SeaSmart.Net™

Version 1.3.0 – Gateway Adapter

Chetco Digital Instruments

Preliminary Specification 041212

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SeaGauge™ is a trademark of Chetco Digital Instruments, Inc.

vGauge™ is a trademark of Chetco Digital Instruments, Inc.

WARNING!

USE THIS UNIT ONLY AS AN AID TO MONITORING ENGINE PERFORMANCE INFORMATION.

CAUTION

When showing sensor data, this unit will only show information based on the sender used and its installed position.

The operating and storage temperature for your unit is from -4 degrees to+167 degrees Fahrenheit (-20 to +75 degrees Celsius). Extended storage temperatures higher or lower than specified will cause the liquid crystal display to fail. Neither this type of failure nor its consequences are covered by the warranty. For more information, consult the factory customer service department.

All features and specifications subject to change without notice.

Chetco Digital Instruments may find it necessary to change or end our policies, regulations, and special offers at any time. We reserve the right to do so without notice.

All screens in this manual are simulated.

NOTICE!

Free software upgrades will be available on our website at http:// www.chetcodigital.com as they are released. Please check our website periodically for these and other information as they become available.

Thank you for choosing Chetco Digital Instruments

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.

Note:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and receiver.

• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

• Consult the factory customer service department for help.

SPECIFICATIONS

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NMEA 2000 Instrumentation Sentences Supported

126992 – System Time
127250 – Vessel Heading
127257 – Vessel Attitude
127251 – Rate of Turn
127488 – Engine Data - Rapid Update
127489 – Engine Data - Dynamic Update
127493 – Transmission Data - Dynamic Update
127497 – Trip Parameters - Dynamic Update
127505 – Fluid Data - Dynamic Update
127508 – Battery Status - Dynamic Update
127506 – DC Status - Detail
127513 – DC Config Detail
127501 – Binary Switch Status - Dynamic Update
130306 – Wind Data
130311 – Environmental Data
130312 – Temperature Data
129025 – Position Data - Rapid
130323 – Weather Station Location Data
129026 – SOG and COG Rapid Update

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Introduction

Welcome

Thank you for purchasing a Chetco Digital Instruments SeaSmart.Net product.

SeaSmart.Net Gateway adapters bridge Serial communications between dissimilar networks such as Ethernet,WiFi, NMEA 0183, and NMEA 2000. SeaSmart.Net gateways contain both hardware interfaces and protocol translators to provide bi-directional communications between networks.

SeaSmart.Net adapters are available for -

NMEA 0183 to Ethernet 10/100 with Embedded Web Server

NMEA 0183 to WiFi 802.11 b/g with Embedded Web Server

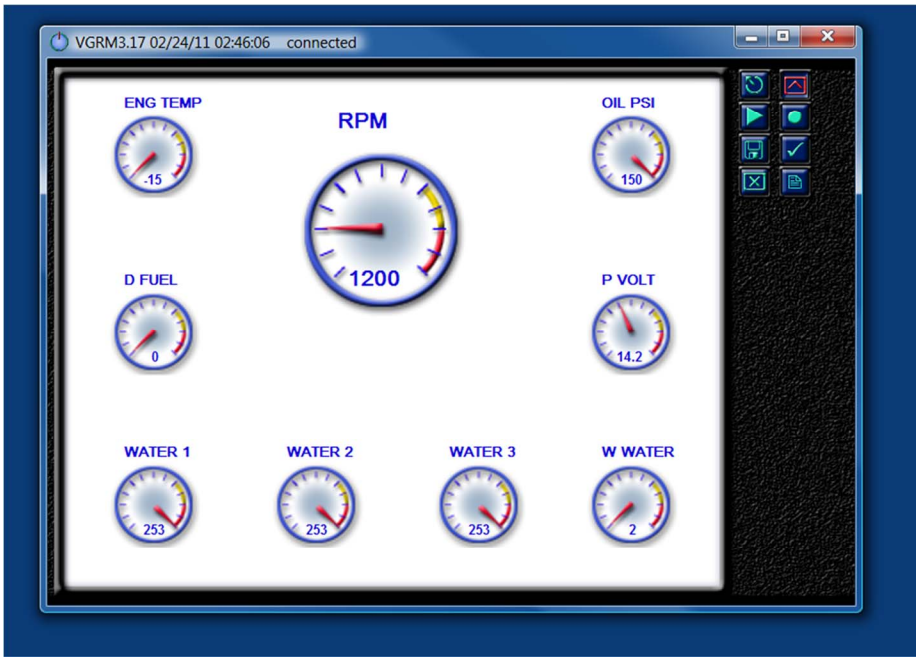
NMEA 2000 to Ethernet 10/100 with Embedded Web Server

NMEA 2000 to WiFi 802.11 b/g with Embedded Web Sever

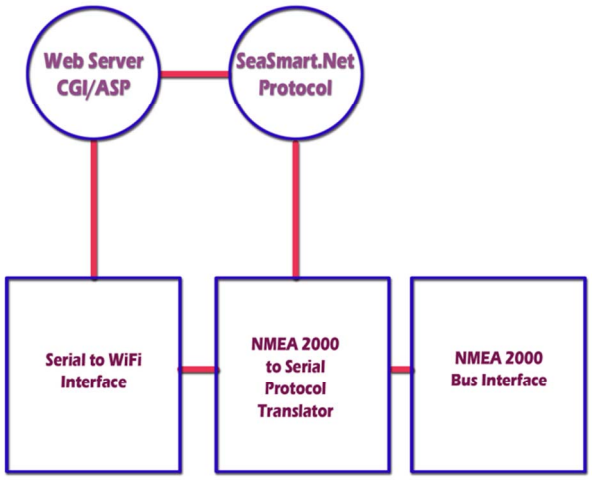
NMEA 2000 to USB/RS232 with external Web Server

Models with Embedded Web Servers allow direct viewing of translated data via standard Web Browser devices as well as bridging between target TCP/UDP networks.

Web Browser enabled device



PC based App using TCP/UDP connections

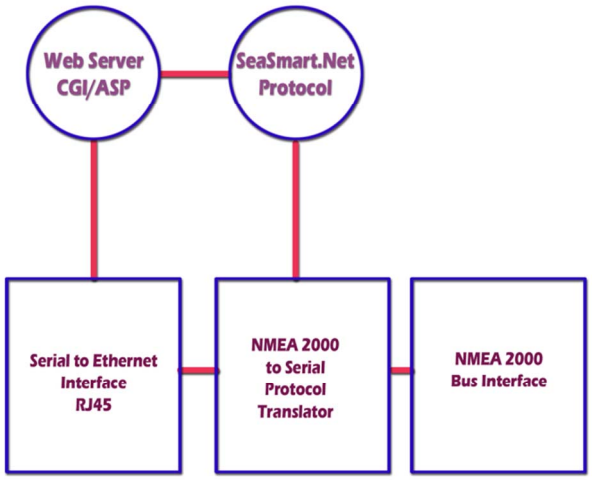


SeaSmart.Net WiFi adapter

Translates NMEA 2000 data to serial data and then to 802.11 b/g WiFi.

