

# Embedded Data Systems OW-SERVER



## OW-SERVER Operation Manual

Rev 1.0



# Table of Contents

Introduction.....	4
How This Manual is Organized: .....	4
Quick Start Guide.....	5
Interface.....	7
Physical .....	7
Web .....	7
Programmatic .....	8
Configuration .....	9
WEB Setup .....	9
OW-SERVER-ENET .....	10
OW-SERVER-WiFi .....	11
1-Wire Setup .....	15
POST Client Setup .....	16
Web Access .....	17
OW-SERVER Device Status.....	18
OW-SERVER.....	18
Connected Devices.....	18
1-Wire Device Details.....	19
1-Wire Interface .....	20
Connected Devices.....	22
Integration .....	23
HTTP.....	23
Retrieving XML File.....	23
Writing Data to 1-Wire Devices.....	24
SNMP (Simple Network Management Protocol) .....	25
edsEnterprise Branch .....	26
owTrap Branch.....	26
Telnet.....	31
TFTP .....	32
UDP.....	32
1-Wire Interface .....	34
POST Client .....	34
Maintenance.....	35
Firmware Upgrade .....	35
TFTP .....	35
Webpage Upload .....	35
Factory Reset .....	37
Additional Resources .....	38
Supported 1-Wire Devices .....	38
EDS Appliance Scanner Software.....	39
OW-SERVER Form Factor.....	39
Power Supply Requirements.....	39
Ethernet Interface.....	39

1-Wire Interface .....	40
Support .....	40
Appendix A .....	41

# Introduction

Thank you for purchasing the Embedded Data Systems OW-SERVER-ENET or OW-SERVER-WiFi. The OW-SERVER provides an easy and simple method for the continuous monitoring of 1-Wire® sensors that you might install in such places as computer server rooms or manufacturing facilities.

The Embedded Data Systems OW-SERVER line of products features a lightweight, low-power space saving design coupled with powerful on-board, web-based monitoring software. Data from connected 1-Wire sensors is provided in open, industry-standard formats (e.g., XML, SNMP) making it easy to integrate with existing business automation and monitoring systems.

This manual is divided into three major sections:

1. The Quick Start Guide for users who just want to get the product up and running quickly, viewing live sensor data in a web browser.
2. The Programming Guide, aimed toward software developers who want to interface the OW-SERVER with their own programs.
3. The Technical Guide for the integrators who need more in-depth information about the way the OW-SERVER interacts with connected 1-Wire devices.
4. Maintenance to aid in upgrading firmware, resetting to factory defaults and using the EDS Application Scanner to determine the IP address of the unit.

## How This Manual is Organized:

- **Quick Start Guide**—this section provides simple and easy steps to get up and running quickly with your OW-SERVER
- **Interface**—this section describes the three interfaces (physical, web, and programmatic) to the OW-SERVER
- **Configuration**—this section provides information on how to setup a OW-SERVER with your existing network and/or business systems as well as how to configure attached 1-Wire devices
- **Web Access**—this section describes how to utilize the on-board web application to access real-time monitoring of your connected 1-Wire sensors
- **Integration**—this section provides details on how to integrate the OW-SERVER with existing systems and applications. This section is aimed at software programmers and engineers who want to interface directly to the OW-SERVER
- **Maintenance**—this section covers various activities related to maintaining or upgrading the OW-SERVER
- **Additional Resources**—this section provides links to other resources, how to get support, and frequently asked questions

# Quick Start Guide

Getting started with the OW-SERVER is simple. Just follow a few easy steps:

1. **Apply power to the OW-SERVER.** The green PWR/ACT LED will begin to flash at one-second intervals, indicating that the product is operating normally.
2. **Connect it to your Network.** Connect a live network cable to the **Ethernet Port** on the device. The green LED on the Ethernet connector will illuminate, indicating a valid network connection. The yellow LED on the Ethernet connector blinks only when there is network traffic. For the OW-SERVER-WiFi, you will need to connect to the device wirelessly in order to assign it your wireless network's SSID. *For more information see the Configuration section of this manual.*
3. **Connect a 1-Wire Device.** Connect a supported 1-Wire device to any of the 1-Wire RJ12 connectors.
4. **Determine the IP address of the OW-SERVER.** Either check your DHCP server logs or download the [EDS Appliance Scanner Software](#) from the EDS website. Either way, you need the IP address in order to access the on-board web application for device configuration. If the OW-SERVER does not find a DHCP server running on your network, it will default to the following IP address: 169.254.1.1. Note: if you are using an OW-SERVER-WiFi, it will automatically look for a network with the SSID of EDSWiFi. If it does not find this SSID, it will default to 169.254.1.1 and create an ad-hoc wireless network named EDSWiFi. *For more information about setting up an OW-SERVER-WiFi, see the appropriate section in this manual.*
5. **Configure your device.** Type the OW-SERVER's IP address (e.g., http://192.168.1.27) into your browser. Select the link on the left called "WEB Setup". When the name and password is requested, enter "admin" for the name and "eds" for the password. A webpage similar to the one shown to the right will enable you to configure and monitor various aspects of your OW-SERVER.



**CONGRATULATIONS!** You have successfully installed your Embedded Data Systems' OW-SERVER. Please keep reading to obtain an understanding of the function of each of the web pages served by the OW-SERVER.

Some things to keep in mind:

- If you are employing an OW-SERVER-WiFi, you will need to connect to it as a device and then access it via its internally-assigned IP address (169.254.1.1) in order to configure it with your network's SSID and security information
- Go to the [EDSPRODUCTS.COM](http://EDSPRODUCTS.COM) for a list of supported 1-Wire devices
- We don't provide any support for OW-SERVER IP identification when utilizing a method other than the [EDS Appliance Scanner Software](#). Please consult your network administrator if you cannot locate the DHCP address

# Interface

The OW-SERVER has three forms of interface:

- Physical—the ports, buttons, and other elements on the unit itself
- Web—the on-board web application that provides real-time access of monitoring data
- Programmatic—the methods by which to interface directly with monitoring data

## Physical

The OW-SERVER's physical interface includes four parts:

- 1-Wire Connector Panel, which provide connectivity to 1-Wire sensors through three (3) RJ12 connectors
- Power, a single 9 volt DC connector
- Ethernet (*OW-SERVER-ENET only*) connects the device to an existing 10-base T network via a standard RJ45 connector
- Power/Activity Indicator (*OW-SERVER-ENET only*) flashes green at a 1 second rate indicating that the unit is receiving power and operating correctly, flashes yellow to indicate data activity



## Web

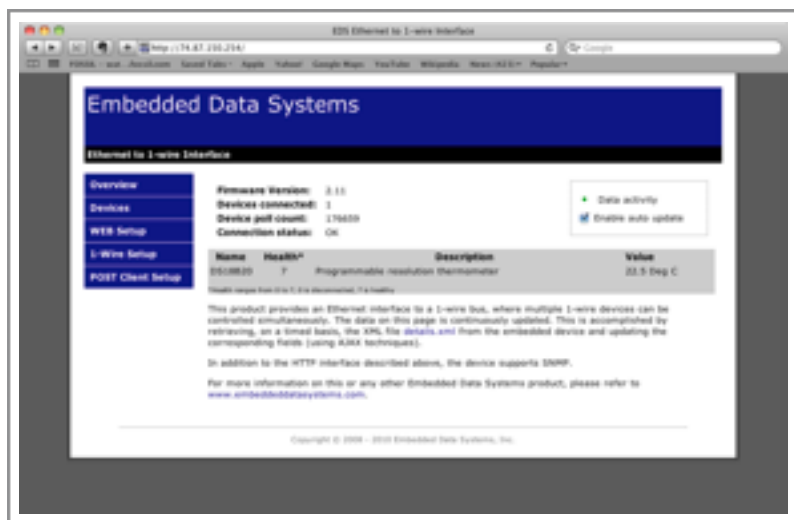
Each OW-SERVER includes an integrated web-server that provides access to monitored data from any Internet connected device such as a web-browser on your PC, smartphone, or even an iPad®!

The Web interface provides you an easy way to configure the OW-SERVER's network settings and is accessible by navigating to the DHCP-assigned address. When you connect the OW-SERVER to your network it will automatically request an IP address from an available DHCP server.

Simply open a web browser and enter that URL to access the web monitoring application.

The web interface provides the following menu items:

- **Overview**—the default, opening screen that provides a snapshot of connected devices and OW-SERVER information
- **Devices**—displays detailed information about each device connected to the OW-SERVER
- **WEB Setup**—provides access to configuration fields for activating direct control of the 1-Wire bus through TCP using an ASCII based command set.



- **1-Wire Setup**—provides access to configuration fields for activating direct control of the 1-Wire bus via TCP using ASCII based command set
- **POST Client Setup**—specifies a URL where the OW-SERVER can send XML data from connected 1-Wire devices on a timed basis; handled through HTTP Post
- **WiFi**—provides the WiFi network configuration settings

Note: If you don't know the IP address being assigned to the OW-SERVER by your network, simply access your DHCP's assignment or download the [EDS Appliance Scanner Software](#) that will automatically find and display the IP address for all connected OW-SERVERs. *For more information about the EDS Application Scanner software, see the appropriate section in this manual.*

Note: If your network does not have a DHCP server, the OW-SERVER will default to a self-assigned address of 169.254.1.1. In the event of this situation, you will need to temporarily re-configure your computer's network settings to be on the same network as the OW-SERVER in order to talk to the device for the first time. Only when the OW-SERVER is in the same address space as your other computers can you access it via a browser.

