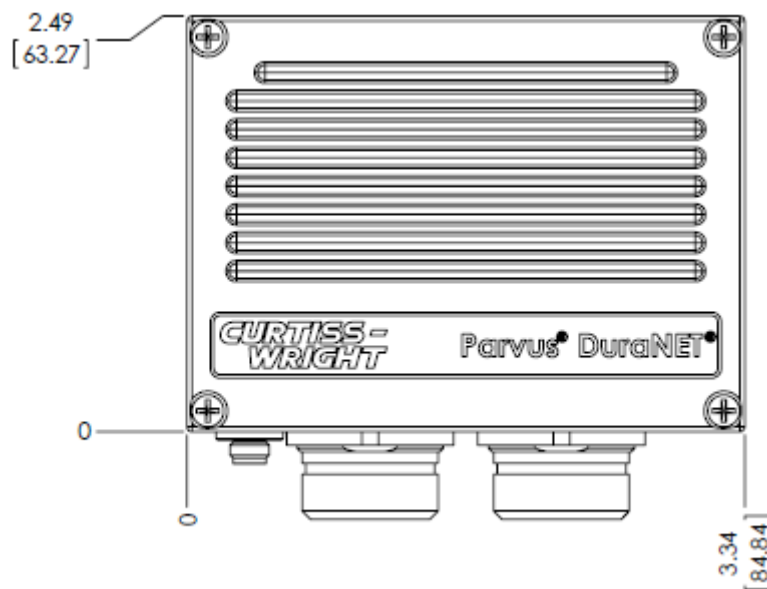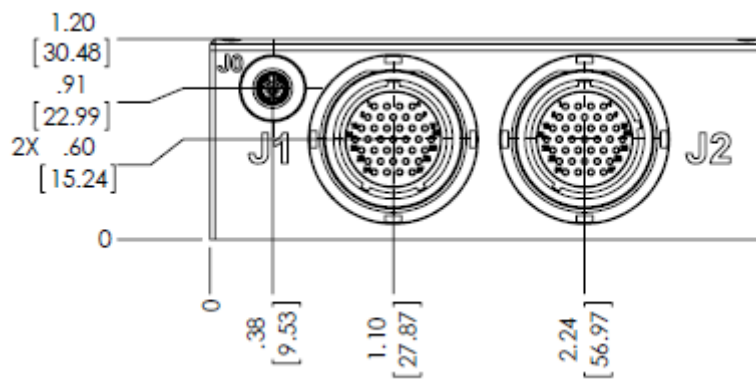
**Figure 11.  Top View Dimensions**



**Figure 12.  Front Panel Dimensions**

## PHYSICAL

- Weight:  ~0.5 lbs.

- Installation:  base flange mount

- Connectors: micro-miniature MIL-DTL-38999 like connectors (Amphenol 2M series)

- Cooling:  passive natural convection without forced air or fans; no moving parts

- Enclosure/finish: corrosion resistant, aluminum alloy w/ black anodize finish per MIL-A-8625

# ENVIRONMENTAL SPECIFICATIONS

## ENVIRONMENTAL

Designed to meet MIL-STD-810G and RTCA DO-160G (formal qualification testing pending):

- Operating temperature: -40° to +85°C / -40° to +185°F (MIL-810G, Methods 501,502)

- Storage temperature: -40° to +85°C / -40° to 185°F (MIL-810G, Methods 501,502)

- Operating shock: 40g, 11ms, 3 pos/neg per axis, 18 terminal peak sawtooth pulses (MIL-810G, Method 516)

- Crash hazard shock: 75g, 11ms, 2 pos/neg per axis, 12 terminal peak sawtooth pulses (MIL-810G, Method 516)

- Random vibration: 10Hz to 2000Hz, 3 Axes, Jet-Helo-Tracked Vehicle Profile, 3 Axes (MIL-STD-810G, Method 514)

- Humidity: up to 95% RH @ 40C, non-condensing (conformal coated PWBs; qual by analysis)

- Water immersion: 1 meter, 30 minutes (MIL-STD-810G, Method 512)

- Blowing sand and dust per MIL-STD-810G, Method 501.5 (sealed enclosure; qual by analysis)

- Operational altitude: up to 50,000 feet (9,144 meters) - MIL-STD-810G, Method 500

- Storage altitude: up to 60,000 feet (18,288 meters) - MIL-STD-810G, Method 500

## EMI/EMC

Designed to meet MIL-STD-461F and DO-160G (formal qualification testing pending):

- Conducted Emissions, CE102, Power Leads, 10 KHz to 10MHz, basic curve

- Conducted Susceptibility, CS101, Power Leads, 30 Hz to 150 KHz, Curve 2 (28V and below)

- Radiated Emissions, RE102, Electric Field, 10 KHz to 18 GHz, Figure RE102-3

- Radiated Susceptibility, RS103, Electric Field, 2MHz to 18 GHz, Aircraft External, 200 Volts per meter

# CHAPTER 6  TROUBLESHOOTING

## PRODUCT IDENTIFICATION

The product is labeled with the Parvus P/N and serial number.  Please refer to this information when communicating with Technical Support.

