

Embedded Data Systems OW-SERVER-ENET-2



OW-SERVER-ENET-2 Operation Manual

Rev 1.1



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Introduction

Thank you for purchasing the Embedded Data Systems OW-SERVER-ENET-2. The OW-SERVER-ENET-2 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-ENET-2 product line 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-ENET-2 with their own programs.
3. The Technical Guide for the integrators who need more in-depth information about the way the OW-SERVER-ENET-2 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-ENET-2
- **Interface**—this section describes the three interfaces (physical, web, and programmatic) to the OW-SERVER-ENET-2
- **Configuration**—this section provides information on how to setup a OW-SERVER-ENET-2 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-ENET-2 with existing systems and applications. This section is aimed at software programmers and engineers who want to interface directly to the OW-SERVER-ENET-2
- **Maintenance**—this section covers various activities related to maintaining or upgrading the OW-SERVER-ENET-2
- **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-ENET-2 is simple. Just follow a few easy steps:

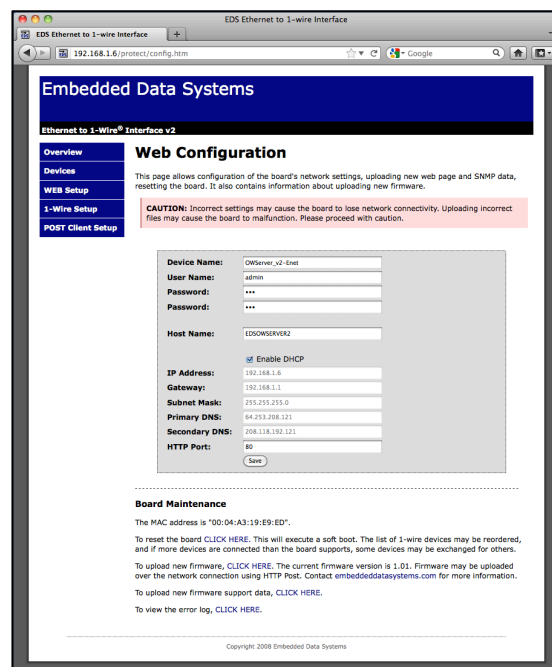
1. **Apply power to the OW-SERVER-ENET-2.** The green PWR/ACT LED will begin to flash at one-second intervals, indicating that the product is operating normally. Power must be 5 volts at 400 milliamp (minimum).
2. **Connect it to your Network.** Connect a live network cable to the Ethernet Port on the 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.
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-ENET-2** by checking your DHCP server logs or using [EDS Appliance Scanner Software](#) available from the EDS website. If the OW-SERVER-ENET-2 does not find a DHCP server running on your network, it will default to the following IP address: 169.254.1.1.
5. **Configure your device.** Type the IP address of the OW-SERVER-ENET-2 into your web browser (e.g., <http://192.168.1.27>) and press enter. 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-ENET-2.



CONGRATULATIONS! You have successfully installed your Embedded Data Systems' OW-SERVER-ENET-2. *Please refer to the Web Access section of the Operation Manual to obtain an understanding of the function of each of the web pages served by the OW-SERVER-ENET-2.*

Some things to keep in mind:

- The OW-SERVER-ENET-2 has an internal flash drive that may be used to set it to a fixed IP address. See the section *Configuration/USB* for more information.
- See section *Additional Resources* or EDSPRODUCTS.COM for a list of supported 1-Wire devices.
- No support is provided for OW-SERVER-ENET-2 IP address identification when utilizing any method other than the [EDS Appliance Scanner Software](#). Please consult your network administrator if you cannot locate the DHCP address.



Interface

The OW-SERVER-ENET-2 has three types 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 physical interface of the OW-SERVER-ENET-2 includes five parts:

- 1-Wire Connector Panel: provides connectivity to 1-Wire sensors through three (3) RJ12 connectors. Each connector is a separate 1-Wire bus
- Power: a single micro USB connector. **The power connector also has a USB port, which may be used to configure the network settings. See section Configuration/USB**
- Ethernet: connects the device to an existing 10/100-baseT network via a standard RJ45 connector
- Power/Activity Indicator: flashes green to indicate the unit is receiving power and operating correctly, flashes yellow to indicate data activity



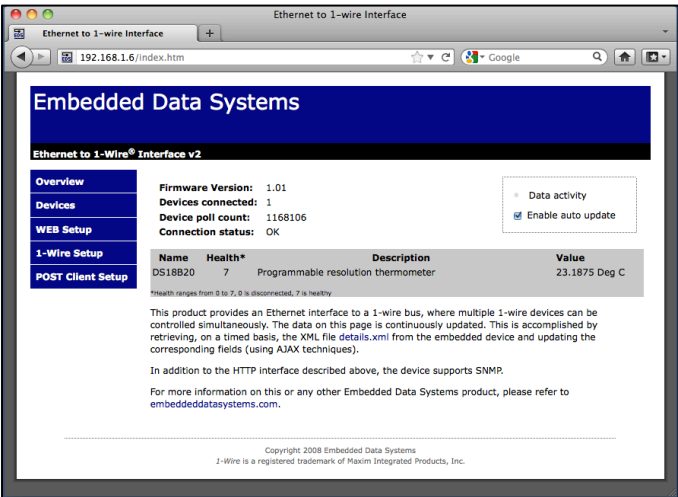
USB

The power / USB port may be used to configure the network settings via the internal flash drive. This method would typically be used to configure the network settings to a fixed IP address with the DHCP server turned off, as shown below. See the section Configuration/USB below.

Web

Each OW-SERVER-ENET-2 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 network setting for the OW-SERVER-ENET-2 and is accessible by navigating to its IP address. When you connect the OW-SERVER-ENET-2 to your network it will automatically request an IP address from an available DHCP server if the feature is turned on, otherwise it will use an IP address assigned by you. See configuration section below.



Simply open a web browser and enter that IP address 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-ENET-2 basic information
- **Devices**—displays detailed information about each device connected to the OW-SERVER-ENET-2
- **WEB Setup**—provides access to security and network configuration information.
- **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**—provides access to configuration fields for HTTP Post and Proxy Server features

Note: If you don't know the IP address being assigned to the OW-SERVER-ENET-2 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 any OW-SERVER-ENET-2 on the network. For more information about the EDS Application Scanner software, see section *Additional Resources*.

Note: If your network does not have a DHCP server, the OW-SERVER-ENET-2 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-ENET-2 in order to talk to the device for the first time. Only when the OW-SERVER-ENET-2 is in the same address space as your other computers can you access it using a web browser.

Programmatic

Through a number of different channels, you can access the OW-SERVER-ENET-2 programmatically to create integration with existing systems and network services:

- **HTTP**—service provides delivery of html and xml data files via http *get* command, and firmware upload via http *post*
- **SNMP**—provides access to data from all connected sensors, and pushes SNMP traps to remote listeners for alarming capabilities
- **Telnet**—service provides ability to monitor the internal activities of the OW-SERVER-ENET-2 for diagnostic purposes
- **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 any OW-SERVER-ENET-2 that exists on the same network. For assistance in determining the units IP address, see the section *Additional Resources* regarding [EDS Appliance 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