## Programmatic

Through a number of different channels, you can access the OW-SERVER programmatically to create integration with existing systems and network services:

- **HTTP**—service provides delivery of html and xml data files via http *get* command
- **SNMP**—provides access to data from all connected sensors, and pushes SNMP traps to remote listeners for alarming capabilities
- **Telnet**—service provides login to monitor the OW-SERVER's internal activities for diagnostic purposes
- **TFTP**—listener service provides a mechanism to transfer new firmware files to the OW-SERVER (*OW-SERVER-ENET only*)
- **UDP Broadcast**—listener on port number 30303 will respond to properly formatted packets broadcast to this port number, allowing other devices and applications to discover OW-SERVERs that exist on the same network. *For assistance in determining the units IP address, see the appropriate section regarding the EDS Application Scanner software.*
- **1-Wire Interface**—service provides a TCP client that implements a command / response low level interface that may be used to directly control the 1-Wire bus
- **POST Client**—provides a method of pushing XML data about connected 1-Wire devices to a server; ideal for circumventing firewall issues



# Configuration

Any configuration of your OW-SERVER can be carried out through the integrated web application. The on-board, web-based tools provide a method to configure both the unit itself as well as any attached supported 1-Wire devices.

To access the configuration elements,

- Navigate to the IP Address your network has assigned to the OW-SERVER. This will open the web interface.

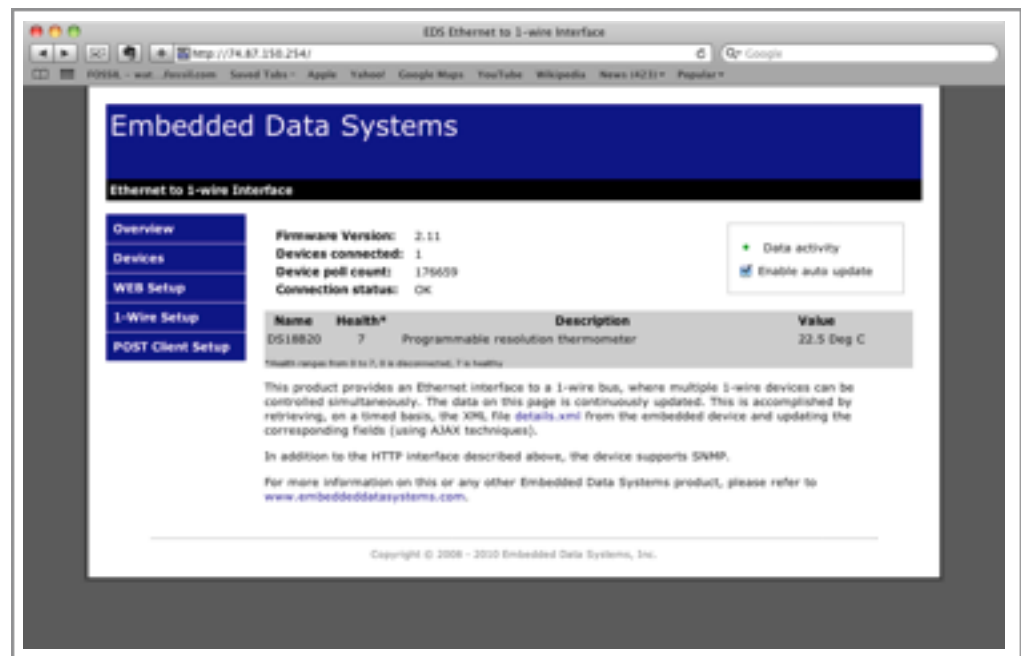
From the default “Overview” screen, you can access the three configuration options using the left-hand menu:

- WEB Setup
- 1-Wire Setup
- POST Client Setup

## WEB Setup

The WEB Setup provides a number of fields to configure how the OW-SERVER operates within your network. This section of the manual covers both the OW-SERVER-ENET and OW-SERVER-WiFi.

Note: In order to access this portion of the web tool, you will need a username and password. If you have not set it previously, you can use the factory default user name of “**admin**”, and password of “**eds**” (all in lower case.)



## OW-SERVER-ENET

The screenshot shows a web browser window titled "EDS Ethernet to 1-wire Interface" with the URL "http://74.87.150.254/protect/config.htm". The page has a blue header with "Embedded Data Systems" and "Ethernet to 1-wire Interface". A left sidebar contains a menu with "Overview", "Devices", "WEB Setup", "1-Wire Setup", and "POST Client Setup". The main content area is titled "Board Configuration" and includes a caution box: "CAUTION: Incorrect settings may cause the board to lose network connectivity. Uploading incorrect files may cause the board to malfunction. Please proceed with caution." Below this is a form with fields for "Device Name" (Demo OW-SERVER-Enet), "User Name" (admin), "Password" (two fields with masked characters), "Host Name" (EDSOWSERVER), "IP Address" (74.87.150.254), "Gateway" (74.87.150.249), "Subnet Mask" (255.255.255.248), "Primary DNS" (8.8.8.8), "Secondary DNS" (192.168.1.2), and "HTTP Port" (80). A "Save" button is at the bottom of the form. Below the form is a "Board Maintenance" section showing the MAC address "00:50:C2:91:82:A9".

You can configure the following aspects of the OW-SERVER-ENET:

- **Device name**—the factory default is OW\_SERVER-Enet. However this is a user definable name, maximum 24 characters. Alphanumeric characters, dashes, periods, spaces and underscores are permitted. This flexibility allows you to distinguish a device by its location or function for clarity. This field is included in the XML file.
- **User name**—this is the user name, case-sensitive maximum 12 characters, used to access the configuration sections of the on-board web tool and the Telnet interface. Uppercase and lowercase Alphanumeric Characters permitted. The factory default is "admin".
- **Password**—this is the password used to access the configuration sections of the on-board web tool and the Telnet interface. Uppercase and lowercase Alphanumeric Characters permitted. The factory default is "eds".
- **Password**—confirm the password entered in the previous password field.
- **Host Name**—the factory default name for the OW-SERVER-ENET is **EDSOWSERVER**. You can change the name but it is limited to 16 UPPERCASE characters. This field is also printed in the XML file.

- **Enable DHCP**—check this box to automatically enable the OW-SERVER-ENET to receive an IP address and other network configuration information (such as gateway and subnet mask) from a DHCP provider on your network. Note: this is the factory default setting of the device. If you elect NOT to enable DHCP, you must manually provide network adapter settings for the device:
  - **IP Address**—a standard IPV4 address. Note: if you configure the device with an IP Address that is NOT a part of your network IP-range or class you will be unable to access the device unless connected directly to it with a computer configured with the same IP settings
  - **Gateway**—the IP address of your network gateway
  - **Subnet Mask**—the Subnet mask
  - **Primary DNS**—the IP address of the primary DNS server
  - **Secondary DNS**—the IP Address of a secondary DNS server. Note: this is optional
  - **HTTP Port**—the port through which the OW-SERVER will listen for incoming HTTP requests. Normally programmed to 80
- **Save**—when you have finished making settings, click the “Save” button to commit the settings to the device. This will cause the device to reboot

*Note: at the time of initial boot-up, the device will look for a DHCP server. If one cannot be found, the following default configuration settings will be applied:*

- IP Address: 169.254.1.1
- Gateway: 169.254.1.1
- Subnet Mask: 255.255.0.0
- DNS: 169.254.1.1

### **OW-SERVER-WiFi**

Upon power-up, the OW-SERVER-WiFi is configured from the factory to immediately look for a wireless network with a SSID of EDSWiFi. If the device finds this network (and it is unsecured) the OW-SERVER-WiFi will immediately connect and attempt to gather network configuration information from an available DHCP server. This includes the following information:

- **IP Address**—a standard IPV4 address. Note: if you configure the device with an IP Address that is NOT a part of your network IP-range or class you will be unable to access the device unless connected directly to it with a computer configured with the same IP settings;
- **Gateway**—the IP address of your network gateway
- **Subnet Mask**—the Subnet mask
- **Primary DNS**—the IP address of the primary DNS
- **Secondary DNS**—the IP Address of a secondary DNS. Note: this is optional

If the device does not find a wireless network with a network SSID of EDSWiFi, you will need to connect to the device to manually configure it.

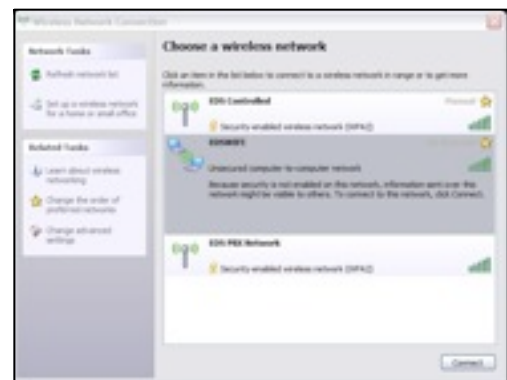
### **Manually Configure the OW-SERVER-WiFi**

In the event that your OW-SERVER-WiFi does not find a wireless SSID of EDSWiFi, it will create an ad-hoc network called EDSWiFi with the following network configuration settings:

- IP Address: 169.254.1.1
- Gateway: 169.254.1.1
- Subnet Mask: 255.255.0.0
- DNS: 169.254.1.1

In order to configure the OW-SERVER-WiFi, you will need to connect directly to the ad-hoc network:

- Open your wireless network settings
- Click on the EDSWiFi network under the “Devices” section of your wireless adapter (the screenshot to the right is from a PC running Microsoft Windows®).
- Once the network has connected, open your browser and navigate to the default configuration IP Address: 169.254.1.1. This will open the web-based configuration application.



In order to get your OW-SERVER-WiFi onto your existing wireless network, you will need to configure its wireless settings. To access the configuration screen:

- Click on the “WiFi Setup” menu on the left-hand side. This will open the WiFi Configuration screen.