SeaSmart.Net Protocol translator passes data to embedded Web Server which is accessed over WiFI Ad Hoc and Infrastructure networks using Web Browser compatible devices

Optional pass-through allows direct access to NMEA data for display on vDash PC Instrumentation S/W over WiFi

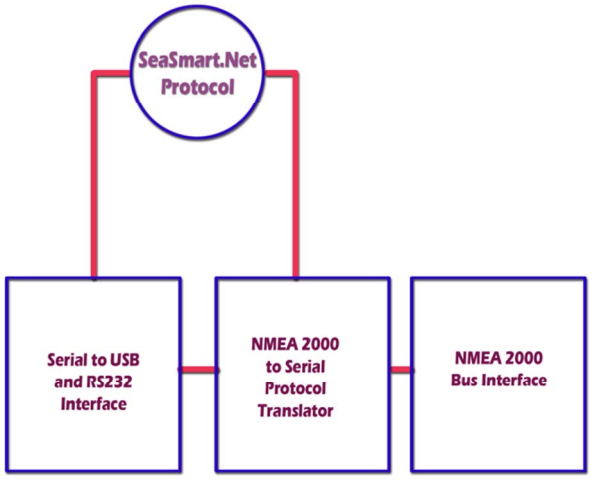


SeaSmart.Net Ethernet adapter

Translates NMEA 2000 data to serial data and then to 10/100 Ethernet (RJ45).

SeaSmart.Net Protocol translator passes data to embedded Web Server which is accessed over Ethernet Infrastructure networks using Web Browser compatible devices

Optional pass-through allows direct access to NMEA data for display on vDash PC Instrumentation S/W via Ethernet.



SeaSmart.Net Serial adapter

Translates NMEA 2000 data to serial data via RS232 and USB interfaces.

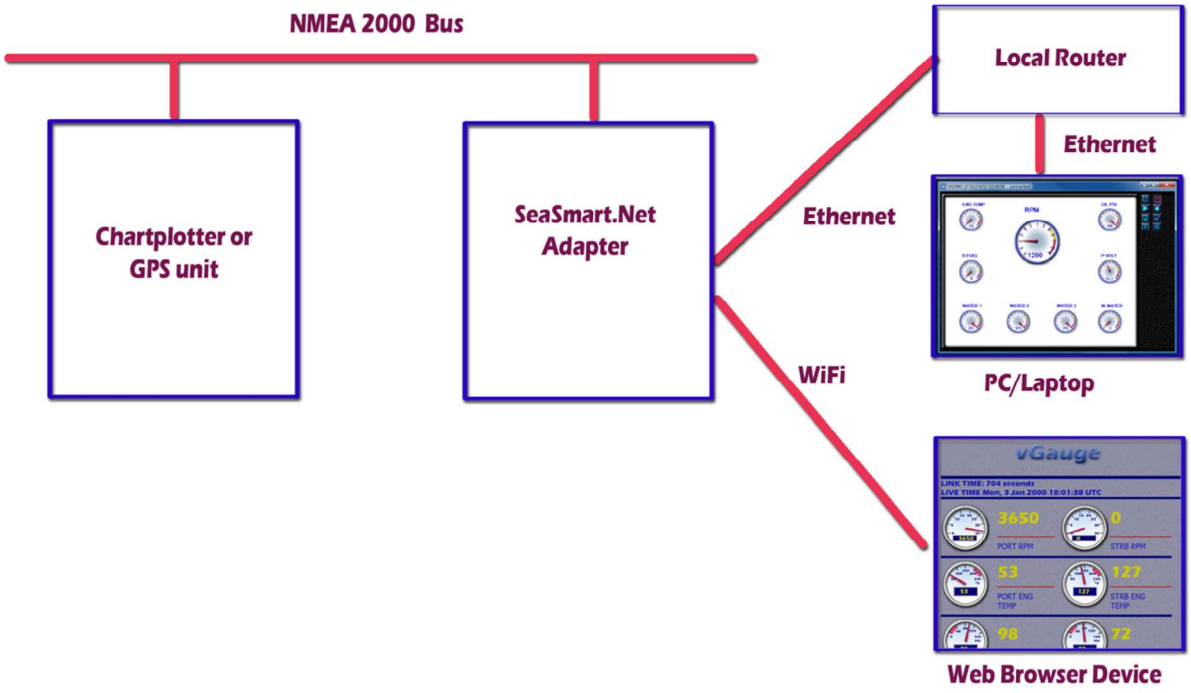
SeaSmart.Net Protocol translator converts RAW NMEA 2000 to NMEA 0183 $IIXDR sentences compatible with SeaGauge Color Displays and PC.

Optional pass-through allows direct access to NMEA data for display on vDash PC Instrumentation S/W using USB port.

The protocol translation is based on embedded microprocessor and can thus be easily updated in the field via USB connection to any PC. The USB port provides power from the PC so no external power is required when connected to a PC for programming.

The embedded Web Server contains a simple file system that allows Web content to be updated over the connected network. The Web Server supports Dynamic HTML, JAVA Script, CGI, and AJAX protocols and contains CGI scripts for bridging serial communications directly to hosted Web Pages.

SeaSmart.Net adapters are typically deployed where it is desired to bridge between NMEA 0183/NMEA 2000 networks and Ethernet/WiFi networks. Here, NMEA data is translated and passed on to both the target network and embedded Web Server. Listeners on the Ethernet/WiFi networks can use both TCP and UDP protocols to access the data. SeaSmart.Net adapters are configured to pass only selected data through the gateway to reduce unnecessary traffic. Typically this configuration is only done on installation but can be modified at anytime via connection to PC USB port.