## TECHNICAL ASSISTANCE

If you have a technical question or if you cannot isolate a problem with your product, please call or e-mail the Parvus Technical Support team:

Email        slp_tsupport@curtisswright.com
Phone        1 (801) 433-6322
Fax          1 (801) 483-1523

## RETURNING FOR SERVICE

Before returning any Parvus product, please fill out a Return Material Authorization (RMA) request form, available for download from the following website under the support section:

www.curtisswrightds.com

Email this form to the Technical Support email address (slp_tsupport@curtisswright.com) to receive authorization for shipment. An RMA number will be emailed back to you as soon as possible.

| | |
|---|---|
| *i* | *Note:  You must have the RMA number in order to return any product for any reason.* |

| | |
|---|---|
| ⚠ | **Caution:**<br>Any product returned to Parvus improperly packed will immediately void the warranty for that particular product. |

# CHAPTER 7  CONTACT INFO

**Company Contact Info:**

Defense Solutions Division
Curtiss-Wright
3222 S. Washington St.
Salt Lake City, Utah, USA 84115

(801) 483-1533
FAX (801) 483-1523

Website:  www.curtisswrightds.com

**Sales:**

+1(800) 483-3152 or (801) 483-1533
slp_sales@curtisswright.com

**Product Technical Support:**

+1 (801) 433-6322
slp_tsupport@curtisswright.com

**Customer Feedback:**

slp_feedback@curtisswright.com
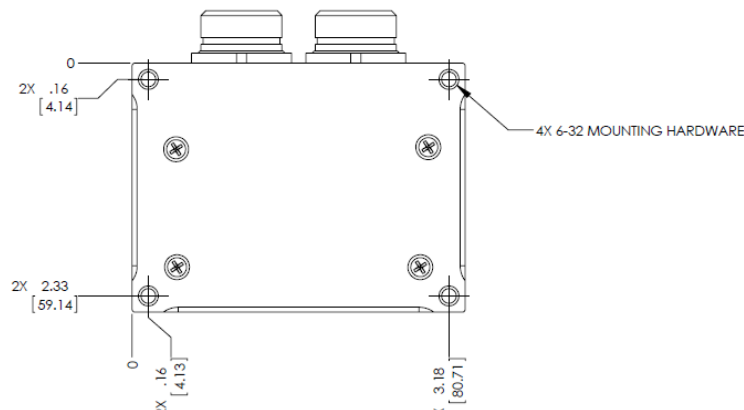
# APPENDIX A – EAU INFORMATION

Early Access units (EAUs) were made before the final production design was completed have a slightly different connector configuration.  The design details for the EAUs are captured in this appendix.
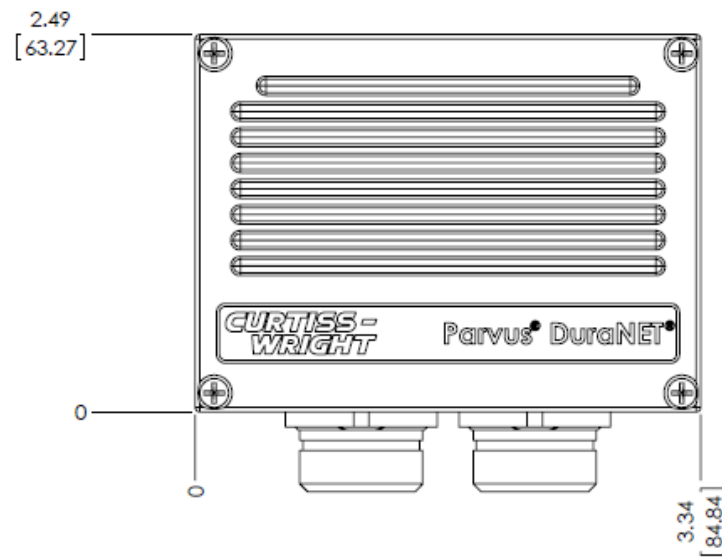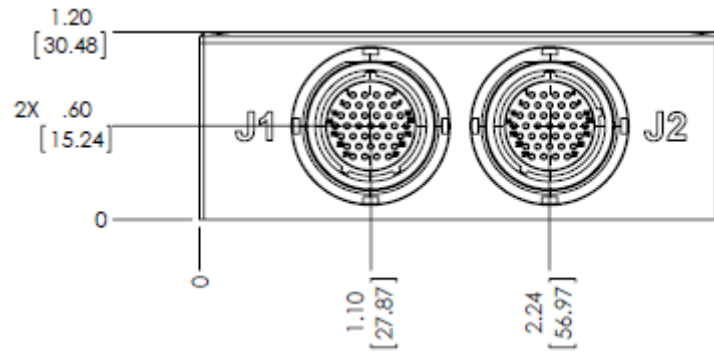
## IDENTIFICATION

The EAUs only had 2 connectors on the front of the unit rather than 3



The dimensions and mounting holes remain the same

## PINOUTS

This section provides the pinouts necessary for creating cables that connect properly to this assembly. If custom cabling is not designed and built by Curtiss-Wright, all EMI and EMC considerations must be handled by the customer.