You can specify the following information to configure your OW-SERVER-WiFi:

- **WLAN Type**—use the radio buttons to specify if your wireless network is an ad-hoc collection of devices or a wireless infrastructure. Contact your network administrator to determine the appropriate setting
- **SSID Name**—use the drop-down to select the SSID to which you want the OW-SERVER-WiFi to connect. In the event that your wireless network does not broadcast its SSID, type in the name into the empty field. Contact your network administrator to determine the appropriate setting
- **Security Type**—use the drop-down to select the type of security on your wireless network. The OW-SERVER-WiFi can authenticate to wireless networks using the following security types:
  - WPA (Personal)
  - WEP (64 and 128-bit)
- **Security Key**—enter the security key for the SSID selected. Contact your network administrator to determine the appropriate setting.
- Click the “Apply” button to commit the changes. If a security key has been entered, it may take up to 2 minutes before the OW-SERVER-WiFi becomes accessible on the new network.

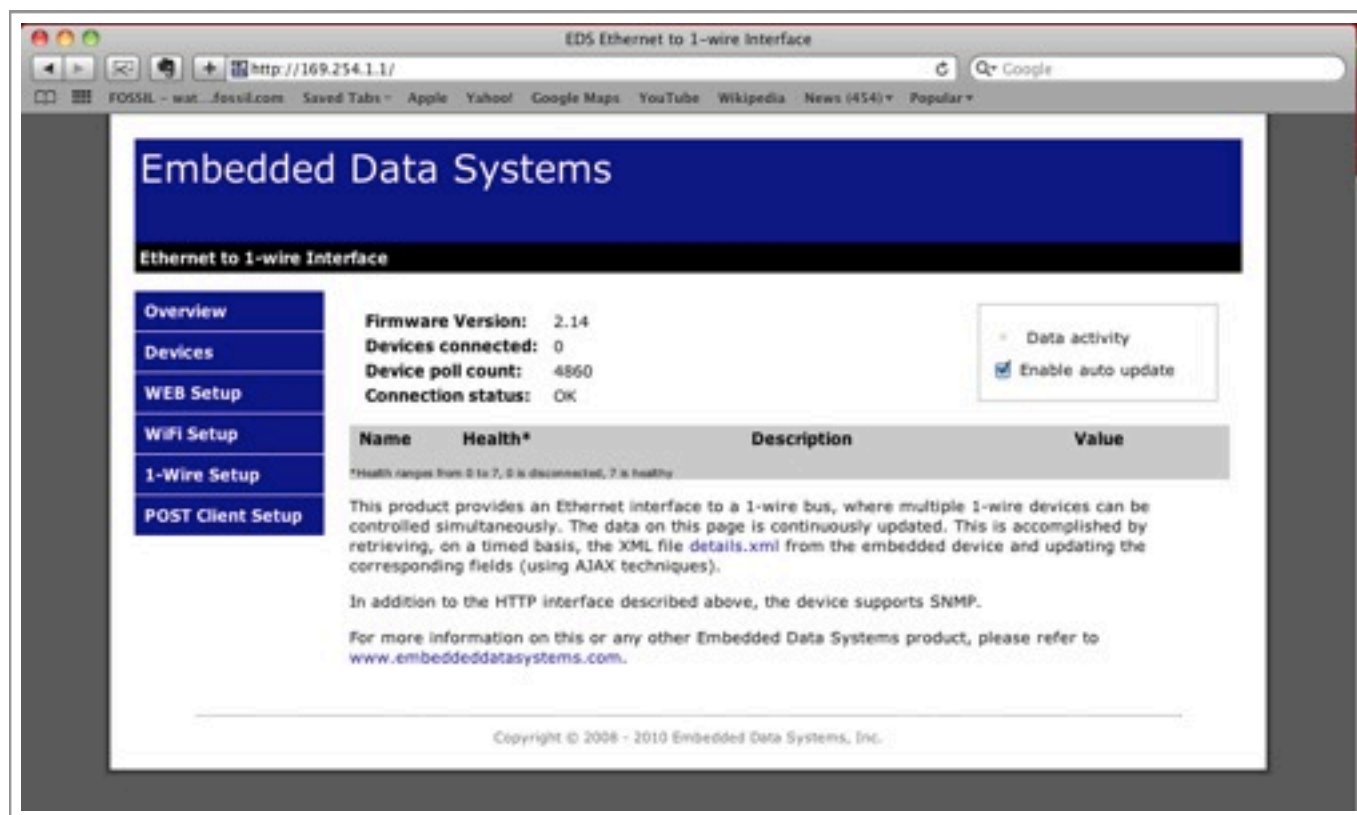
Once the changes have been applied, you can connect to the wireless network that the OW-SERVER-WiFi is joining and utilize either your DHCP lease tables or the [EDS Appliance Scan-](#)

[ner Software](#) to find the device's new IP address. The IP address enables access through a web browser.

## **EDSWiFi SSID Found**

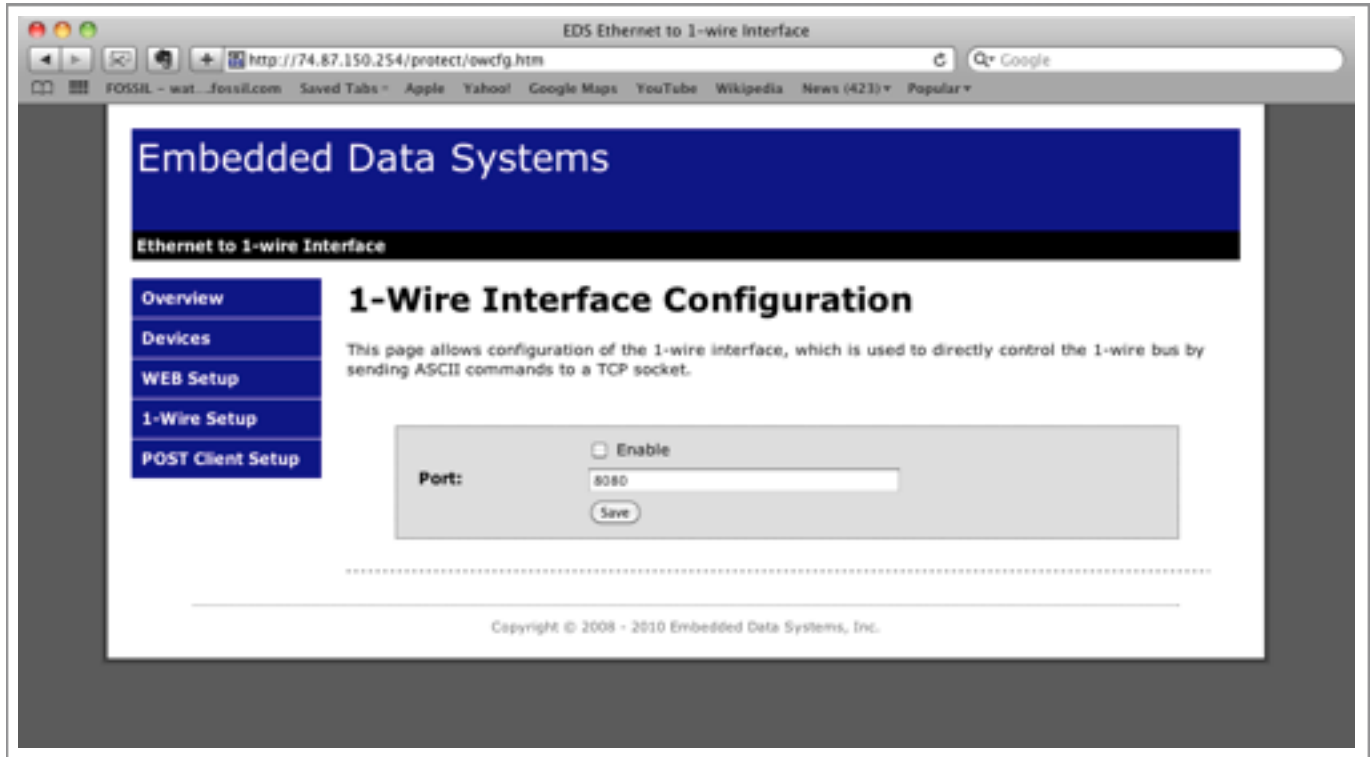
In the event that the OW-SERVER-WiFi finds a wireless SSID of EDSWiFi,

- Use either your DHCP lease tables or the [EDS Appliance Scanner Software](#) to find the device's IP address
- Open your browser and navigate to the IP Address returned from the previous step. This will open the web-based configuration application.



You can make changes to the device's WiFi configuration details by choosing the "WiFi Setup" menu option on the left-hand side, then specifying the configuration information discussed previously.

## 1-Wire Setup



The 1-Wire Setup feature of the web-tool allows you to configure the 1-Wire interface on the OW-SERVER.

At this time, the only configuration setting allowed is to enable direct TCP communication with the 1-Wire bus. This allows you to send commands directly to 1-Wire devices connected to the system. It is ideal for solutions developers looking to integrate the OW-SERVER with 1-Wire devices not currently supported at a high level or for legacy applications.

To configure the port

- Click the “Enable” check box
- Specify a port number through which communication will occur
- When you are finished, click the “Save” Button to commit the settings to the device

## POST Client Setup

The POST Client Setup page of the web-tool allows you to configure the OW-SERVER's POST Client feature.

The screenshot shows a web browser window with the address bar displaying "74.87.150.254/protect/cfgpc.htm". The page has a blue header with "Embedded Data Systems" and a sub-header "Ethernet to 1-wire Interface". On the left is a navigation menu with "Overview", "Devices", "WEB Setup", "1-Wire Setup", and "POST Client Setup" (which is highlighted). The main content area is titled "POST Client Configuration" and includes the instruction: "Use this page to configure the automatic sending of data to an HTTP server using POST." Below this is a configuration form with the following fields: "Enable:" with an unchecked checkbox, "URL:" with a text box containing "http://192.168.1.23/upload.htm", and "Period (sec):" with a text box containing "60". A "Save" button is located below the "Period (sec):" field. Below the form is a "Notes:" section with three numbered points: 1. The latest 1-wire device data can be automatically sent to a HTTP Post server using the POST Client feature. Data is sent in XML format. 2. URL - Where to post the data, as typed into a browser. Examples: "http://www.embeddeddatasystems.com/upload.htm", "http://www.embeddeddatasystems.com:12391/files/myfile.htm", "http://192.168.1.23/upload.htm". 3. Period - How often, in seconds, to send the data. At the bottom of the page is a copyright notice: "Copyright © 2008 - 2011 Embedded Data Systems".