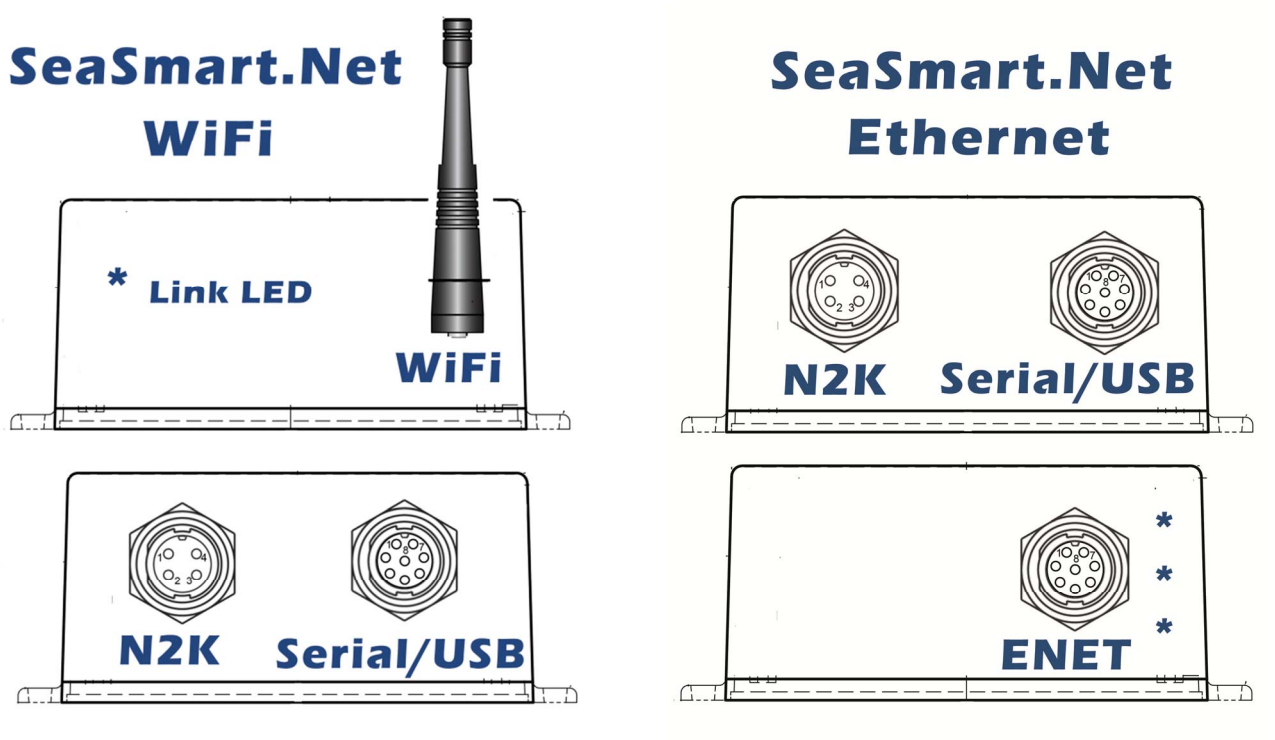


SeaSmart.Net adapters can provide either a wired Ethernet or wireless WiFi connection to a local router (Infrastructure Network). The router then interfaces to other devices on the network via additional wired or wireless interfaces. It is possible and often practical, to use the WiFi features of a local router to service other wireless clients.

SeaSmart.Net adapters with WiFi can also provide direct (point to point) connections with other Wireless devices by using a Ad Hoc network which does not require a local router.

Connections

Installation of SeaSmart.Net adapters typically requires connecting the appropriate interface cables to each network. Power is supplied from the NMEA 2000 network and is electrically isolated. When powering from the NMEA 2000 network, Care must be taken to ensure not to exceed maximum current load of all devices. Max load for SeaMart.Net adapters is 6 LEN



Two connectors on the input side provide the interface to the source networks (USB/Serial and/or NMEA 2000) The USB/Serial connector is a dual interface with only one active at a time (USB or RS232). The appropriate USB or Serial interface cable must be used. The NMEA 2000 connector requires a supplied Micro C adapter cable to connect to a NMEA 2000 bus "T" connector. SeaSmart.Net uses Opto-isolators and thus is power and ground isolated from the NMEA 2000 network. SeaSmart.Net adapters only draw 1-6 LEN when powered via external source. When using SeaSmart.Net as a NMEA 2000 Gateway, the USB/Serial interface is used off-line for configuration and firmware updates or as a second data port accessible via the network.

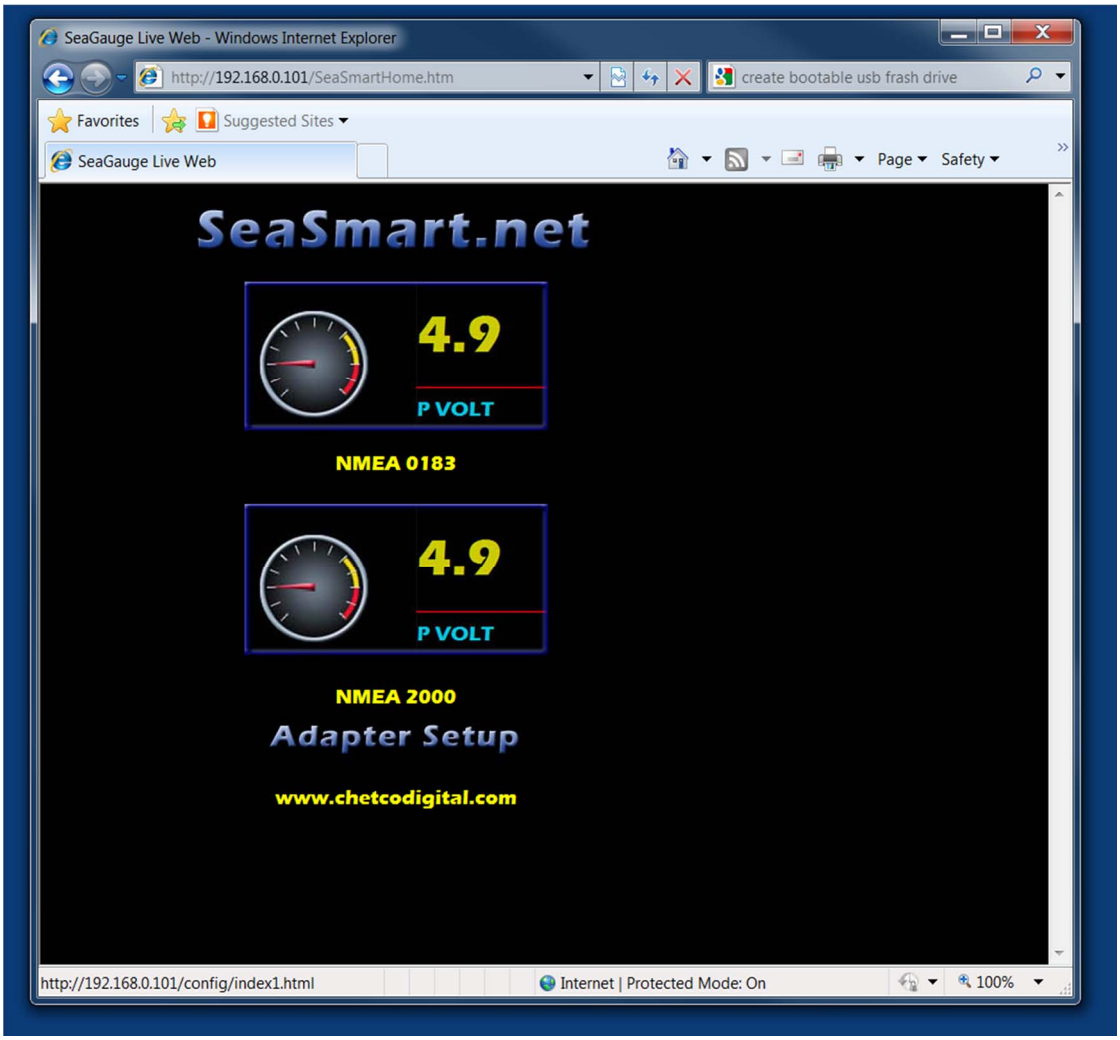
For Ethernet devices the default configuration is to allow an External DHCP server to assign a network address to the device. Access to the NMEA data is then done with TCP connection to the address or via Web Browser to the same IP Address using Port 80. The Ethernet interface uses a supplied custom RJ45 cable with water-resist locking connector. The opposite RJ45 plug can be directly attached to any network device or router. The Ethernet cable is a "straight-through" type.