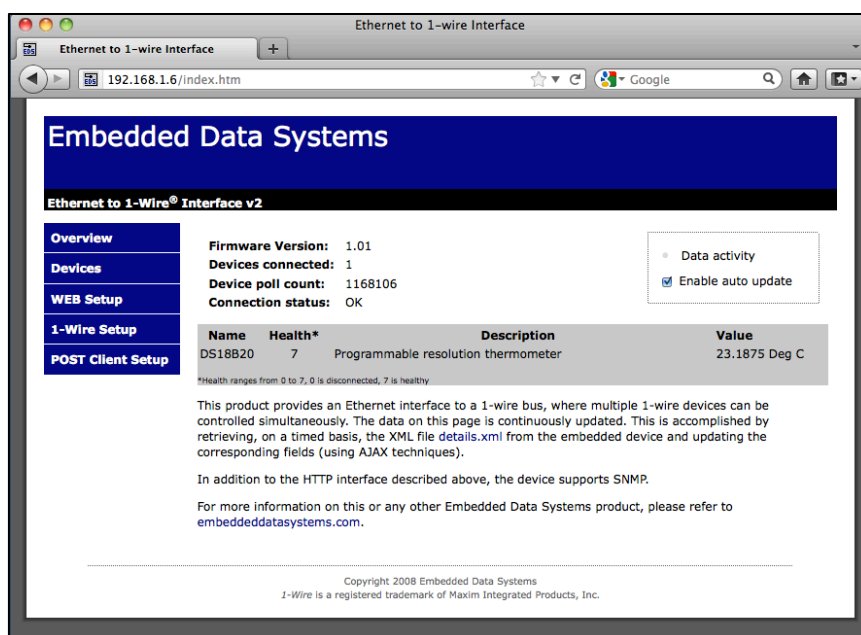
Any configuration of your OW-SERVER-ENET-2 can be carried out through the integrated web application and, in some cases, the USB port. The on-board, web-based tools provide a method to configure both the unit itself as well as any attached supported 1-Wire devices. The USB port provides a way to configure the network settings.

To access the configuration elements,

- Navigate to the IP Address your network has assigned to the OW-SERVER-ENET-2. This will open the web interface.

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

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



WEB Setup

The WEB Setup provides a number of fields to configure the OW-SERVER-ENET-2 operations within your network.

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.)

You can configure the following aspects of the OW-SERVER-ENET-2:

- **Device name**—the factory default is OWServer_v2-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-2 is **EDSOWSERV-ER2**. 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-2 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

EDS Ethernet to 1-Wire Interface

192.168.1.6/protect/config.htm

Embedded Data Systems

Ethernet to 1-Wire® Interface v2

Web Configuration

This page allows configuration of the board's network settings, uploading new web page and SNMP data, resetting the board. It also contains information about uploading new firmware.

CAUTION: Incorrect settings may cause the board to lose network connectivity. Uploading incorrect files may cause the board to malfunction. Please proceed with caution.

Device Name: OWServer_v2-Enet

User Name: admin

Password: ***

Password: ***

Host Name: EDSOWSERV2

☒ Enable DHCP

IP Address: 192.168.1.6

Gateway: 192.168.1.1

Subnet Mask: 255.255.255.0

Primary DNS: 64.253.208.121

Secondary DNS: 208.118.192.121

HTTP Port: 80

Save

Board Maintenance

The MAC address is "00:04:A3:19:E9:ED".

To reset the board [CLICK HERE](#). This will execute a soft boot. The list of 1-wire devices may be reordered, and if more devices are connected than the board supports, some devices may be exchanged for others.

To upload new firmware, [CLICK HERE](#). The current firmware version is 1.01. Firmware may be uploaded over the network connection using HTTP Post. Contact embeddeddatasystems.com for more information.

To upload new firmware support data, [CLICK HERE](#).

To view the error log, [CLICK HERE](#).

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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-ENET-2 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:

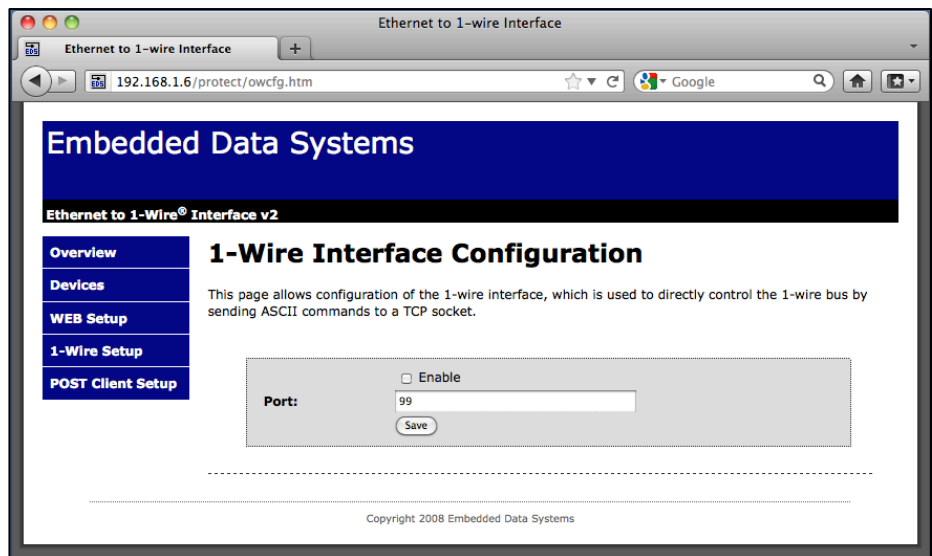
- IP Address: 169.254.1.1
- Gateway: 169.254.1.1
- Subnet Mask: 255.255.0.0
- DNS: 169.254.1.1

1-Wire Setup

The 1-Wire Setup feature of the web-tool allows you to configure the 1-Wire interface on the OW-SERVER-ENET-2.

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-ENET-2 with 1-Wire devices not currently supported at a high level or for legacy applications. *For specific 1-Wire commands see Low Level 1-Wire Communication Protocol in Appendix A.*



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 POST Client and Proxy features of the OW-SERVER-ENET-2.

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.

The screenshot shows a web browser window titled "Ethernet to 1-wire Interface" with the address bar showing "192.168.1.6/protect/cfgpc.htm". The page has a blue header with "Embedded Data Systems" and "Ethernet to 1-Wire® Interface v2". A left sidebar contains navigation links: 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 Client:" with a checked checkbox, "URL:" with the value "http://httptest.embeddeddatasystems.com:8080/owServer/owPostTest.php", "Period (sec):" with the value "10", "Enable Proxy:" with an unchecked checkbox, and "Proxy URL:" with the value "http://192.168.1.230:8080". A "Save" button is at the bottom of the form. Below the form is a "Notes:" section with four numbered points explaining the configuration options. The footer of the page reads "Copyright 2008 Embedded Data Systems".

This example sets the port to 12391:

"http://www.embeddeddatasystems.com:12391/files/myfile.htm"

- Select how often to send the "details.xml" file
- Proxy server may be enabled by clicking the check box
- Set the Proxy URL to the appropriate address, which is typically obtained from the network administrator. For example, if the proxy server is at 192.168.1.230, port number 8080, then the Proxy URL field would be programmed to <http://192.168.1.230:8080>. These proxy parameters only apply to the POST Client feature, they have no effect on any of the other features.

USB

The power / USB port may be used to configure the network settings via the internal flash drive. Using a cable with a micro USB connector, simply plug the OW-SERVER-ENET-2 into a USB port of a computer and read the file CONFIG.TXT on the flash drive.

Edit the file as desired, save it, eject the disk and disconnect the OW-SERVER-ENET-2 from the computer's USB port. Apply power using the wall transformer and the OW-SERVER-ENET-2 will power up with the new network settings.

The screenshot shows a text file named "CONFIG.TXT" with the following configuration parameters:

```
DHCP_Enabled: TRUE (TRUE or FALSE)
IP_Address: 192.168.1.6
Gateway_Address: 192.168.1.1
Subnet_Mask: 255.255.255.0
Primary_DNS: 64.253.208.121
Secondary_DNS: 208.118.192.121
HTTP_Port: 80
```

This method would typically be used to configure the network settings to a fixed IP address with the DHCP server turned off, as shown below.