To configure POST Client

- Enable the feature by clicking the check box
- Select the URL of the HTTP POST server. This field requires a fully qualified URL and may include an alternate port number. This example sets the port to 12391:  
"http://www.embeddeddatasystems.com:12391/files/myfile.htm"
- Select how often to send the "details.xml" file



# Web Access

The OW-SERVER provides a robust, on-board, web-based tool to access connected 1-Wire devices from any web browser—whether on a PC or a smartphone! (*However some phones do have ad hoc network limitations*).

To access the connected 1-Wire devices,

- Navigate to the IP Address your network has assigned to the OW-SERVER. This will open the web interface.

The screenshot shows a web browser window titled "EDS Ethernet to 1-wire Interface" with the address bar displaying "http://74.87.150.254/". The page has a blue header with "Embedded Data Systems" and "Ethernet to 1-wire Interface". A left sidebar contains navigation links: Overview, Devices, WEB Setup, 1-Wire Setup, and POST Client Setup. The main content area displays system status: Firmware Version: 2.11, Devices connected: 1, Device poll count: 176659, and Connection status: OK. A "Data activity" indicator shows a green dot and a checkbox for "Enable auto update" which is checked. Below this is a table with columns Name, Health\*, Description, and Value. The table lists one device: DS18B20 with Health 7, Description "Programmable resolution thermometer", and Value "22.5 Deg C". A note below the table states: "Health ranges from 0 to 7, 0 is disconnected, 7 is healthy". Further text explains the product's function and mentions SNMP support. The footer includes the copyright notice: "Copyright © 2006 - 2010 Embedded Data Systems, Inc."

Name	Health*	Description	Value
DS18B20	7	Programmable resolution thermometer	22.5 Deg C

From the default “Overview” page you can access the following:

- OW-SERVER Device Status
- 1-Wire Device information.

## OW-SERVER Device Status

<b>Firmware Version:</b> 2.11	<div><div>• Data activity</div><div><input checked="" type="checkbox"/> Enable auto update</div></div>
<b>Devices connected:</b> 1	
<b>Device poll count:</b> 176659	
<b>Connection status:</b> OK	

Name	Health*	Description	Value
DS18B20	7	Programmable resolution thermometer	22.5 Deg C

\*Health ranges from 0 to 7, 0 is disconnected, 7 is healthy

The default “Overview” page contains summary data at the top of the page for:

- The OW-SERVER
- Connected devices (in the gray box).

## OW-SERVER

The OW-SERVER summary data provides the following points:

- **Firmware version**—the version of firmware currently operating on the OW-SERVER
- **Devices connected**—the number of 1-Wire devices connected to the OW-SERVER
- **Device poll count**—the number of times the OW-SERVER has polled devices. The rate of polling depends upon the number of devices and the specific device. Some 1-Wire devices refresh every second while others may do so much faster (e.g., The DS18B20 causes a 900ms delay while waiting for the temperature to be converted, whereas the DS2406 has no delay).
- **Connection status**—the connection status between the OW-SERVER and the web browser that is accessing the OW-SERVER web configuration page. An error will be displayed here in the event there is an issue.
- **Data activity**—this light will flash green every time the browser receives a data push of new values from the OW-SERVER. This is useful to know that the data feed is alive, even if the values are not changing.
- **Enable auto update**—check this box to enable the browser to update the webpage as new data is received from the OW-SERVER. Uncheck the box if you would like to pause the automatic refresh between browser and the OW-SERVER to analyze information on the screen. Note: if you leave this box unchecked, the web page will not update with new values automatically but the OW-SERVER will continue to poll attached 1-Wire devices.

## Connected Devices

The Connected Devices summary data provides the following points:

- **Name**—the name of the device
- **Health**—the health of the device. Each time a device is successfully read, its health field is incremented by 1, to a maximum value of 7. If a device fails to read properly for any reason, its health field is decremented by 1, to a minimum value of 0. Generally, a health

value of 7 indicates a properly functioning device, 0 indicates a device that has been disconnected, and anything in between might indicate intermittent communication or a recently connected device.

- **Description**—the description of the device<sup>1</sup>
- **Value**—the primary value of the sensor on the connected device

During normal operation the OW-SERVER automatically scans the 1-Wire bus as follows:

- **Searches for devices**—if new devices are found, they are added to the end of the device list<sup>2</sup>
- **Reads data from all devices**—updates the data fields

## 1-Wire Device Details

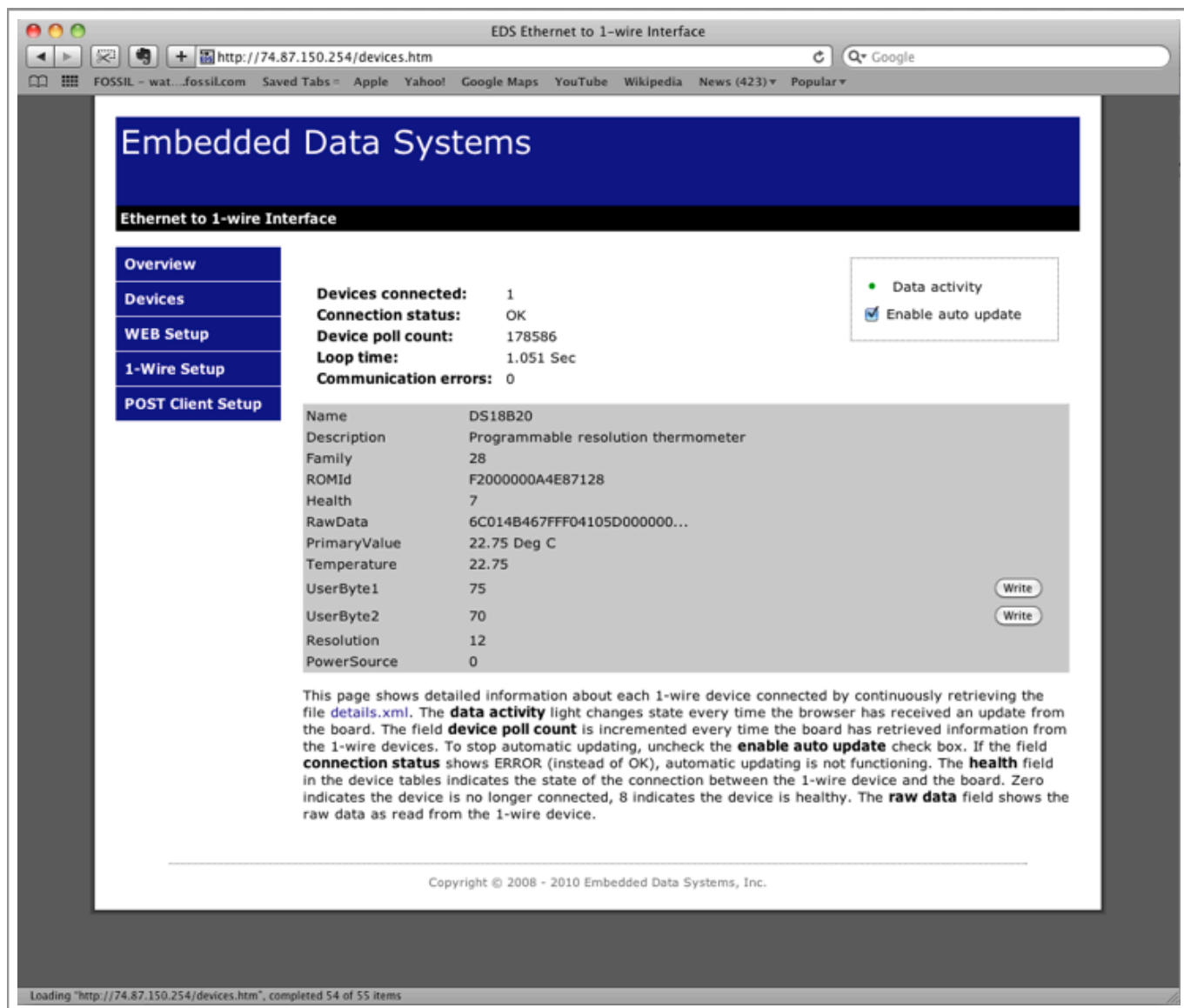
To access details about the connected devices:

- Choose the “Devices” menu on the left. This will open the Connected Devices screen.

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<sup>1</sup> Please note that the description is commonly based on the Maxim chips, not the sensor connected to the chip.

<sup>2</sup> The order of devices in the list may change if the power is cycled.



The Connected Devices screen displays all 1-Wire devices that are currently connected to the OW-SERVER. The data is presented in two sets—1-Wire interface and the connected devices.

### 1-Wire Interface



The top of the screen shows information about the communication status between the OW-SERVER, the 1-Wire devices as a whole and the web browser:

- **Devices Connected**—the # of devices connected
- **Connection status**—the connection status between the OW-SERVER and the web browser that is accessing the OW-SERVER web configuration page. An error will be displayed here in the event there is an issue.
- **Device poll count**—the number of times the OW-SERVER has cycled through polling all of the connected devices
- **Loop time**—the time, in seconds, it takes for the OW-SERVER to cycle through polling all of the devices and receive a response. As more devices are added, each individual device gets read less frequently since only a single device can be read at a time. The0. value is useful for determining how frequently each sensor gets read.
- **Communication errors**—number of errors in communication between the OW-SERVER and the attached devices.
- **Data activity**—this light will flash green every time the browser receives a data push of new values from the OW-SERVER. This is useful to know that the data feed is alive, even if the values are not changing.
- **Enable auto update**—check this box to enable the browser to update the webpage as new data is received from the OW-SERVER. Uncheck the box if you would like to pause the automatic refresh between browser and the OW-SERVER to analyze information on the screen. Note: if you leave this box unchecked, the web page will not update with new values automatically but the OW-SERVER will continue to poll attached 1-Wire devices.