For WiFi adapters, the default configuration is Ad Hoc Network with SSID of SeaSmart and an IP address of 169.254.100.100. Once connected to the Ad Hoc network, SeaSmart.Net can be reconfigured via Web Browser to use a different SSID and/or Infrastructure Mode.

Once successfully connected to SeaSmart.Net adapters, additional configuration can be accomplished via Web Browser interface to the assigned address which is described in the following section.

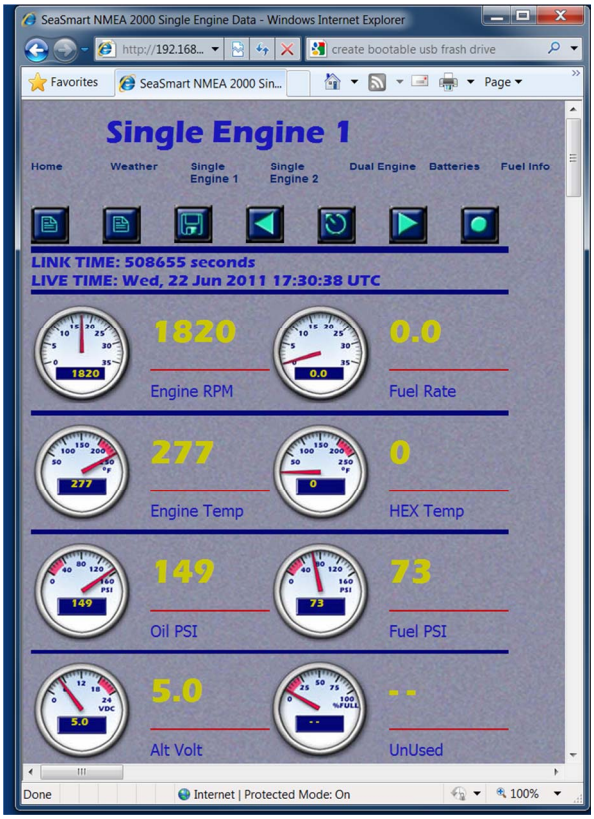
Web Brower Interface

The simplest way to use SeaSmart.Net adapters is with the embedded Web Interface. Data from the connected NMEA network is automatically converted into Web pages which use graphic dials and text to display selected data. Various links off the default SeaSmart web page will present data as it arrives over the interface.

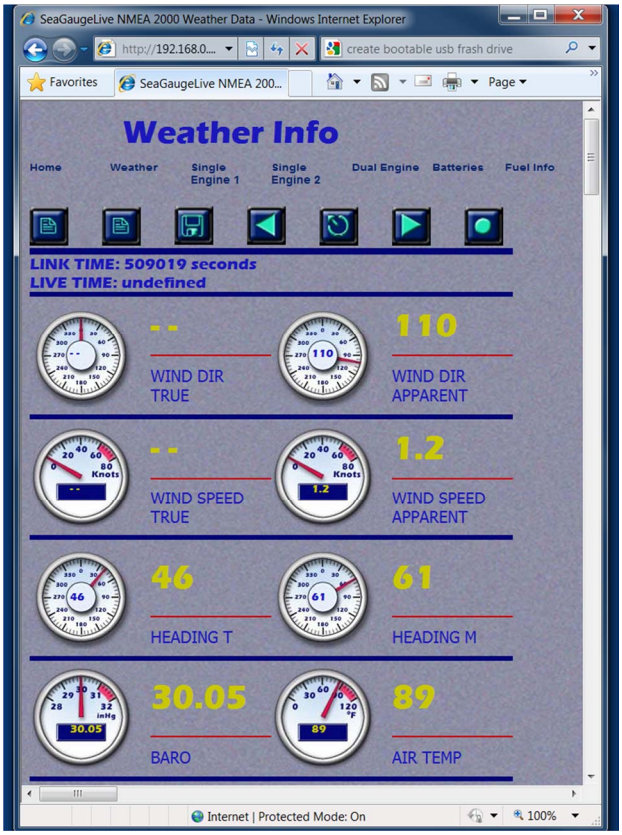


NMEA 0183 $IIXDR data - SeaGauge Remote Sensor Units output data using NMEA 0183 $IIXDR sentences and RS232 serial formats. These Web Pages translate and display the data in real-time as it is received from an attached unit.

NMEA 2000 data - The SeaSmart.Net protocol translator converts the RAW NMEA 2000 data into a format compatible with HTML and displays in real time using graphical dials and text.



SeaSmart.Net Web Page for NMEA 2000 Engine



SeaSmart.Net Web Page for NMEA 2000 Weather

Single Dials use a single PGN Instance and Dual Dials use two different instances.

Engine data use PGN127488, 127489, 127493, 127501, 127505, 127508, 130312.

Weather data use PGN 130323, 130311, 130306, 127250, 127257, 127251

Any of the default Web Pages can be modified and new pages loaded onto the adapter by using the supplied Web Page interface. Maximum Memory for Web Pages and Graphics is 6 Mbytes total.

Instrument Link Bar

The Instruments Link Bar contains a set of pre-configured Web Pages for display of various groups of PGNs. Selecting a link will decode incoming PGN and format for a specific data set.

Home Page	Weather Data	Detailed Engine Data Single Instance	Detailed Engine Data Single Instance	Basic Dual Engine Data	Detailed Battery Info Single Instance	Detailed Fuel consumption and Tank Level

Data Logging Tool Bar

The Data logging toolbar contains a set of Icons for control of data logging functions.

View Log File Contents	Start and Stop Data Logging	Pay Log File Backwards one step	Reset Log File to Beginning	Play Log File Forward one step	Stop playback and revert to Live mode

Themes Toolbar

Allows selection of various predefined themes with customizable backgrounds, colors, and dial faces. The selected theme will be applied to Instrument groups.