Note: The USB port cannot be used to determine the current IP address assigned by the DHCP server.

Device Name:	OWServer_v2-Enet
User Name:	admin
Password:	***
Password:	***
Host Name:	EDSOWSERVER2
	<input type="checkbox"/> Enable DHCP
IP Address:	192.168.1.6
Gateway:	192.168.1.1
Subnet Mask:	255.255.255.0
Primary DNS:	64.253.208.121
Secondary DNS:	208.118.192.121
HTTP Port:	80
	<input type="button" value="Save"/>

Web Access

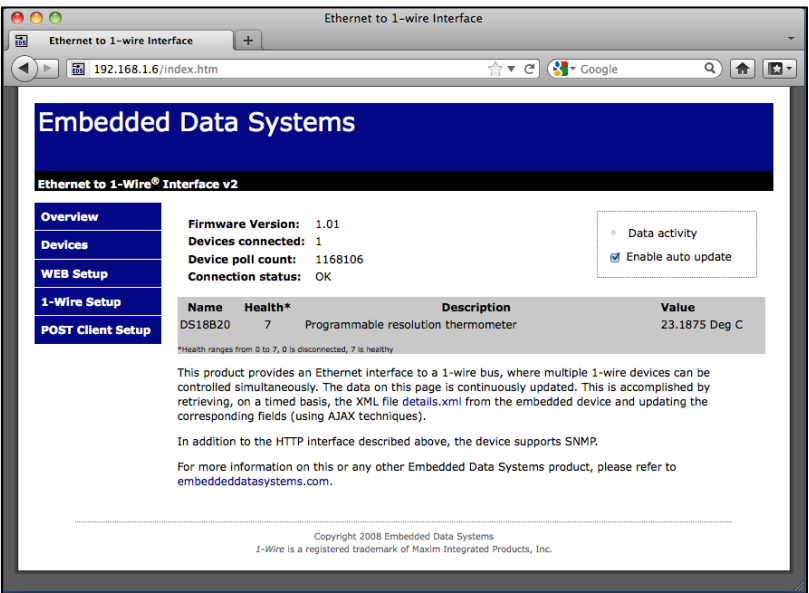
The OW-SERVER-ENET-2 provides a robust, on-board, web-based tool to access connected 1-Wire devices from any web browser—whether on a PC or a smartphone!

To access the connected 1-Wire devices,

- Navigate to the IP Address your network has assigned to the OW-SERVER-ENET-2. This will open the web interface.

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

- OW-SERVER-ENET-2 Status
- 1-Wire Device information



1-Wire Device Status Overview

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

- The OW-SERVER-ENET-2
- Connected devices (in the gray box).

Firmware Version:	1.01	<div><div><div>● Data activity</div><div><input checked="" type="checkbox"/> Enable auto update</div></div></div>	
Devices connected:	1		
Device poll count:	96		
Connection status:	OK		
Name	Health*	Description	Value
DS18B20	7	Programmable resolution thermometer	24.0625 Deg C
*Health ranges from 0 to 7, 0 is disconnected, 7 is healthy			

The OW-SERVER-ENET-2 summary data provides the following points:

- **Firmware version**—the version of firmware currently operating on the OW-SERVER-ENET-2
- **Devices connected**—the number of 1-Wire devices connected to the OW-SERVER-ENET-2
- **Device poll count**—the number of times the OW-SERVER-ENET-2 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-ENET-2 and the web browser that is accessing the OW-SERVER-ENET-2 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-ENET-2. 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-ENET-2. Uncheck the box if you would like to pause the automatic refresh between browser and the OW-SERVER-ENET-2 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-ENET-2 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 device¹
- **Value**—the primary value of the sensor on the connected device

During normal operation the OW-SERVER-ENET-2 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 list²
- **Reads data from all devices**—updates the data fields

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

² The order of devices in the list may change if the power is cycled.

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.

The Connected Devices screen displays all 1-Wire devices that are currently connected to the OW-SERVER-ENET-2. The data is presented in two sets—1-Wire interface and the connected devices.

Embedded Data Systems
Ethernet to 1-Wire® Interface v2

Overview
Devices
WEB Setup
1-Wire Setup
POST Client Setup

Devices connected: 1
Connection status: OK
Device poll count: 466
Loop time: 1.046 Sec
Power Voltage: 5.09

☐ Data activity
☒ Enable auto update

	Channel 1	Channel 2	Channel 3
Devices:	0	0	1
Voltage:	4.83	4.85	4.78
Errors:	0	0	0

Name	DS18B20
Description	Programmable resolution thermometer
Family	28
ROMId	7B0000030EBA4E28
Health	7
Channel	3
RawData	7F0107087FFF011070FF0000...
PrimaryValue	23.9375 Deg C
Temperature	23.9375
UserByte1	7
UserByte2	8
Resolution	12
PowerSource	255

This page shows detailed information about each 1-wire device connected by continuously retrieving the file details.xml. The **data activity** light changes state every time the browser has received an update from the board. The field **device poll count** is incremented every time the board has retrieved information from the 1-wire devices. To stop automatic updating, uncheck the **enable auto update** check box. If the field **connection status** shows ERROR (instead of OK), automatic updating is not functioning. The **health** field in the device tables indicates the state of the connection between the 1-wire device and the board. Zero indicates the device is no longer connected, 7 indicates the device is healthy. The **raw data** field shows the raw data as read from the 1-wire device.

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Communications

The top of the screen shows information about the communication status between the OW-SERVER-ENET-2, the 1-Wire devices as a group, and the web browser:

- Devices Connected**—the total # of devices connected
- Connection status**—the connection status between the OW-SERVER-ENET-2 and the

web browser that is accessing the OW-SERVER-ENET-2 web configuration page. An error will be displayed here in the event there is an issue.

Devices connected: 1
Connection status: OK
Device poll count: 691
Loop time: 1.039 Sec
Power Voltage: 5.08

☐ Data activity
☒ Enable auto update

	Channel 1	Channel 2	Channel 3
Devices:	0	0	1
Voltage:	4.83	4.85	4.76
Errors:	0	0	0

- **Device poll count**—the number of times the OW-SERVER-ENET-2 has cycled through polling all of the connected devices
- **Loop time**—the time, in seconds, it takes for the OW-SERVER-ENET-2 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. This value is useful for determining how frequently each sensor gets read.
- **Power Voltage** – the voltage of the power supply
- **Data activity**—this light will flash green every time the browser receives a data push of new values from the OW-SERVER-ENET-2. 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-ENET-2. Uncheck the box if you would like to pause the automatic refresh between browser and the OW-SERVER-ENET-2 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-ENET-2 will continue to poll attached 1-Wire devices.
- **Channel chart** – displays parameters specific to each channel
 - **Devices** – number of devices on each channel
 - **Voltage** – voltage of each channel
 - **Errors**—number of errors on the 1-Wire bus for each channel

Connected Devices

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.