## Connected Devices

Name	DS18B20	
Description	Programmable resolution thermometer	
Family	28	
ROMId	F2000000A4E87128	
Health	7	
RawData	6C014B467FFF04105D000000...	
PrimaryValue	22.75 Deg C	
Temperature	22.75	
UserByte1	75	<div>Write</div>
UserByte2	70	<div>Write</div>
Resolution	12	
PowerSource	0	

The bottom part of the screen displays information about each connected device. Because each supported device may have different elements, they are not covered in detail in this manual.

For those devices that have “programmable” elements (e.g., UserByte1 and UserByte2 in the Programmable Resolution Thermometer example depicted above), you can click the “Write” button to specify a value.

All of the current sensor data is available for download at the details.xml link on the bottom of the page.

# Integration

The OW-SERVER provides a powerful set of tools to enable developers and network administrators the ability to integrate the device (and data from connected 1-Wire devices) with existing management and/or monitoring systems. The following are the network services supported by OW-SERVER, accessible via TCP/IP:

- **HTTP**—service provides delivery of html and xml data files via http get, a method of writing data to 1-Wire devices and the web browser interface previously discusses.
- **SNMP**—provides access to data from all connected sensors, and pushes SNMP traps to remote listeners for alarming capabilities
- **Telnet**—service provides login to monitor the OW-SERVER's internal activities for diagnostic purposes
- **TFTP**—listener service provides a mechanism to transfer new firmware files to the OW-SERVER. \* Only Microsoft's TFTP Server is supported.
- **UDP Broadcast**—listener on port number 30303 will respond to properly formatted packets broadcast to this port number, allowing other devices and applications to discover OW-SERVERs that exist on the same network.
- **1-Wire Interface**—service provides a TCP client that implements a command / response low level interface that may be used to directly control the 1-Wire bus
- **POST Client**—provides a method of pushing XML data about connected 1-Wire devices to a server.

## HTTP

The HTTP mechanism enables programmers to utilize a GET command to retrieve various data elements that are contained in an XML file as well as write data to 1-Wire devices that support control functions.

The OW-SERVER provides the following XML file for data retrieval:

- **Details.xml**—this file provides detailed information on the OW-SERVER and all connected devices.

### *Retrieving XML File*

To retrieve the XML file, simply access it by corresponding URL.

For example: "http://192.254.1.1/details.xml"

Once the file has been retrieved, it can be parsed according to the methods available to the developer in whatever programming language they are using.

### Details.xml

The following is an example of the details.xml file:

```
<Devices-Detail-Response xmlns="http://www.embeddeddatasystems.com/schema/owserver"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
```

[illegible]

## Writing Data to 1-Wire Devices

*devices.htm?rom=4300000200AD1928&variable=UserByte1&value=75*

- **rom**—the ROM ID of the device to modify, alpha characters must be upper case
- **variable**—the name of the variable to modify. The name is the same as the XML field name, only XML fields with attributes of **'Writable="True"'** may be written, (e.g., <User-Byte....)
- **value**—the new decimal value to write to the 1-Wire device

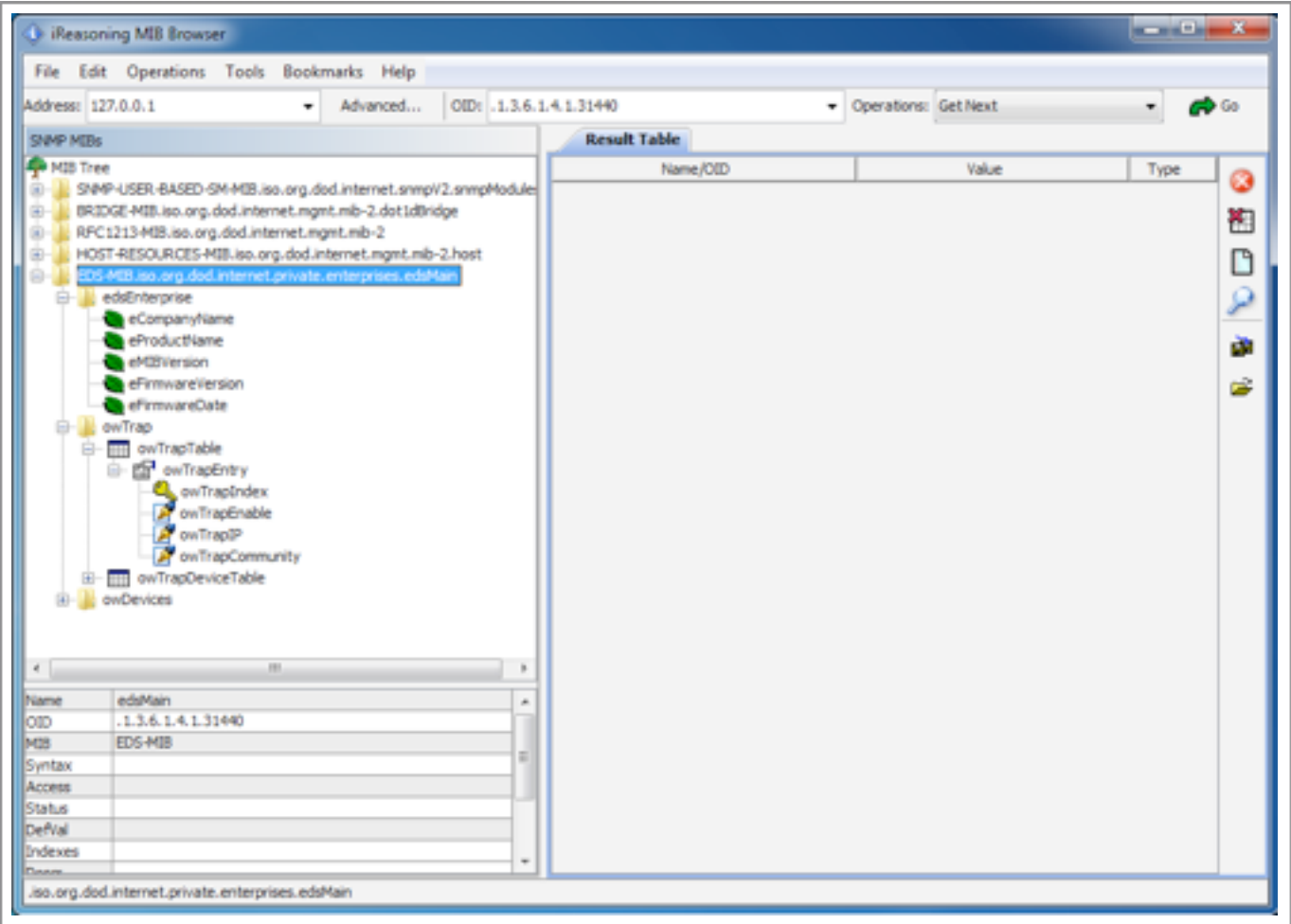


SNMP (Simple Network Management Protocol)

Simple Network Management Protocol (SNMP) is a protocol commonly used to maintain network equipment. Each piece of equipment in a network is described by its .mib file (Machine Information Base file). Using an SNMP application, network administrators can monitor and interact with equipment throughout the network.

The OW-SERVER-MIB file can be loaded into your SNMP program, making it available for management and machine-to-machine communication. This file is available from the [EDS OW-SERVER product page](#) under the DOWNLOADS tab.

The file also contains text descriptions and explanations of the various OID functions.



The screenshot above (from the iReasoning MIB Browser<sup>1</sup>) shows the OW-SERVER .mib file loaded into the SNMP interface and expanded to display the 3 nodes—*edsEnterprise*, *owTrap* and *owDevices*, as shown below.

<sup>1</sup> This application is available from the iReasoning website and is only used as an example. There is no affiliation of any kind between Embedded Data Systems and the creator of iReasoning.

## ***edsEnterprise Branch***

The *edsEnterprise* branch presents basic information such as name and version.

## ***owTrap Branch***

The *owTrap* contains 2 tables used to send traps based on preset conditions.