## CONNECTOR PART NUMBERS

The following table shows the manufacturer part numbers for the DuraNET 20-11-01-E connectors (identified in Figure 10), together with the suggested mating connectors.

| Connector | Manufacturer | Part Number | Mating Connector |
|-----------|--------------|-------------|------------------|
| J1 | Amphenol | 2M801-011-07M13-37SA | 2M801-008-16M13-37PA |
| J2 | Amphenol | 2M801-011-07M13-37SA | 2M801-008-16M13-37PA |

## J1 GIGABIT ETHERNET (PORT 1-4), POWER, & ZEROIZE

J1 is a 37 pin socket connector with four GigE ports brought out on it, as well as power and a zeroize port. Four twisted pairs are used for each GigE port (8 pins total). This documentation refers to these pairs as a pair (GbEn_A_P / GbEn_A_N, GbEn_B_P / GbEn_B_N, GbEn_C_P / GbEn_C_N, GbEn_D_P / GbEn_D_N) where n = a port number from 1 to 4. J1 has a serial console port on two pins (plus a signal ground return). J1 has a zeroize port on one pin (plus the same signal ground return).
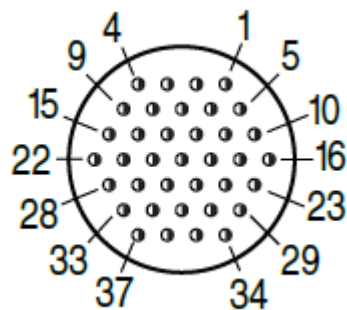
| Pin # | Signal Name | | Pin # | Signal Name |
|-------|-------------|---|-------|-------------|
| 1 | GBE3_D_N | | 20 | GBE4_C_P |
| 2 | GBE3_C_N | | 21 | GBE4_D_N |
| 3 | GBE3_B_N | | 22 | GBE4_A_N |
| 4 | GBE3_A_N | | 23 | GBE2_D_N |
| 5 | GBE3_D_P | | 24 | GBE2_C_N |
| 6 | GBE3_C_P | | 25 | GBE2_B_N |
| 7 | GBE3_B_P | | 26 | GBE2_A_N |
| 8 | GBE3_A_P | | 27 | GBE4_D_P |

| 9 | GBE4_B_N | | 28 | GBE4_A_P |
|---|---|---|---|---|
| 10 | GBE1_B_N | | 29 | GBE2_D_P |
| 11 | GBE1_A_N | | 30 | GBE2_C_P |
| 12 | GBE1_C_N | | 31 | GBE2_B_P |
| 13 | GBE1_D_N | | 32 | GBE2_A_P |
| 14 | GBE4_C_N | | 33 | ZEROIZE_GND |
| 15 | GBE4_B_P | | 34 | 28VDC |
| 16 | GBE1_B_P | | 35 | 28VDC_RETURN |
| 17 | GBE1_A_P | | 36 | NO CONNECT |
| 18 | GBE1_C_P | | 37 | ZEROIZE |
| 19 | GBE1_D_P | | | |

## J2 GIGABIT ETHERNET (4 PORT), CONSOLE

J2 is a 37 pin socket connector with four GigE ports brought out on it. Four twisted pairs are used for each GigE port (8 pins total). This documentation refers to these pairs as a pair (GbEn_A_P / GbEn_A_N, GbEn_B_P / GbEn_B_N, GbEn_C_P / GbEn_C_N, GbEn_D_P / GbEn_D_N) where n = a port number from 5 to 8.



| Pin # | Signal Name | | Pin # | Signal Name |
|-------|-------------|--|-------|-------------|
| 1 | GBE7_D_N | | 20 | GBE8_C_P |
| 2 | GBE7_C_N | | 21 | GBE8_D_N |
| 3 | GBE7_B_N | | 22 | GBE8_A_N |
| 4 | GBE7_A_N | | 23 | GBE6_D_N |
| 5 | GBE7_D_P | | 24 | GBE6_C_N |
| 6 | GBE7_C_P | | 25 | GBE6_B_N |
| 7 | GBE7_B_P | | 26 | GBE6_A_N |
| 8 | GBE7_A_P | | 27 | GBE8_D_P |
| 9 | GBE8_B_N | | 28 | GBE8_A_P |
| 10 | GBE5_B_N | | 29 | GBE6_D_P |
| 11 | GBE5_A_N | | 30 | GBE6_C_P |
| 12 | GBE5_C_N | | 31 | GBE6_B_P |
| 13 | GBE5_D_N | | 32 | GBE6_A_P |
| 14 | GBE8_C_N | | 33 | CONSOLE_GND |
| 15 | GBE8_B_P | | 34 | NO CONNECT |
| 16 | GBE5_B_P | | 35 | NO CONNECT |
| 17 | GBE5_A_P | | 36 | CONSOLE_TXD |
| 18 | GBE5_C_P | | 37 | CONSOLE_RXD |
| 19 | GBE5_D_P | | | |

**CURTISS - WRIGHT**

www.curtiss-wright.com