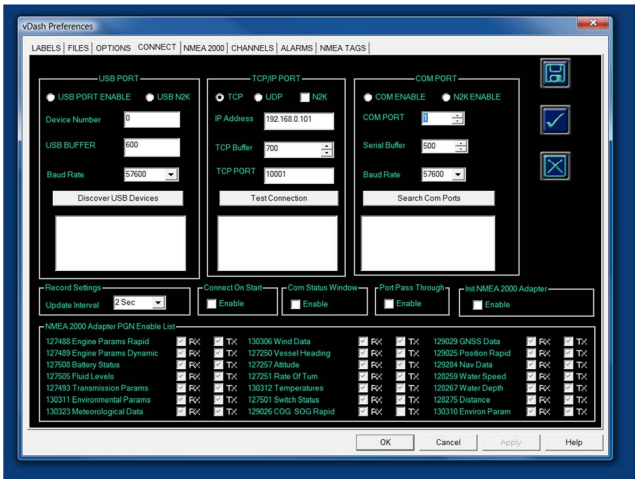
Classic Text White **Classic Text Black** **Classic Dial White** **Classic Dial Black** **Garmin style Dials**

Instance Tool Bar

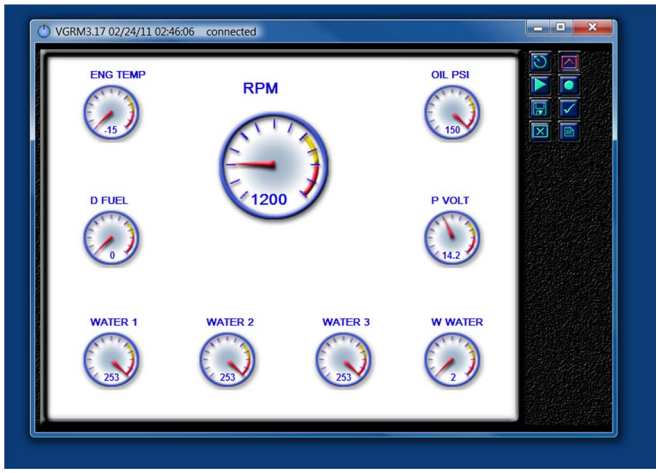
The Instance Tool bar selects the PGN Instance to display many PGNs (engine data for example) will have multiple Instances for the same data set (port = 0 Starboard = 1) Selecting an Instance number will allow only the chosen data to be display. The selected Instance will be applied only to the current Instrument page.

Direct TCP/UDP Access

Access to the NEMA 1083 $IIXDR or NMEA 2000 data is available over direct TCP and UDP connection to the device network address. SeaSmart.Net supports both client and server connections. In client mode (Accept) SeaSmart.Net will accept a TCP/UDP connection request from any other network device using a specified Port Number. In server mode (Connect) SeaSmart.Net will initiate a network connection to specified network address and Port number. This is mode is useful for UDP broadcasts or HTTP POST to Web Server.



vDash Connect Screen with enabled TCP connection to SeaSmat.Net adapter using IP address 192.168.0.101 Port 10001



vDash receiving NMEA 2000 data directly form SeaSmart.Net adapter via Ethernet connection

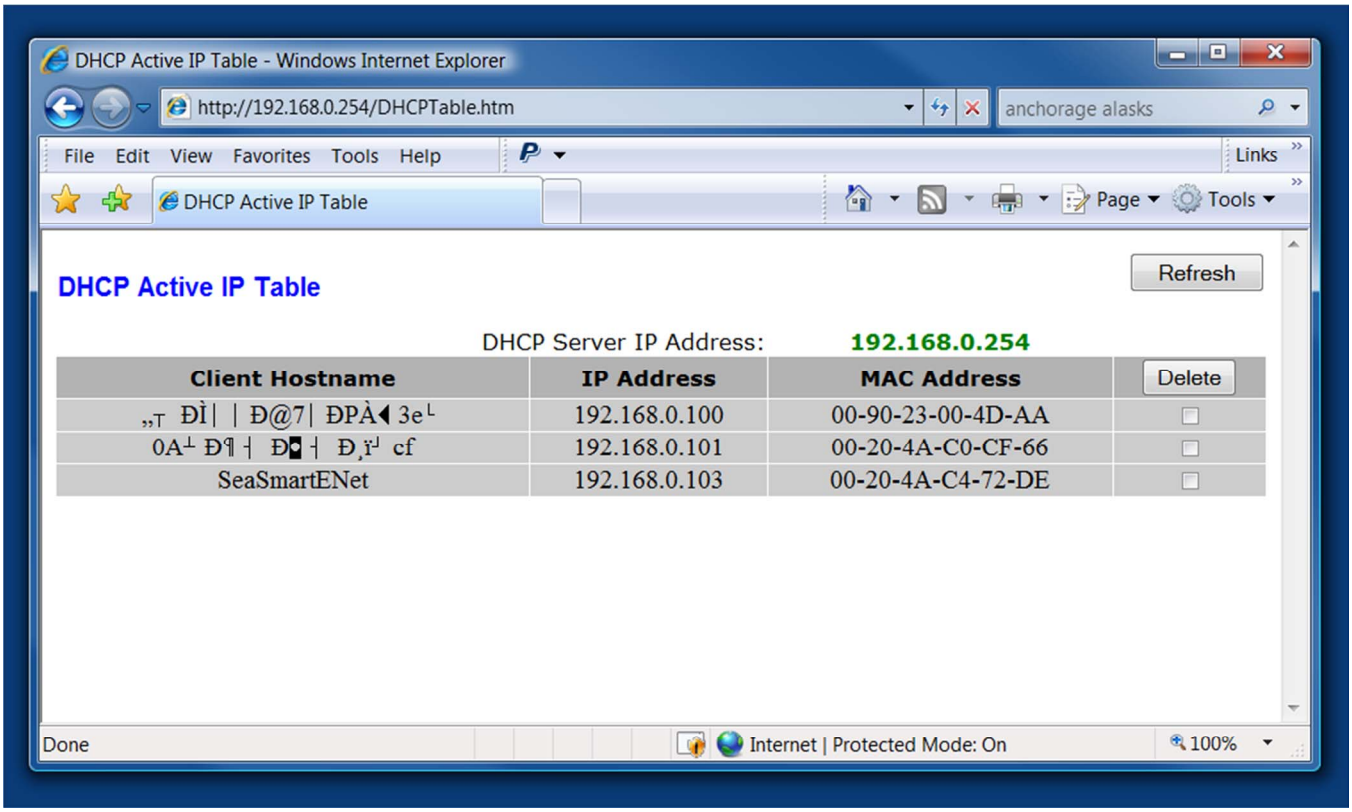
Normal access is via translated NMEA 2000 data using the SeaSmart Protocol. This allows sharing of NMEA 2000 data with multiple Applications by selecting different port number. SeaSmart can support multiple TCP incoming connections on a single port (10001 default) as well as outbound UDP broadcast on an alternate port (10003 default) while simultaneously supplying the embedded Web Server. Thus SeaSmart.net can support Live Direct Web Viewing and Gateway hosting to other network services.

Access to Raw NMEA 2000 data is possible by turning off the Protocol Translator and connecting on port 10002 (default). This may have limited use as NMEA 2000 data will not be available to the embedded Web Server but may however, be accessed from compatible applications running on the PC platform such as Actisense NMEA Reader and Chetco Digital's vDash instrumentation viewer program. The details of the SeaSmart.Net Protocol can be found in the supplemental SeaSmart.Net Protocol document.