- The *owTrapTable* defines where to send traps. It has 2 rows, each defining an IP address, community string and enable flag. In order for a trap to be sent, the IP address must not be zero and the enable flag must be one (zero disables). The community string is not used by the OW-Sensor-ENET, except to send the string in the trap PDU.
- The *owTrapDeviceTable* specifies the criteria for sending a trap. The table has 7 rows that support 7 different traps. The rows of this table are as follows:
  - *owTrapDeviceEnable* – must be 1 to enable sending traps, zero disables sending
  - *owTrapSendPointer* – may be 0 or 1. Points to the row of the *owTrap* table which defines where to send the trap. Note that all data in the row in this table and the corresponding row of the *owTrap* table must be valid for the trap to be sent.
  - *owTrapDeviceROM* – Stores the 1-Wire ROM ID of the device to base sending traps on. To be valid, this value must not be zero and must match a ROM code of a currently connected and active 1-Wire device.
  - *owTrapDeviceVariable* – Defines which variable of the 1-Wire device to base calculation on. The value must refer to a valid variable or no trap will be sent.
    - DS2406
      - 1 – Input level A
      - 2 – Input level B
      - 3 – Flip Flop A
      - 4 – Flip Flop B
      - 5 – Activity latch A
      - 6 – Activity latch B
      - 7 – Number of Channels
      - 8 – Power source
      - 9 – Activity latch reset
    - DS18B20
      - 1 – Temperature
      - 2 – User byte 1
      - 3 – User byte 2
      - 4 – Resolution
      - 5 – Power source
    - DS18S20
      - 1 – Temperature
      - 2 – User byte 1
      - 3 – User byte 2

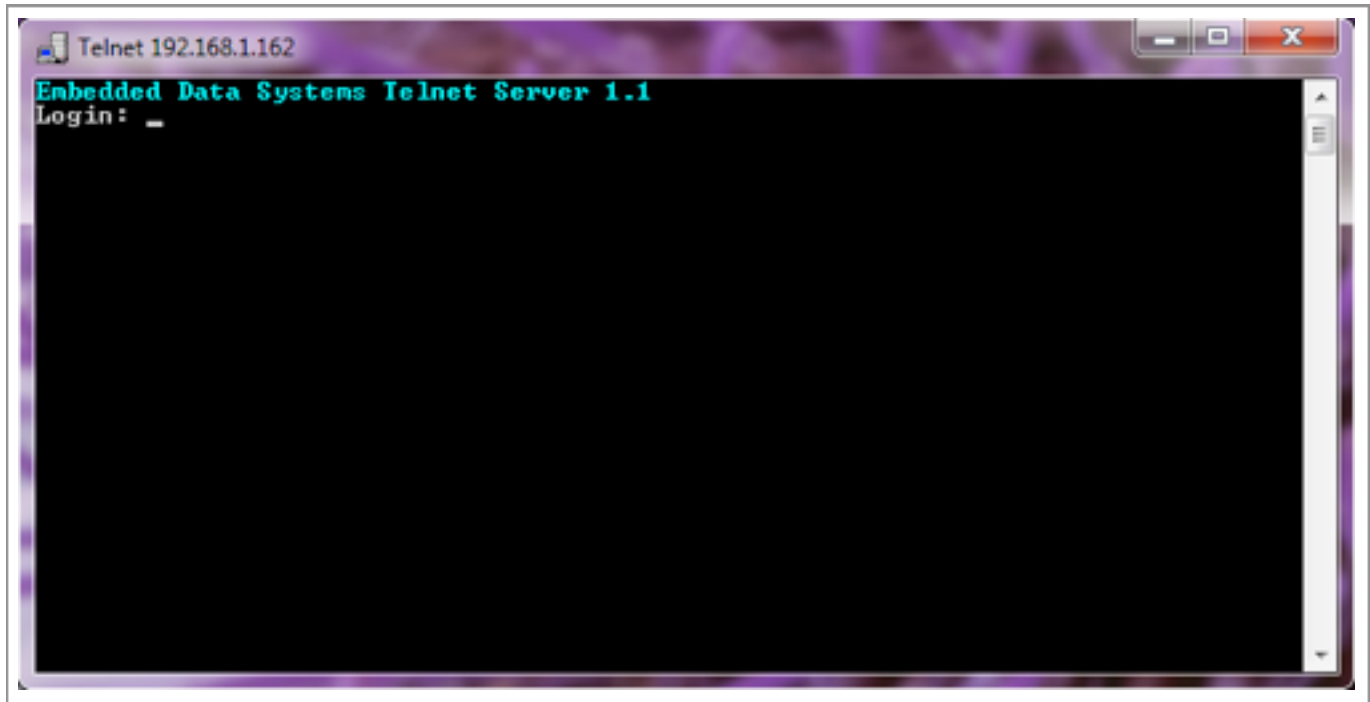
- DS2423
  - 1 – Counter A
  - 2 – Counter B
- DS2438
  - 1 – Temperature
  - 2 – VDD
  - 3 – VAD
  - 4 – Current
  - 5 – Humidity (assumes a humidity sensor is connected to device.)
- DS2408
  - 1 – Logic state
  - 2 – Output latch state
  - 3 – Activity latch state
  - 4 – RSTZ configuration
  - 5 – Power on reset latch
  - 6 – VCC power status
- DS2450
  - 1 – Channel A conversion value
  - 2 – Channel A conversion resolution
  - 3 – Channel A conversion range
  - 4 – Channel A output enable
  - 5 – Channel A output control
  - 6 – Channel B conversion value
  - 7 – Channel B conversion resolution
  - 8 – Channel B conversion range
  - 9 – Channel B output enable
  - 10 – Channel B output control
  - 11 – Channel C conversion value
  - 12 – Channel C conversion resolution
  - 13 – Channel C conversion range
  - 14 – Channel C output enable
  - 15 – Channel C output control
  - 16 – Channel D conversion value
  - 17 – Channel D conversion resolution
  - 18 – Channel D conversion range
  - 19 – Channel D output enable
  - 20 – Channel D output control
  - 21 – Power on reset
  - 22 – VCC control
- EDS0064
  - 1 – Temperature
  - 2 – Counter

- EDS0065
  - 1 – Temperature
  - 2 – Humidity
  - 3 – Dew point
  - 4 – Humidex
  - 5 – Heat index
  - 6 – Counter
- EDS0066
  - 1 – Temperature
  - 2 – Barometric pressure in mb
  - 3 – Barometric pressure in Hg
  - 4 – Counter
- EDS0067
  - 1 – Temperature
  - 2 – Light
  - 3 – Counter
- EDS0068
  - 1 – Temperature
  - 2 – Humidity
  - 3 – Dew point
  - 4 – Humidex
  - 5 – Heat index
  - 6 – Barometric pressure in mb
  - 7 – Barometric pressure in Hg
  - 8 – Light
  - 9 – Counter
- EDS0070
  - 1 – Vibration peak
  - 2 – Vibration minimum
  - 3 – Vibration maximum
  - 4 – Counter
- EDS0071
  - 1 – Temperature
  - 2 – Counter
- The items *owTrapDeviceHighThreshold*, *owTrapDeviceLowThreshold* and *owTrapDeviceHysteresis* work together to define 3 windows.
  - The variable is in the high window when it is greater than the high threshold
  - The variable is in the middle window when it becomes less than or equal to the high threshold minus hysteresis, or greater than or equal to the low threshold plus hysteresis

- It is in the low window when it is less than the low threshold
- When a variable is read from a 1-Wire device, it is compared to these values. If the new value from the 1-Wire device causes a change in the windows, this generates a trap message with this information:
  - OID of *owTrapDeviceIndex.x* where x is the number of *owTrapDeviceTable* row that caused the trap. The numeric value is 1.3.6.1.4.1.3.1440.2.2.1.1.x.
  - The data type integer indicates which transition occurred:
    - 1 – middle to high window transition
    - 2 – high to middle window transition
    - 3 – middle to low transition
    - 4 – low to middle transition
  - If the high threshold is less than the low threshold, no traps will be generated. Hysteresis is not checked for validity and may be set to any value.
  - The high threshold, low threshold and hysteresis are stored as float in the OW-SERVER-ENET, but are written as strings. This is because the SNMP V1 protocol makes no provision for a float. Because of this, some numbers may be rounded, and are displayed with 3 digits of precision after the decimal point regardless of what the number actually is in the OW-SERVER-ENET. Numbers entered must be between +32767 and – 32767.
- The *owDevices* has the following branches:
  - *owDeviceTypes* lists each device type supported. This branch is read only.
  - *owDeviceInfo* branch lists the number of devices connected
  - *owDeviceTable* shows basic information about each device connected
  - *owDS2406Table*, *owDS18B20Table*, *owDS18S20Table*, *owDS2423Table*, *owDS2438Table*, *owDS2408Table*, *owDS2450Table*, *owEDS0064Table*, *owEDS0065Table*, *owEDS0066Table*, *owEDS0067Table*, *owEDS0068Table*, *owEDS0070Table*, *owEDS0071Table* show detailed information similar to what is shown on the devices web page

- *owDS2406Table* contains the following writable items: (Writing to these items, causes the OW-SERVER-ENET to copy the value to the corresponding 1-Wire device).
  - *owDS2406PIOAFlipFlop*
  - *owDS2406PIOBFlipFlop*
  - *owDS2406ActivityLatchReset*
- *owDS18B20Table* has the following writable items:
  - *owDS18B20UserByte1*
  - *owDS18B20UserByte2*
- *owDS2408Table* has the following writable items:
  - *owDS2408PIOOutputLatchState*
  - *owDS2408PIOActivityLatchState*
  - *owDS2408RSTZConfiguration*
  - *owDS2408PowerOnResetLatch*
- *owDS2450Table* has the following writable items:
  - *owDS2450ChannelAConversionResolution*
  - *owDS2450ChannelAConversionRange*
  - *owDS2450ChannelAOutputEnable*
  - *owDS2450ChannelAOutputControl*
  - *owDS2450ChannelBConversionResolution*
  - *owDS2450ChannelBConversionRange*
  - *owDS2450ChannelBOutputEnable*
  - *owDS2450ChannelBOutputControl*
  - *owDS2450ChannelCConversionResolution*
  - *owDS2450ChannelCConversionRange*
  - *owDS2450ChannelCOutputEnable*
  - *owDS2450ChannelCOutputControl*
  - *owDS2450ChannelDConversionResolution*
  - *owDS2450ChannelDConversionRange*
  - *owDS2450ChannelDOutputEnable*
  - *owDS2450ChannelDOutputControl*
  - *owDS2450PowerOnState*
  - *owDS2450VCCControl*

## Telnet



Telnet is a network protocol used on the Internet or local area networks to provide a bidirectional interactive text-oriented communications facility using a virtual terminal connection. User data is interspersed in-band with Telnet control information in an 8-bit byte oriented data connection over the Transmission Control Protocol (TCP).