Name	DS18B20	
Description	Programmable resolution thermometer	
Family	28	
ROMId	7B0000030EBA4E28	
Health	7	
Channel	3	
RawData	7D0107087FFF031067FF0000...	
PrimaryValue	23.8125 Deg C	
Temperature	23.8125	
UserByte1	7	<div>Write</div>
UserByte2	8	<div>Write</div>
Resolution	12	
PowerSource	255	

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-ENET-2 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-ENET-2, 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, the web browser interface previously discussed and firmware upgrading
- **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 some of the OW-SERVER-ENET-2's communication activities for diagnostic purposes
- **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-SERVER-ENET-2s 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-ENET-2 provides the following XML file for data retrieval:

- **Details.xml**—this file provides detailed information on the OW-SERVER-ENET-2 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">
  <PollCount>85</PollCount>
  <DevicesConnected>1</DevicesConnected>
  <LoopTime>1.046</LoopTime>
  <DevicesConnectedChannel1>0</DevicesConnectedChannel1>
```


Once firmware has been upgraded, the firmware support data must be updated. This link is directly below the firmware link on the “WEB Setup” page. For more information, see the MAINTENANCE section of this manual.

SNMP (Simple Network Management Protocol)

Simple Network Management Protocol (SNMP) is a protocol commonly used to maintain network equipment. Every piece of equipment in a network is described in 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-ENET-2-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-ENET-2 product page](#) under the *DOWNLOADS* tab. It defines all available SNMP nodes available, complete with a text description.

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

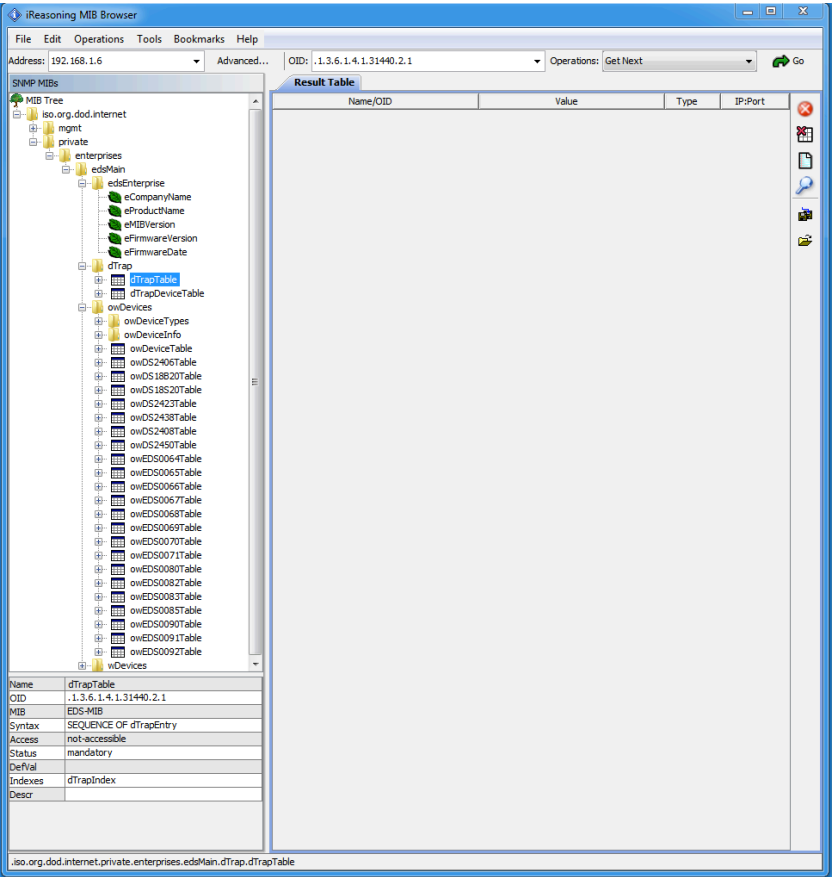
This screenshot of the iReasoning MIB Browser¹ shows the OW-SERVER-ENET-2 .mib file loaded into the SNMP interface and expanded to display the 3 nodes—*edsEnterprise*, *dTrap* and *owDevices*, as shown below.

edsEnterprise Branch

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

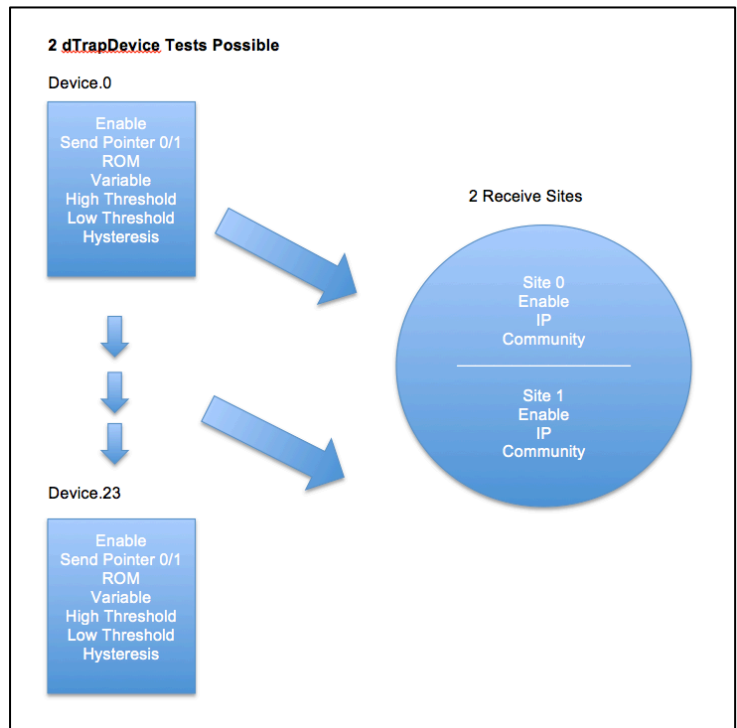
dTrap Branch

The *dTrap* contains 2 tables used to send traps based on preset conditions. The 2 tables are the *dTrapTable* and the *dTrapDeviceTable*. The *dTrapTable* contains information about where to send the trap, the *dTrapDeviceTable* defines when to send the trap. The 2 tables are depicted in the diagram below.



¹ 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.
Embedded Data Systems, LLC; 2019 Fortune Dr., Lawrenceburg, KY 40342; Phone/Fax 502-859-5490 20 / 38
EN-USERMAN OW-SERVER 1.1 2.29.12

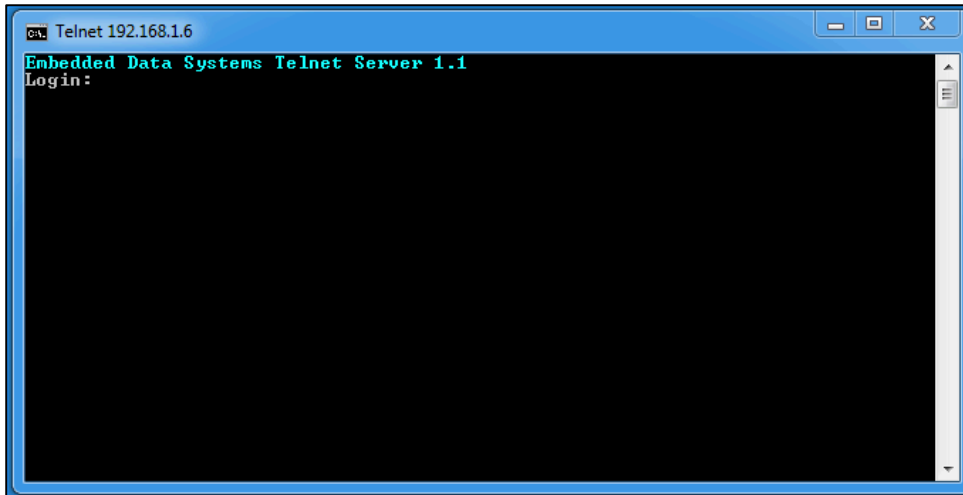
- The *dTrapTable* defines where to send traps. It has 2 rows, each defining an IP address, community string and enable flag. In order for a trap to be sent, the IP address must not be zero and the enable flag must be one (zero disables). The community string is not used by the OW-Sensor-ENET-2, except to send the string in the trap PDU.
- The *dTrapDeviceTable* 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:



- *dTrapDeviceEnable* – must be 1 to enable sending traps, zero disables sending
- *dTrapSendPointer* – may be 0 or 1. Points to the row of the *dTrap* table which defines where to send the trap. Note that all data in the row in this table and the corresponding row of the *dTrap* table must be valid for the trap to be sent.
- *dTrapDeviceROM* – 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.
- *dTrapDeviceVariable* – 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. The variable number can be determined by viewing the Devices web page, each line below “PrimaryValue” is a potential variable, numbered sequentially. For example, the DS18B20 has as the first item below “PrimaryValue” the item “Temperature”, so this is number 0. The next item is “UserByte1”, so this is item 1, after that is “UserByte2”, which is item 2, then item 3 is “Resolution” and item 4 is “PowerSource”.
 - DS18B20
 - 0 – Temperature
 - 1 – User byte 1
 - 2 – User byte 2
 - 3 – Resolution
 - 4 – Power source
- The items *dTrapDeviceHighThreshold*, *dTrapDeviceLowThreshold* and *dTrapDeviceHysteresis* 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 *dTrapDeviceIndex.x* where x is the number of *dTrapDeviceTable* 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-2, 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-2.
- 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
 - *These are the specific device tables, for example owDS18B20Table defines the DS18B20. See the latest version of the EDS MIB file for a list and description of the devices supported and their associated parameters.*

Telnet

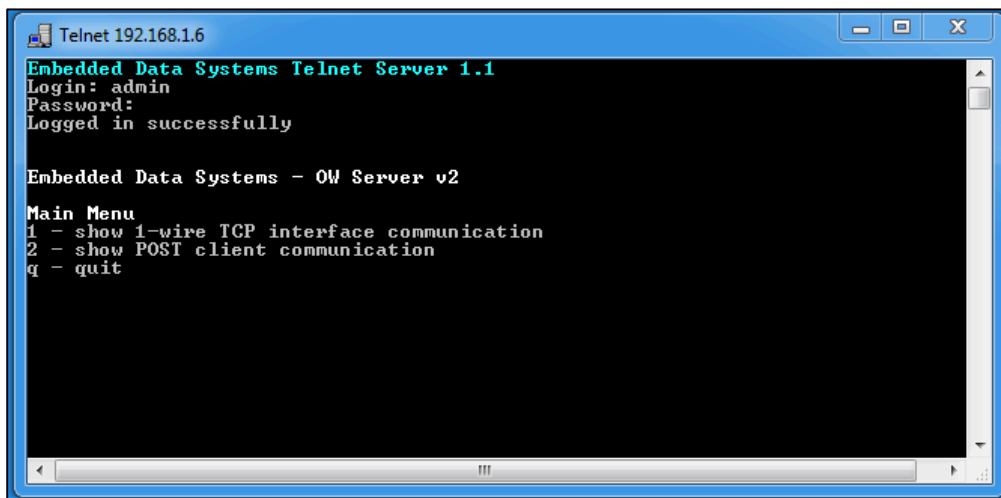


Telnet is a network protocol used on the Internet or local area networks to provide a bidirectional interactive text-oriented communications facility using a virtual terminal connection. User data is interspersed in-band with Telnet control information in an 8-bit byte oriented data connection over the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

In most operating systems, Telnet connections are enabled through the Telnet Client program, which is run in a terminal window (as illustrated above). To start a Telnet connection with the OW-SERVER-ENET-2,

- Open the Telnet program. This is accomplished by typing “Telnet” into the search box (of a windows computer) or “Telnet” in a terminal window of a Mac or Linux computer.
- Once the Telnet program has opened, type “open {IP address}” where {IP address} represents the IP address of your OW-SERVER-ENET-2 (e.g., open 192.168.1.14). This will open a connection between your Telnet program and the OW-SERVER-ENET-2.

In order to complete the connection, you must enter the username¹ and password.²



Once the connection has been successfully authenticated, the OW-SERVER-ENET-2 will present you with a textual menu through which you can show basic information.

UDP

The OW-SERVER-ENET-2 can interact with UDP requests on port 30303 and provide basic information in return. The primary use for this is discovering any OW-SERVER-ENET-2 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-ENET-2 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-2",  
  "FWVer": "1.01",  
  "Name": "OW_SERVER-Enet-2",  
  "HTTPPort": "80",  
  "Bootloader": "POST",  
  "TCPIntfPort": "0",  
}
```