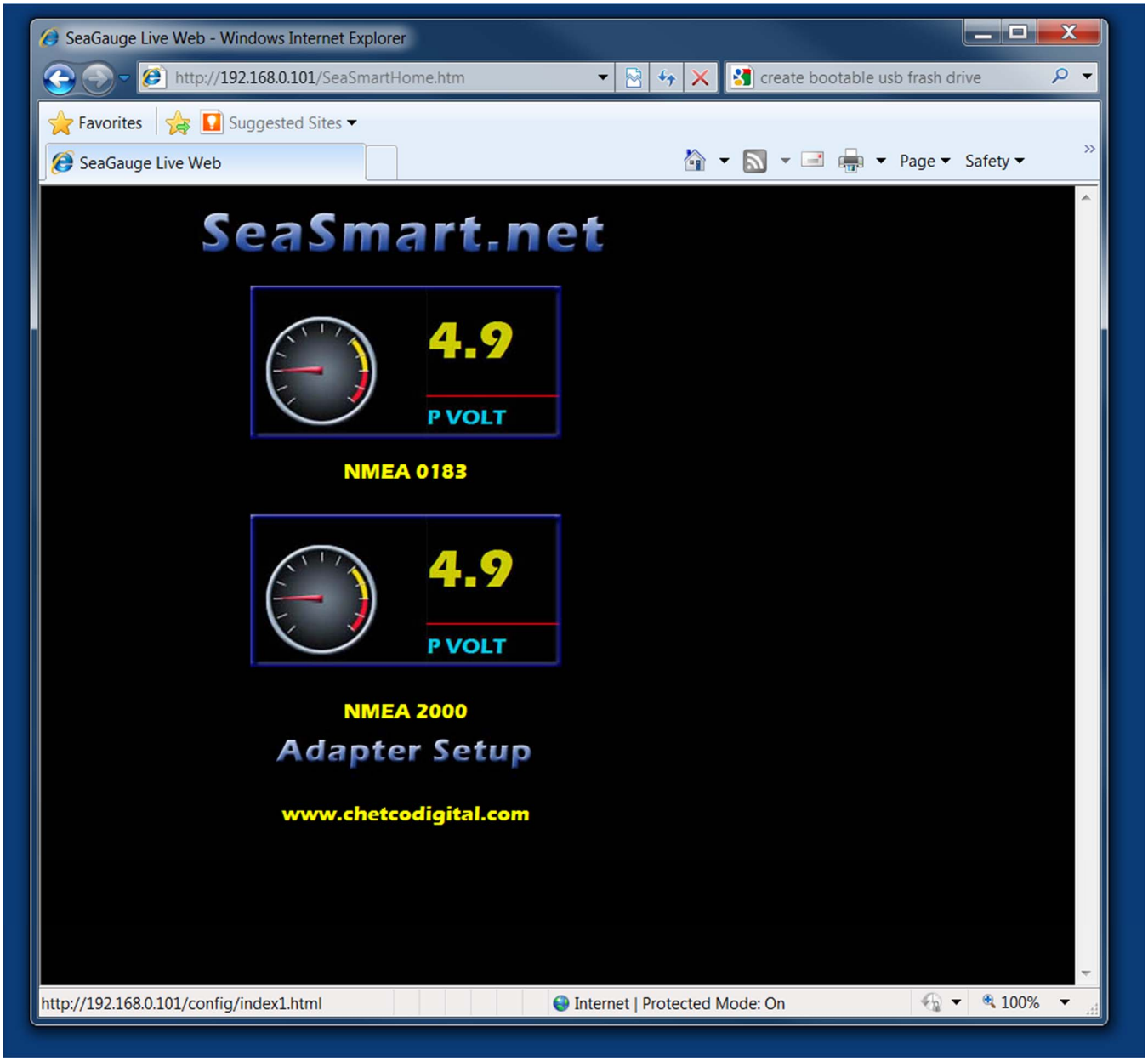
SeaSmart.Net Configuration

Configuration and access to all SeaSmart.Net functions are available via Web Browser Interface. The Browser interface will enable access to system setup and Live Data viewing. The most common configuration required is assignment of local IP address and upload of new Web Server content.

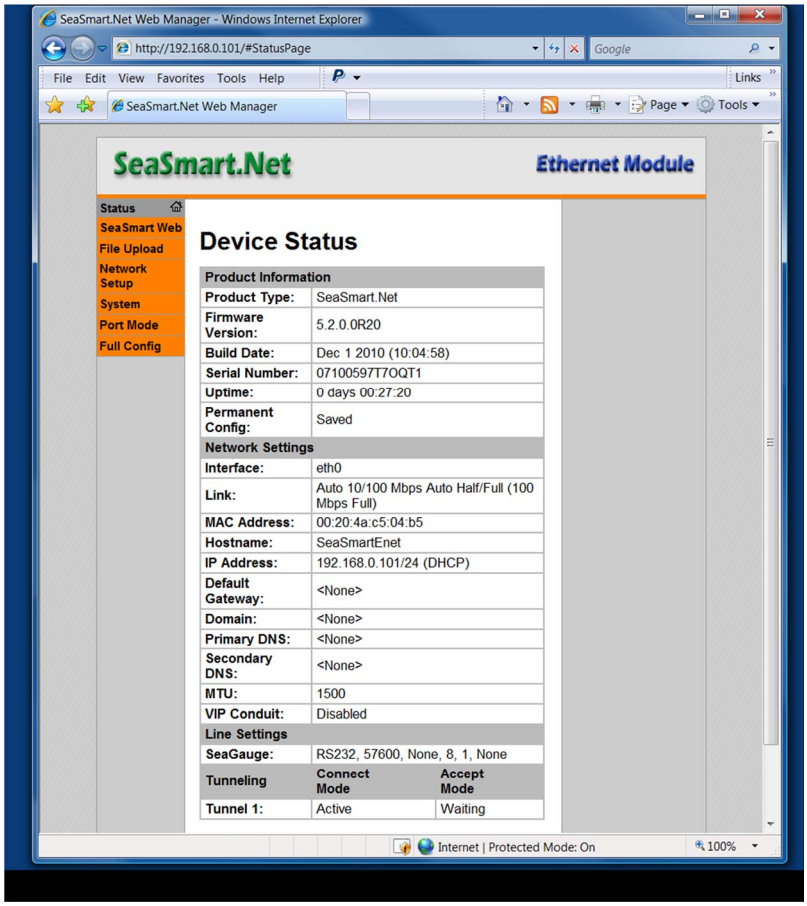
Once a SeaSmart.Net device is installed on the network, a IP address will be assigned by the local DHCP server (usually the router). If, no DHCP service is present or enabled, a dynamic IP address in the range of 192.168.0.1 to 192.168.0.254 will be assigned. Network monitoring tools or Router Interface tools may be used to determine the local address assigned. One such tool is the Lantronix Device Installer 4.0.2 supplied on the SeaSmart.Net application CD or downloaded from the internet at www.lantronix.com. Other tools such as the SoftPerfect Network Scanner can be downloaded for free at http://www.softperfect.com/products/networkscanner . These tools are useful in obtaining the IP address of devices installed on the local network. The most common method to get the IP address is the Router configuration screen under DHCP services.