In the Windows operating system, Telnet connections are enabled through the Windows Telnet Client (as illustrated above). To start a Telnet connection with the OW-SERVER,

- Open the Telnet Client. This is accomplished by typing “Telnet” into the search box.
- Once the Telnet Client has opened, type “o {IP address}” where {IP address} represents the IP address of your OW-SERVER (e.g., o 192.168.1.14). This will open a connection between your Telnet Client and the OW-SERVER.
- In order to complete the connection, you must enter the username<sup>1</sup> and password.<sup>2</sup>

---

<sup>1</sup> Factory default "admin"

<sup>2</sup> Factory default "eds"



Once the connection has been successfully authenticated, the OW-SERVER will present you with a textual menu through which you can show basic information.

## TFTP

Trivial File Transfer Protocol (TFTP) is a simple protocol to transfer files. It has been implemented on top of the User Datagram Protocol (UDP) using port number 69. TFTP only reads and writes files (or mail) from/to a remote server. It cannot list directories, and currently has no provisions for user authentication.

*For more information on accessing the device utilizing TFTP (to upload new versions of the software), see the Maintenance section of this manual.*

## UDP

The OW-SERVER can interact with UDP requests on port 30303 and provide basic information in return. The primary use for this is discovering OW-SERVERs on the network, such as with the EDS Appliance Scanner Software. You can download a copy of this free OW-SERVER discovery application (available for Windows, Apple OS X, and Linux) from the EDS website. A link to the software is provided in the EDS Appliance Scanner section of this manual.

The OW-SERVER sends a UDP broadcast packet to port 30303 when:

- First powered up
- IP address changes due to a new DHCP server lease
- When the letter 'D' is received on UDP port 30303, either directly or via a UDP broadcast.



The following is an example of the UDP packet:

```
{ "NETBios": "EDSOWSERVER ",  
  "MAC": "00-50-C2-91-B1-44",  
  "IP": "192.168.1.14",  
  "Product": "OW_SERVER-Enet",  
  "FWVer": "2.22",  
  "Name": "OW_SERVER-Enet",  
  "HTTPPort": "80",  
  "Bootloader": "TFTP",  
  "TCPIntfPort": "0",  
}
```

The packet is formatted using JSON (Javascript Object Notation). The fields have the following information

- **NETBios**—This is the text string programmed in the “Host Name” field of the “Web Setup” web page
- **MAC**—This is the globally unique MAC address of the OW-SERVER
- **IP**—The current IP address
- **Product**—A text description of the product. It cannot be changed
- **FWVer**—Firmware version of the OW-SERVER
- **Name**—This is the text string programmed in the “Device Name” field of the “Web Setup” web page
- **HTTPPort**—The HTTP port number as programmed in the “HTTP Port” field of the “Web Setup” web page. The standard HTTP port is 80.
- **Bootloader**—Specifies the boot-loader type
- **TCPIntfPort**—This is the 1-Wire interface port as programmed in the “Port” field of the “1-Wire Setup” web page

## 1-Wire Interface

The 1-Wire Interface provides a command level interface to directly control the 1-Wire bus through a TCP connection. This feature is provided for integration to products that have already implemented a low level interface for other 1-Wire bus masters and is for experienced 1-Wire integrators only.

When a TCP connection is made, the OW-SERVER ***stops polling 1-Wire devices*** and waits for commands over the TCP connection. If 30 seconds elapse without any commands, the OW-SERVER closes the TCP connection and resumes normal polling of 1-Wire devices. Optionally, the user may send a quit command to avoid the 30 seconds delay.

*See Appendix A for COMMUNICATION PROTOCOL*

## POST Client

This feature automatically, on a timed basis, sends the XML file “details.xml” to a HTTP server. Its primary purpose is to get data that’s behind a firewall to a server residing on the Internet. By using the standard HTTP POST originating from behind the firewall, firewalls and other Internet filters see the communication as a standard browser request and typically will not block it.

The HTTP POST feature requires a properly configured server to receive the file. Download the [OW-SERVER PHP Script](#) from the EDS website to perform this function.

# Maintenance

There are various activities you can carry out to maintain and/or upgrade your OW-SERVER:

- Firmware upgrade
- Webpage Upload using SNMB MIB file
- Factory reset

## Firmware Upgrade

The OW-SERVER features the ability to perform firmware upload over the network using the TFTP (Trivial File Transfer Protocol), or Web page upload.<sup>1</sup>

### TFTP

To locate your current installed firmware version, access the Overview Web Page. The version of firmware installed in your device is listed at the top. To determine if there is a more recent version available, contact EDS.

If EDS has provided you a new firmware, you can upload it to your OW-SERVER via TFTP:

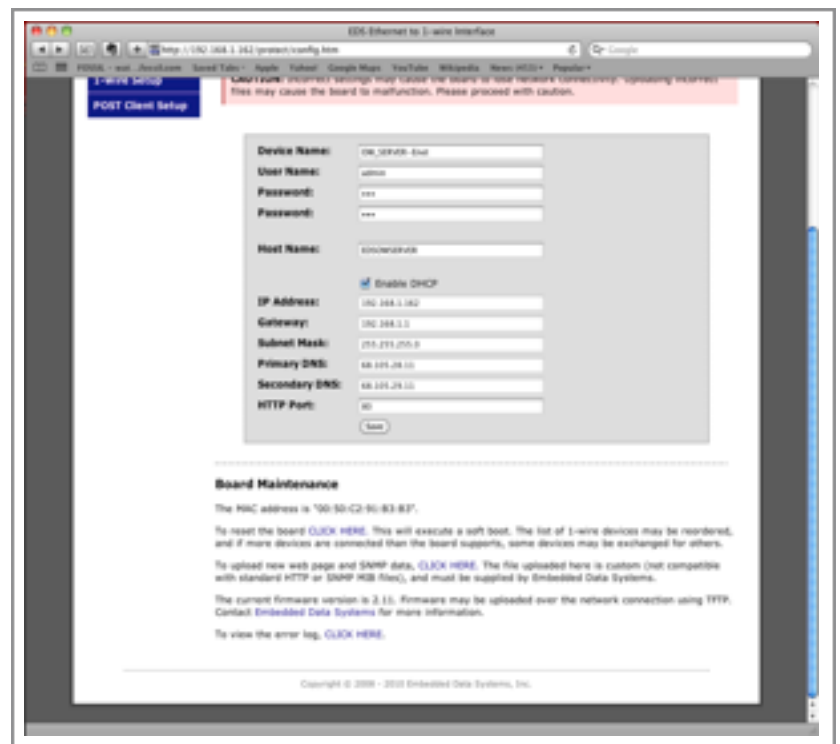
- Open a command prompt on Windows
- Change your working directory to the location of the firmware file.
- Run the following command “tftp {IP Address} put “{File Name}” where {IP Address} is the specific IP of the OW-SERVER you are trying to upgrade and {File Name} is the name of the firmware file provided by EDS (e.g., 192.168.1.14 put OW\_Server\_Firmware\_Enet\_TFTP\_v2.22.hex).

Upon successful uploading of the firmware file, the OW-SERVER will apply the new firmware and reboot.

## Webpage Upload

The OW-SERVER stores Web pages and SNMP MIB files in a custom file format on a flash memory chip. These files can be updated over the network via HTTP. This is typically done in conjunction with a firmware upgrade. To update the SNMP MIB Files,

- Open the web-based configuration tool and click on the “WEB Setup” link.
- Scroll to the bottom of the page and click the “CLICK HERE” link in the paragraph describing, “To upload new web page and SNMP data...” This will open the SMNP MIB Upload tool.



<sup>1</sup> Upgrade method is hardware dependent and applies only to the OW-SERVER-WiFi



- Click the “Choose File” button to locate the file as provided to you by EDS
- Once located, click the “Upload” button
- Once uploaded, the OW-SERVER will apply the new file and reboot

## Factory Reset

To reset the OW-SERVER to factory defaults:

1. Remove the top cover of the OW-SERVER by unscrewing the four screws
2. Once removed, with connector panel positioned towards you, locate the two plated drill holes in the upper center of the PC board (P5)
3. Apply power to the OW-SERVER
4. Using an appropriate tool (tweezers, paper clip, etc.) short these two pads together
5. Remove the short and replace the top cover. Once you have removed the short from P5, the reset will take less than four seconds to complete.

Note: When performing the factory reset properly, the PWR/ACT LED will no longer flash, but will stay on solidly indicating a successful reset to factory defaults.

Once reset, the following configuration elements will be returned to their factory settings:

- Host Name: EDSOWSERVER
- DHCP Enabled. In the event that a DHCP server is available on the network, the following will be provided automatic configuration data:
  - IP Address: DHCP assigned
  - Gateway: DHCP assigned
  - Subnet Mask: DHCP assigned
  - Primary DNS: DHCP assigned
  - Secondary DNS: DHCP assigned
  - If there is no DHCP server, an internal IP address will be provided. More information about this process can be found in the Setup section of this manual.
- User Name: admin
- Password: eds

The following configuration settings will be returned to factory defaults if you reset an OW-SERVER-WiFi device:

- SSID: EDSWiFi
- Type: Ad-Hoc
- Security: Open
- Passphrase: None

## Additional Resources

Below is a list of additional resources:

- Supported 1-Wire devices
- EDS Appliance Scanner Software
- OW-SERVER form factor

### Supported 1-Wire Devices

The OW-SERVER supports the following 1-Wire devices:

- DS18B20 - Programmable Resolution Thermometer
- DS18S20 - Parasite Power Thermometer
- DS2406 - Dual Addressable Switch Plus Memory
- DS2408 - 8 Channel Addressable Switch
- DS2423 - RAM with Counters
- DS2438 - Smart Battery Monitor
- DS2450 - Quad A/D Converter
  
- DS18B20 - OW-TEMP-B3-12xA — Temperature Probe
- DS18B20 - OW-TEMP-BF-12x — Foil Tape Temperature Sensor
- DS18B20 - OW-TEMP-BW-12X — Wall Mount Temperature Sensor
- DS18S20 - OW-TEMP-S3-12x — Temperature Probe
- DS18S20 - OW-TEMP-SF-12x — Foil Tape Temperature Sensor
- DS18S20 - OW-TEMP-SW-12x — Wall Mount Temperature Sensor
  