¹ Factory default "admin"

² Factory default "eds"

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-ENET-2
- **IP**—The current IP address
- **Product**—A text description of the product. It cannot be changed
- **FWVer**—Firmware version of the OW-SERVER-ENET-2
- **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

Low Level 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-ENET-2 ***stops polling 1-Wire devices*** and waits for commands over the TCP connection. If 30 seconds elapse without any commands, the OW-SERVER-ENET-2 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 LOW LEVEL 1-WIRE 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.

An HTTP proxy server has been included for the POST Client.

The HTTP POST feature requires a properly configured server to receive the file. Download the [OW-SERVER-ENET-2 PHP Script](#) from the EDS website to perform this function.

Maintenance

The activities you can carry out to maintain and/or upgrade your OW-SERVER-ENET-2 include:

- Firmware and support files upgrade
- Factory reset

Firmware and Support Files Upgrade

The OW-SERVER-ENET-2 features the ability to upload firmware and support files over the network.

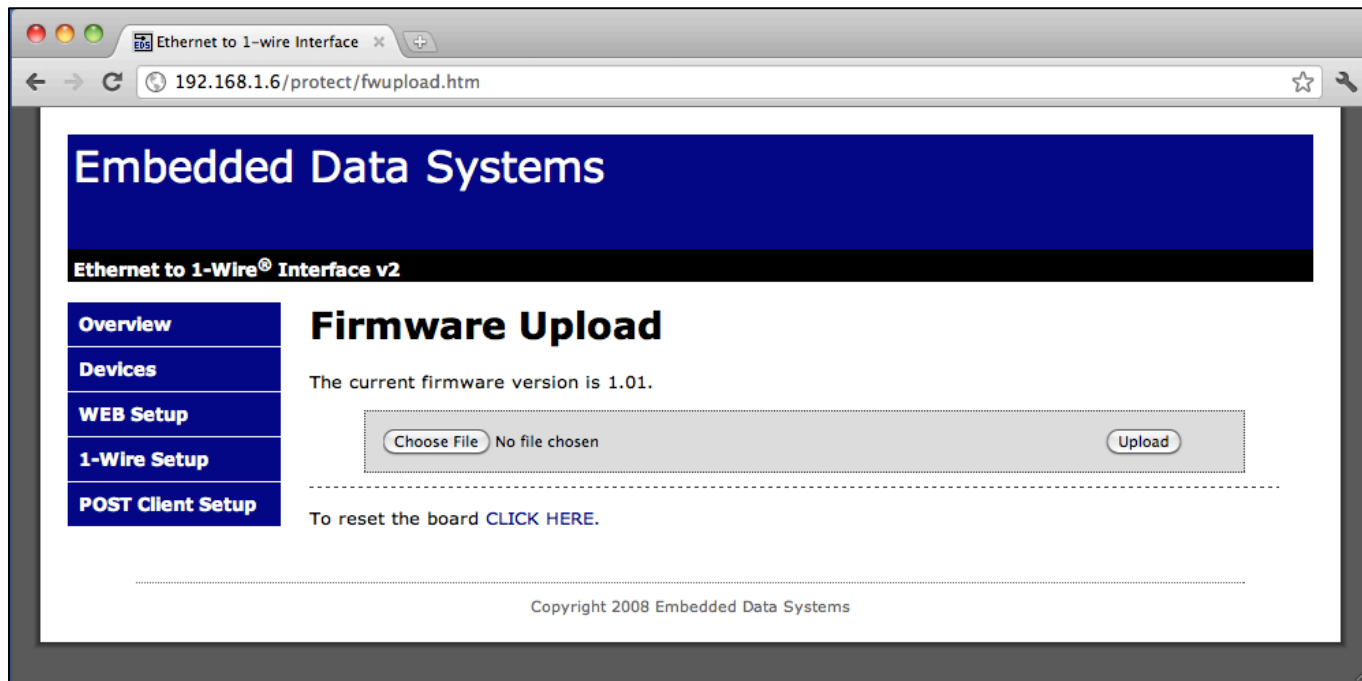
Update of support files must always be done in conjunction with a firmware upgrade.