The SeaSmart.Net home web page can be accessed by typing in the IP address into the browser address bar. For example, if the SeaSmart.Net device address is 192.168.0.101, then type http://192.168.1.101. This will load the home page as shown.



Selecting the ADAPTER SETUP link will navigate to the SeaSmart Configuration page were various set up and maintenance operations can be performed.



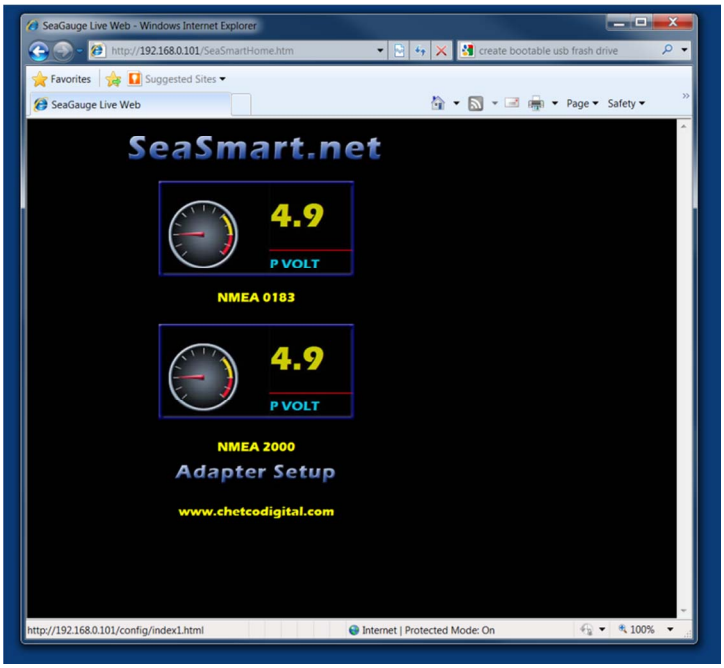
The SeaSmart.Net Configuration page contains seven links to additional pages on the upper right hand column. They are:

Status	current device status
SeaSmart Web	Live view of data being received from the NMEA 2000 network or attached SeaGauge Remote Sensor Interface unit
File Upload	Browser based file upload to Web Server and File management. Used to update files stored in Flash Memory.
Network	used to assign a static IP address or enable DHCP for dynamic IP address. Also used to change device host name.
System	Used to upload new device firmware files or reboot.
Port Mode	Used to configure access to serial ports. Serial ports can be configured for ACCEPT or CONNECT. In ACCEPT mode, TCP and UPD connections are allowed from other network devices on specified port numbers. In CONNECT mode, SeaSmart.Net will initiate TCP and UDP connections to supplied host IP address and port number.
Full Config	Access to all SeaSmart.Net configuration options. Should only be used when necessary by trained support personal.

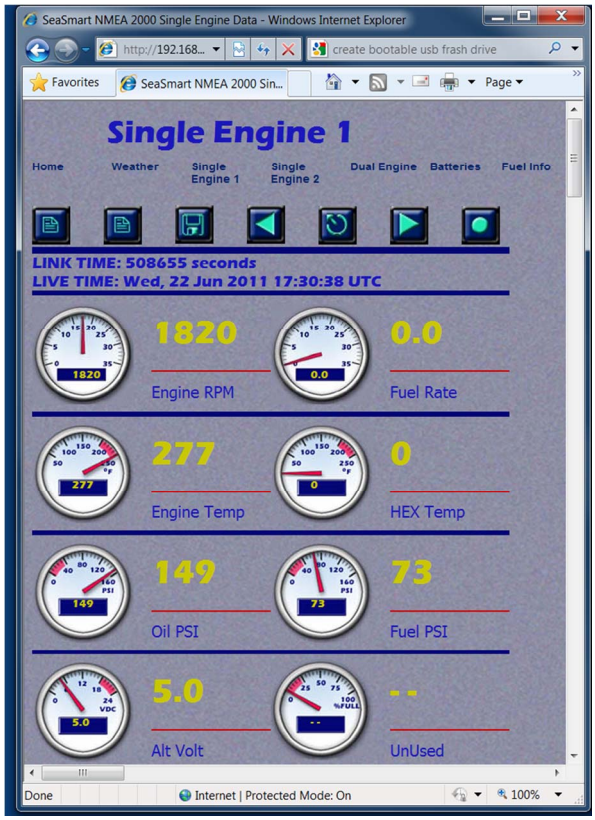
SeaSmart Web

SeaSmart.Net devices with embedded web server allow browser access to live data being received from the NMEA 2000 Network or SeaGauge Remote Sensor Interface units. The type of web page available will be dependent on model of SeaSmart.Net device.

The SeaSmart Live Home page has several Icons for choosing the type of data to display and graphic Themes. When an Icon is selected, a new page will load with a preset array of dials to represent the desired data group.



Web View – Select the desired data display format



Web View – SINGLE Engine NMEA 2000

SeaGauge Remote Sensor Units use a NMEA 0183 type of protocol ($IIXDR). Therefore select the appropriate Icon when displaying data from a directly connected SeaGauge Remote Sensor Interface Unit.

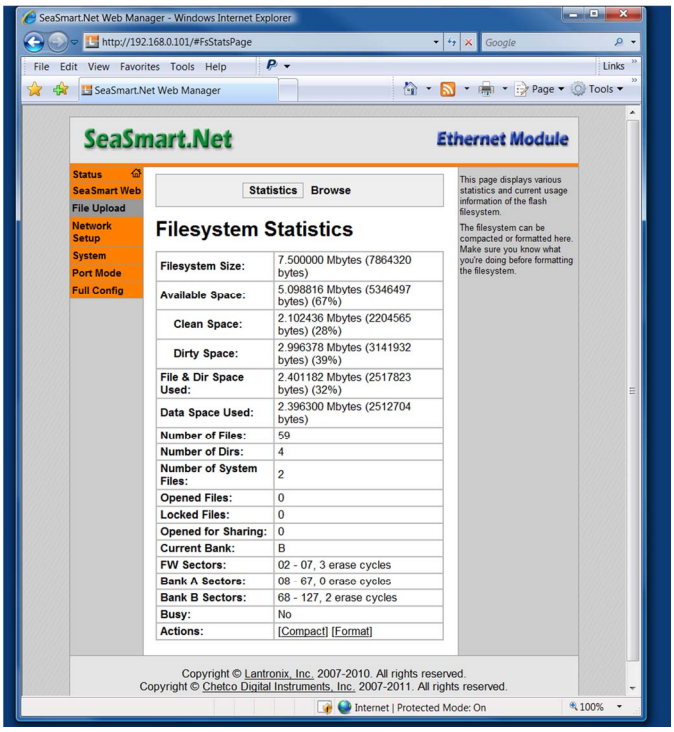
NMEA 2000 and SeaGauge use two different types of Protocols and both can not active at the same time. Therefore NMEA 2000 Web pages will not function when connected directly to a SeaGauge Remote Sensor unit and visa via. When selecting a viewing mode, if the appropriate interface is not present, the dials will not update as no data is being received on the selected interface.