- DS18B20 - OW-ENV-T — Temperature sensor
- EDS0064 - OW-ENV-TR — Temperature sensor w/relay
- EDS0065 - OW-ENV-TH — Temperature and humidity sensor
- EDS0065 - OW-ENV-TH(R) — Temperature and humidity sensor w/relay
- EDS0066 - OW-ENV-TP — Temperature and barometric pressure sensor
- EDS0066 - OW-ENV-TP(R) — Temperature and barometric pressure sensor w/relay
- EDS0067 - OW-ENV-TL — Temperature and light sensor
- EDS0067 - OW-ENV-TL(R) — Temperature and light sensor w/relay
- EDS0068 - OW-ENV-THPL — Temperature, humidity, barometric pressure and light sensor
- EDS0068 - OW-ENV-THPL(R) — Temperature, humidity, barometric pressure and light sensor w/relay
- EDS0070 - OW-VIB — Vibration sensor
- EDS0070 - OW-VIB-R — Vibration sensor w/relay
- EDS0071 - OW-RTD4W — RTD reader, 4 wire
- EDS0071 - OW-RTD4W-R — RTD reader, 4 wire w/relay

## **EDS Appliance Scanner Software**

In some instances, it may not be easy to obtain the IP address of an OW-SERVER via DHCP router tables. Therefore, EDS offers a Windows application that will utilize the UDP communication method available on all OW-SERVERs to retrieve the IP addresses of all OW-SERVERs connected to the network.

This application software can be downloaded at [EDS Appliance Scanner Software](#). If you have difficulty downloading the software from this link, contact EDS.

## **OW-SERVER Form Factor**

The OW-SERVER is available in panel mount form factor, suitable for mounting on desktop or wall.

## **Power Supply Requirements**

The OW-SERVER is fitted with a 2.5mm power jack suitable for connection to any 6-16 Volt DC power supply having a F2 (2.5mmID x 5.5mmOD) female type plug wired for positive polarity on the center conductor. While the power supply should be capable of delivering up to 250mA, the typical current draw with no connected devices is 150ma. Current requirements may increase depending on the number and type of sensors / devices connected to the OW-SERVER. The input is reversed and over voltage protected (to 60V). If blown, the fuse will automatically reset itself when the short condition is removed.

## **Ethernet Interface**

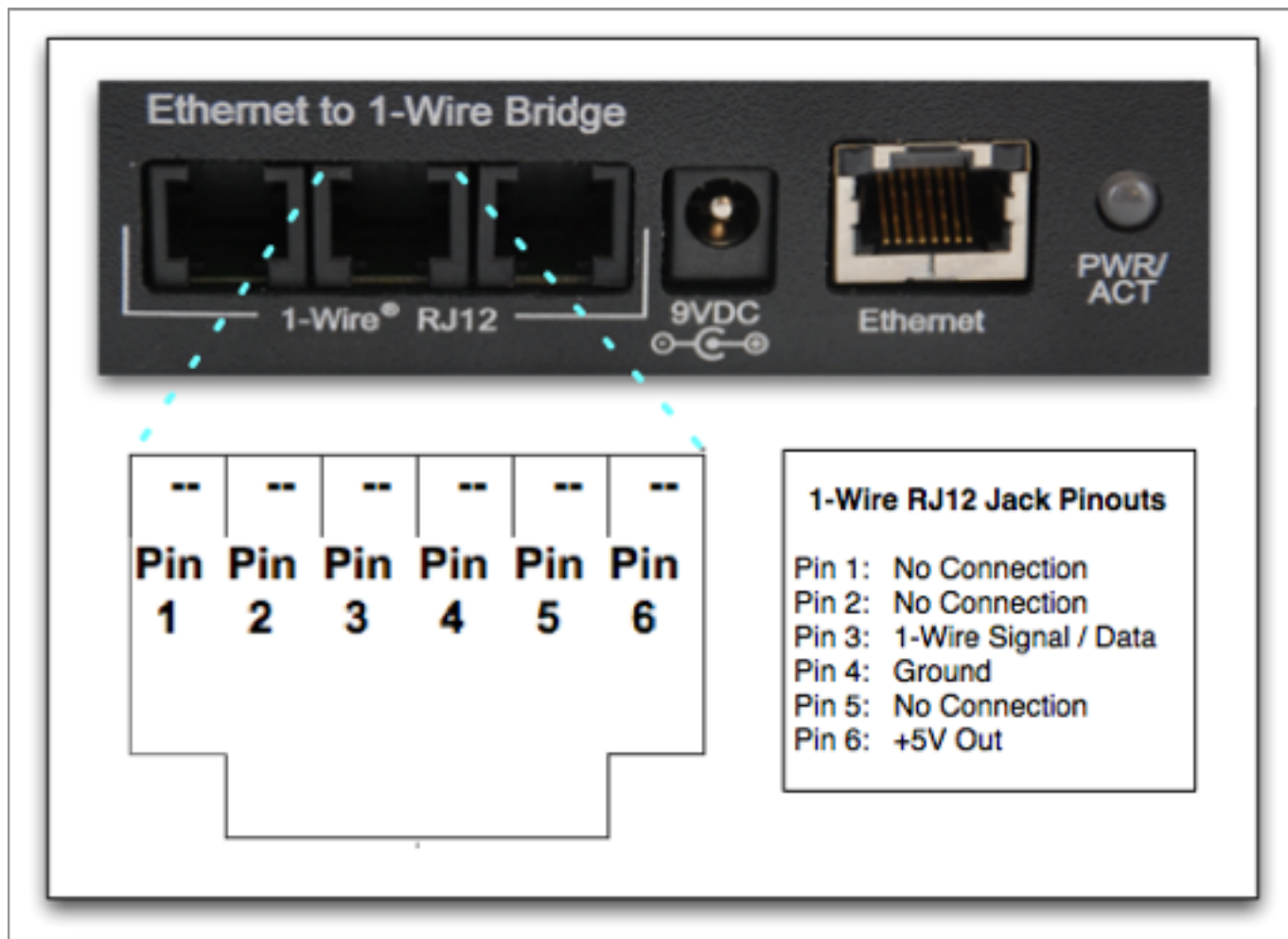
The OW-SERVER is equipped with a standard RJ45 Ethernet jack for 10 BASE-T. The half duplex mode of operation is supported on the Ethernet interface. If you are connecting to a hub or switch, a straight through cable should be used. If connecting directly to a PC, then a crossover cable should be used. The Ethernet connector has 2 LEDs; the green indicates connection to the network and the yellow indicates network traffic.

Note: The traffic indicator LED indicates any traffic on the network, not just traffic addressed to the OW Server. This is a hardware function.

## 1-Wire Interface

For ease of use, the OW-SERVER is equipped with three 1-Wire ports, each with an associated 150 ohm resistor and jumper. The resistor is in series with the 1-Wire data line and the jumper is in parallel with the resistor. Applying a solder bridge to the jumper shorts the resistor allowing a greater amount of current to flow to the 1-Wire device.

Each port is a standard 6-Wire RJ11 (RJ12) jack, pinned for use with 1-Wire devices as follows:



The OW-SERVER supports up to 1000 feet of cabling and 24 1-Wire devices on a CAT-5 twisted pair net, and automatically provides smart strong-pull-up for sensors. ESD protection to more than 27kV (IEC801-2 Reference Model) is provided on the 1-Wire bus.

## Support

Embedded Data Systems provides a comprehensive FAQ and online support system accessible from their website. This support system includes the most up-to-date information about the OW-SERVER product family.



# Appendix A

## OW-SERVER — COMMUNICATION PROTOCOL

### COMMANDS

'R'	1-Wire Reset - Generates a reset pulse on the 1-wire bus, returns 'N' or 'P' for presence pulse
'S'	First search ROM
's'	Next search ROM
'C'	First conditional search ROM
'c'	Next conditional search ROM
'A'	Address select with send - Address follows command, address is copied to 'active ROM' and is sent out 1-wire bus using 'M' command
'a'	Address select without send - Address follows command, address is copied to 'active ROM' but is not sent out 1-wire bus
'M'	Match ROM - Address stored in 'active ROM' is sent out 1-wire bus
'm'	Match ROM, set overdrive speed - Required as the next command after setting overdrive speed, to be used only once
'W'	Write a block of data, up to 64 bytes. Data follows command (no byte count)
'Q'	Overdrive speed select
'q'	Standard speed select
'Z'	Write a zero bit
'O'	Write a one bit
'h'	Disable interface

### RESPONSES

'!'	Error
'+'	OK
'?'	Ready for commands, sent at initial connect

### COMMUNICATION

The OW server communicates with a client using a TCP socket. The OW server maintains the server side, listening on the programmed port. Only 1 socket is supported. If desired, the feature can be disabled via programming.

When first connecting, the OW server will send a "?" when commands may be sent.

## **PACKET FORMAT**

The OW server accepts incoming connection requests and listens for data. Data is sent to the client in response to packets received from the client. Packets sent to the OW server have this format:

Command - Single char

Data - sent as ASCII encoded hex, up to 128 bytes or 256 characters

Carriage return - termination char

Data sent from the OW server to the client has this format:

Data - sent as ASCII encoded hex, up to 128 bytes or 256 characters

Carriage return - termination char (a line feed is also sent)

## **AUTO UPDATE LOCKOUT**

The OW server automatically reads 1-wire devices continuously. This feature is turned off when the low level interface becomes active, which is when:

1. A client connects to the TCP socket.

Any valid command restarts a 30 second timer. Auto updating is turned on, and the socket is closed when:

- The 'disable interface' command is received.
- No commands are received for 30 seconds.

The client disconnects.

*1-Wire* is a registered trademark of Maxim Integrated Products, Inc.

*Windows* is a registered trademark of Microsoft Corporation in the United States and other countries.