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 new firmware and support files, you can upload it to your OW-SERVER-ENET-2 via the WEB using the following procedure:

1) Update the firmware files:

- Open the web-based configuration tool and select the “WEB Setup” screen.
- Scroll to the paragraph near the bottom of the page, beginning with "To upload new firmware, CLICK HERE". Click the link to begin the procedure
- Click the “Choose File” button to locate and select the *.hex file provided to you by EDS



- Once the file is located, click the “Upload” button

- It can take over 30 seconds to upload the firmware, if successful the following page will display prompting you to reset the device and complete the process by selecting "CLICKING HERE"

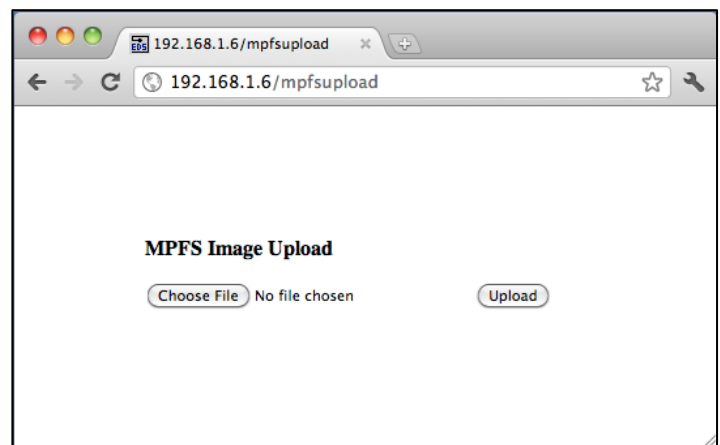
Firmware Upload

The firmware upload was successful. To begin using the new firmware, reset the device by [CLICKING HERE](#).

- Approximately 10 seconds after reset, the green LED will flash at a 1 second rate, indicating completion.
- Verify the upload was successful by viewing the new version of firmware on the Overview page.

2) Update the Support files:

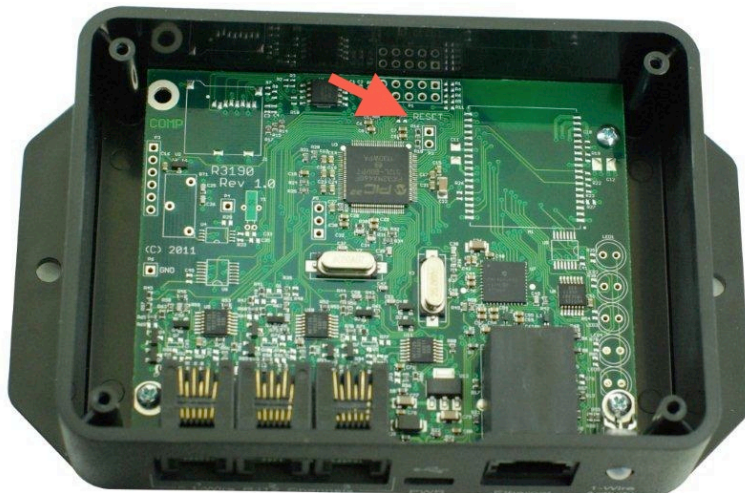
- Open the web-based configuration tool and select the "WEB Setup" screen
- Scroll to the paragraph near the bottom of the page, beginning with "To upload new firmware **support** data, **CLICK HERE**". Click the link to begin the procedure
- Click the "Choose File" button to locate and select the *.bin file provided to you by EDS
- Once the file is located, click the "Upload" button
- Once complete, the OW-SERVER-ENET-2 will apply the new file and return the message "MPFS Update Successful"
- Select "Site main page" to return to "OVERVIEW" screen
- **NOTE:** Be certain to clear the cache in your web browser; otherwise the new web pages will not be displayed.



Factory Reset

To reset the OW-SERVER-ENET-2 to factory defaults:

1. Be certain power has been removed from the OW-SERVER-ENET-2
2. Remove the lid of the OW-SERVER-ENET-2 by unscrewing the four corner screws
3. Once lid is removed, with connector panel positioned towards you, locate the two plated drill holes in the upper center of the PC board with the word "RESET" above it (P2). See *photo below*.
4. Apply power to the OW-SERVER-ENET-2
5. Using an appropriate tool (tweezers, paper clip, etc.) short these two pads together until the green LED stops flashing and stays on solidly.
6. Remove the short and replace the top cover. Once you have removed the short from P2, the reset will take less than four seconds to complete.



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

- Device Name: OWServer_v2-Enet
- Host Name: EDSOWSERVER2
- 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

Additional Resources

Below is a list of additional resources:

- Supported 1-Wire devices
- EDS Appliance Scanner Software
- OW-SERVER-ENET-2 form factor

Supported 1-Wire Devices

The OW-SERVER-ENET-2 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(R) — Temperature and humidity sensor (w/relay)
- EDS0066 - OW-ENV-TP(R) — Temperature and barometric pressure sensor (w/relay)
- EDS0067 - OW-ENV-TL(R) — Temperature and light sensor (w/relay)
- EDS0068 - OW-ENV-THPL(R) — Temperature, humidity, barometric pressure and light sensor (w/relay)
- EDS0070 - OW-VIB(-R)— Vibration sensor (w/relay)
- EDS0071 - OW-RTD4W(-R) — RTD reader, 4 wire (w/relay)
- EDS0080 - OW-IO-AI8-420(-R) — Octal 4-20 milliamp input (w/relay)
- EDS0082 - OW-IO-AI8-10V(-R) — Octal 0-10 volt input (w/relay)
- EDS0083 - OW-IO-AI4-420(-R) — Quad 4-20 milliamp input (w/relay)
- EDS0085 - OW-IO-AI4-10V(-R) — Quad 0-10 volt input (w/relay)
- EDS0090 - OW-IO-DIO8(-R) — Octal discrete input/output (w/relay)

EDS Appliance Scanner Software

In some instances, it may not be easy to obtain the IP address of an OW-SERVER-ENET-2 via DHCP router tables. Therefore, EDS offers a Windows application that will utilize the UDP communication method available on any OW-SERVER-ENET-2 to retrieve the IP address of any OW-SERVER-ENET-2 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-ENET-2 Form Factor

The OW-SERVER-ENET-2 is available in panel mount form factor, suitable for mounting on desktop or wall.

Power Supply Requirements

The OW-SERVER-ENET-2 is fitted with a USB micro-B receptacle suitable for connection to any 5 Volt DC power supply having a USB micro-B plug. The OW-SERVER-ENET-2 has a typical current draw of 245ma with no devices connected; however a power supply with at least 400ma capacity is required for correct operation. The input is reversed voltage protected, although use of a standard micro USB wall transformer such as used to charge cellular phones should avoid any reverse or over voltage issues. The voltage must be 5 Volts +/- 10%. The OW-SERVER-ENET-2 was tested to meet FCC, CSA, CE, and C-check using the Emerson DCH3-050EU-0006 wall power supply.

Ethernet Interface

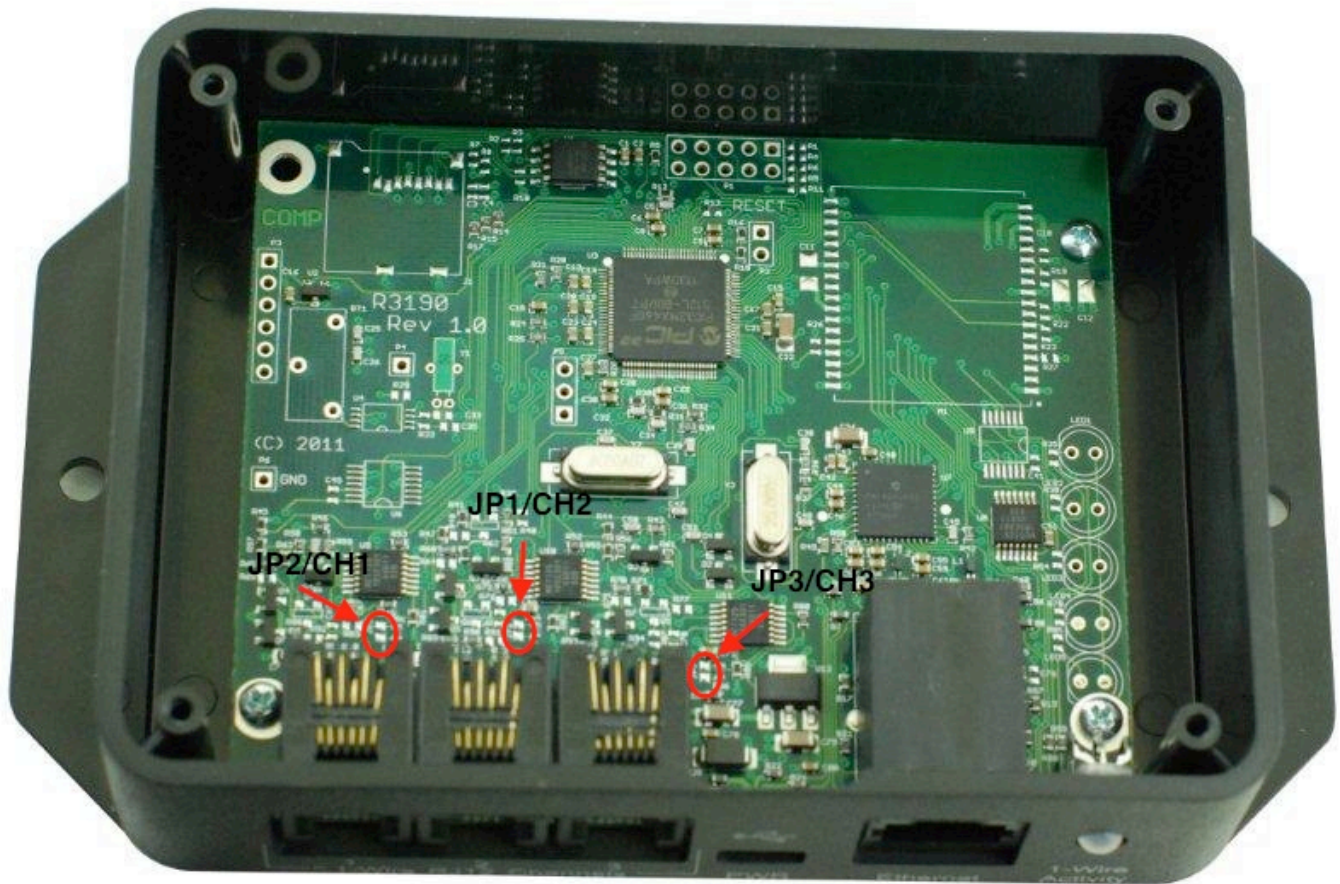
The OW-SERVER-ENET-2 is equipped with a standard RJ45 Ethernet jack for 10/100 BASE-T. The half duplex mode of operation is supported on the Ethernet interface. If you are connecting to a hub or switch, a straight through cable should be used. If connecting directly to a PC, then a crossover cable should 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.

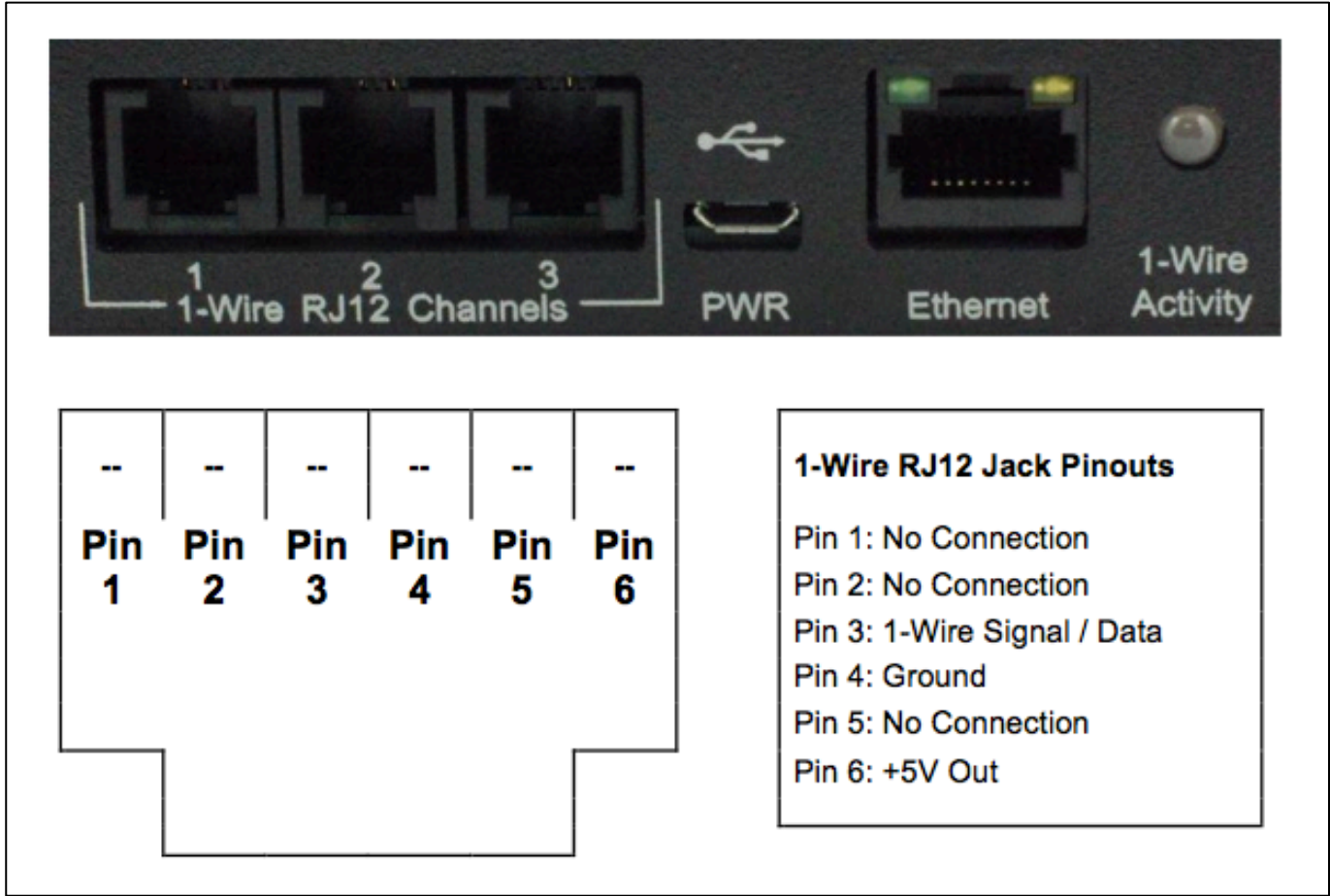
1-Wire Interface

For ease of use, the OW-SERVER-ENET-2 is equipped with three 1-Wire ports that are driven separately. By driving each port separately, electromagnetic interference is reduced, electrical reflections are reduced, each connector has more power available for parasite powered devices and devices can be physically located based on the bus they are connected to.

Each of the 1-Wire ports has an associated 10 ohm resistor and jumper. The resistor is in series with the +5V out 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 device via the +5v out pin. Only under extreme conditions should it be necessary to short this jumper.

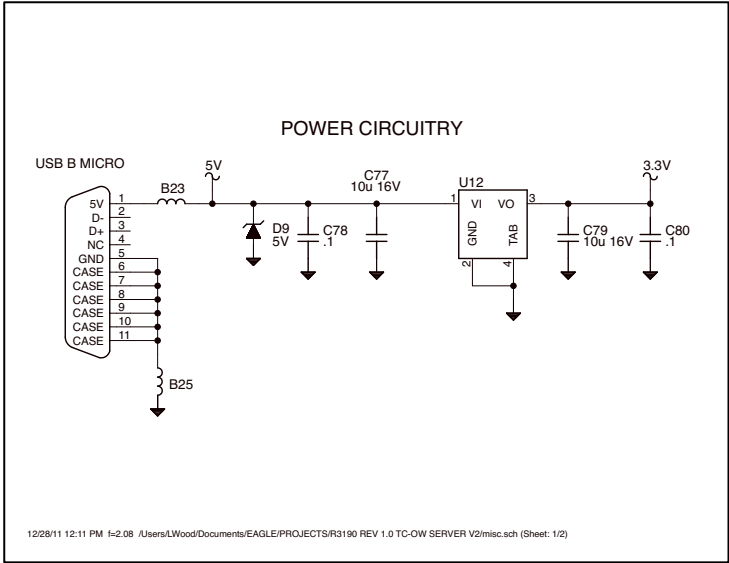


Each port is a standard 6-Wire RJ12 jack, pinned for use with 1-Wire devices as follows:

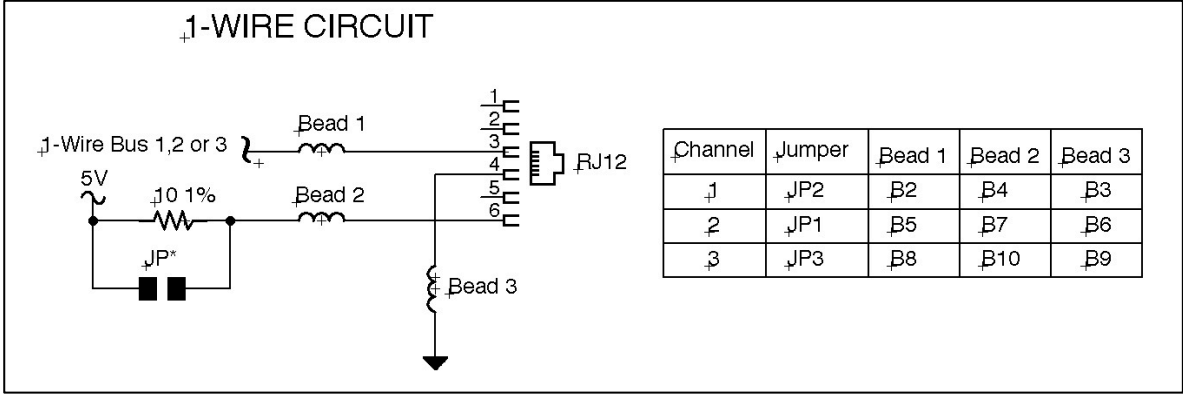


The OW-SERVER-ENET-2 supports up to 1000 feet of cabling and 24 1-Wire devices on a CAT-5 twisted pair net. ESD protection is provided on the 1-Wire bus.

Power Supply Schematic



1-Wire Interface Schematic



Specifications

PARAMETER	MIN	TYP	MAX	UNITS
Operating Temperature	-40	-	85	°C
Storing Temperature	-40	-	85	°C
Operating Humidity (non-condensing)	0	-	90	%
Storing Humidity (non-condensing)	0	-	90	%
Supply Voltage DC +/-10%	-	5	-	Volts
Rated Current (average) with Ethernet but no 1-Wire devices connected	-	245	-	mA
Communication	10/100Base-T Ethernet			
Enclosure Dimensions (L x W x H)	139.7	85.27	31.75	mm
Weight	-	.2	-	kg

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-ENET-2 product family.

Compliance

FEDERAL COMMUNICATIONS COMMISSION (FCC) COMPLIANCE STATEMENT

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

INDUSTRY CANADA (IC) COMPLIANCE STATEMENT

This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

EUROPEAN COMMUNITY (EC) DIRECTIVES CONFORMITY

APPLICATION OF COUNCIL DIRECTIVE 2004/108/EC Standard to which Conformity is Declared:

EN 61326-1:2006	(Emmissions)
EN 61326-2-3:2006	(Immunity)
EN 61000-3-2:2006+A1:2009+A2:2009	(Harmonics)
EN 61000-3-3:2008	(Flicker)



Caution: The manufacturer is not responsible for any radio or television interference caused by using other than recommended cables or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate this equipment.

Acknowledgements

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.

Appendix A

Low Level 1-Wire 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
- 'I' Get information about the device
- 'h' Disable interface

RESPONSES

- '!' Error
- '+' OK
- '?' Ready for commands, sent at initial connect
- 'xxx" Data

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
- Channel - single char, must be 1, 2 or 3 (not required for the l or h command)
- 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, such as 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, or
- No commands are received for 30 seconds, or
- The client disconnects

EXAMPLE

The following example illustrates how to initiate a temperature conversion for each channel, then read the result of a DS18B20 on channel 1.

Temperature conversion for each channel. (Channel can be skipped if no device exists on the channel)		
tx:	R1	Reset 1-Wire Bus Channel 1
rx:	P	Presence Pulse received
tx:	W1CC	Write to Channel 1 the "Skip ROM" command
rx:	CC	Data received
tx:	W144	Write to Channel 1 the "Convert T" command. After this command is executed no activity is permitted on the 1-Wire bus for at least 750ms to allow parasite powered devices to complete their conversion
rx:	44	Data received
tx:	R2	Reset 1-Wire Bus Channel 2
rx:	P	Presence Pulse received
tx:	W2CC	Write to Channel 2 the "Skip ROM" command
rx:	CC	Data received
tx:	W244	Write to Channel 2 the "Convert T" command. After this command is executed no activity is permitted on the 1-Wire bus for at least 750ms to allow parasite powered devices to complete their conversion
rx:	44	Data received
tx:	R3	Reset 1-Wire Bus Channel 3
rx:	P	Presence Pulse received
rx:	W3CC	Write to Channel 3 the "Skip ROM" command
rx:	CC	Data received
tx:	W344	Write to Channel 3 the "Convert T" command. After this command is executed no activity is permitted on the 1-Wire bus for at least 750ms to allow parasite powered devices to complete their conversion
rx:	44	Data received

Individually address DS18B20 on Channel 1		
tx:	R1	
rx:	P	Presence Pulse received
tx:	A1CD00000027C5CD28	Address the DS18B20 on channel 1
rx:	+	Command accepted
tx:	W1BEFFFFFFFFFFFFFFFFFFFF	Display scratchpad data of DS18B20
rx:	BE90014B467FFF101092	Data Received. (Interpreting scratchpad data is covered in the DS18B20's data sheet at http://pdfserv.maxim-ic.com/en/ds/DS18B20.pdf)