Only a select list of NMEA 2000 PGNs can be displayed. Consult the SeaSmart.Net specification sheet to obtain the most recent list of supported PGNs

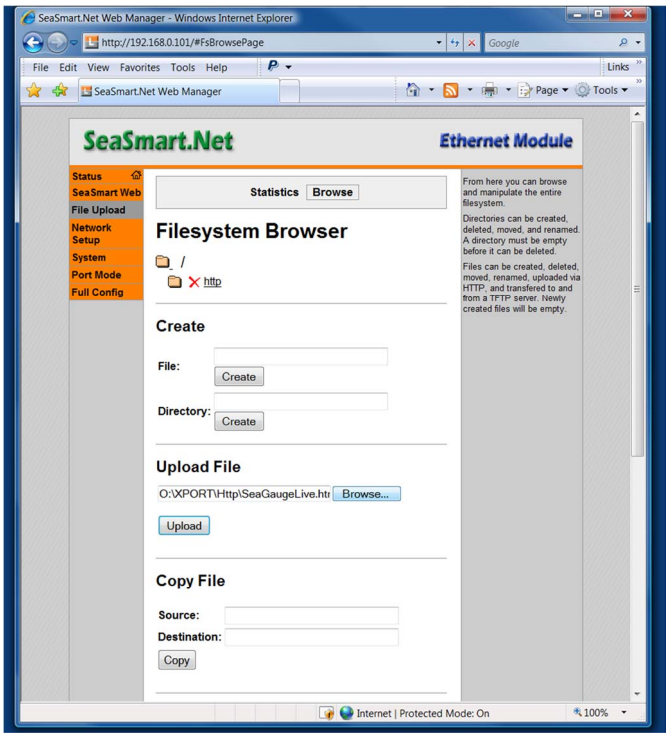
File Upload

Files contained in Flash Memory can be managed using the File Upload. The initial page will show current statistics with the most important being Free Space Remaining.

The Top center section of the Page contains two links - Statistics and Browse. To upload new files or delete existing files - select the Browse link.



File Upload - Statistics



File Upload - Browser

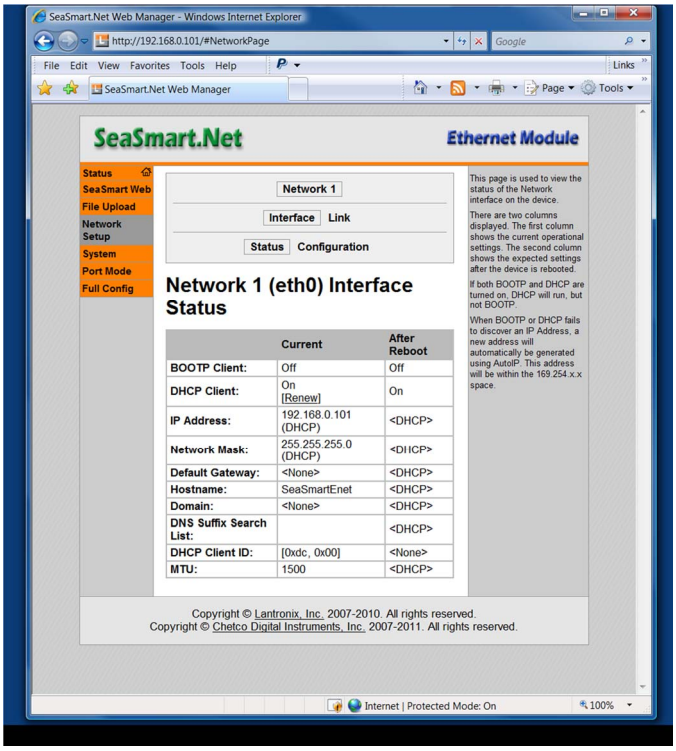
When using the File System Browser, there are options to Create/Delete directories, Load/Delete Files, and Move/Copy files.

The process to upload a new file or replace a existing file is the same. First, select the appropriate directory before selecting a local file. The Folder Icons underneath the File system Browser Banner will expand or contract subdirectories if present. If the correct subdirectory is not present, use the Create Directory option. The Red X next to each Folder Icon will remove the folder and all contents from Flash Memory.

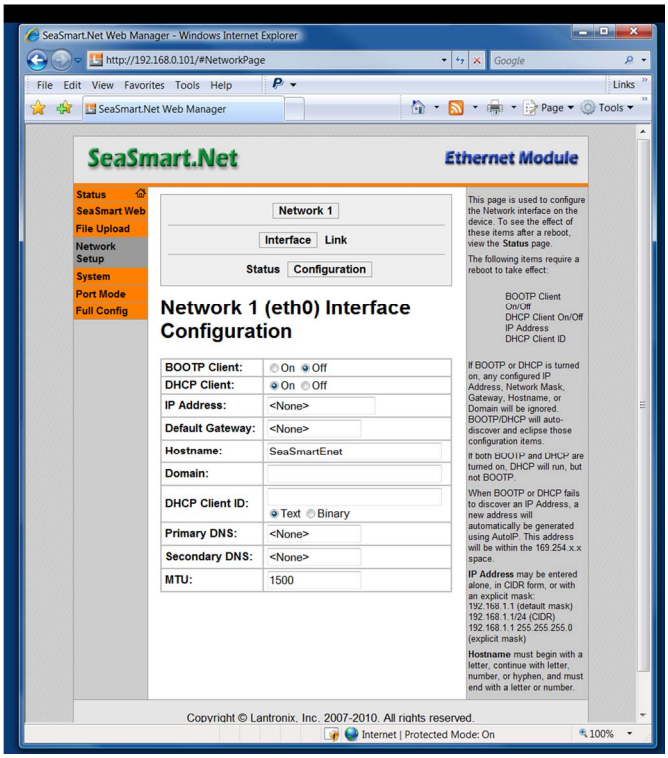
Network Setup

SeaSmart.Net devices need a network address to function and allow connection to other devices. There are two common methods to obtain an address, static assignment and DHCP.

Static assignment allows an fixed IP address to be entered. Careful consideration must be made when creating a Static IP address and should only be done by qualified Network administrators.



Network Setup - Status



Network Setup - Config

The most common method to set a network address is via DHCP server. A device on the network (usually the router) will keep track of available addresses and dynamically assign them to new devices as required. The address is not fixed and will often change on power up. The Status Page of the Network Config will show the current address being allocated by the local DHCP server.

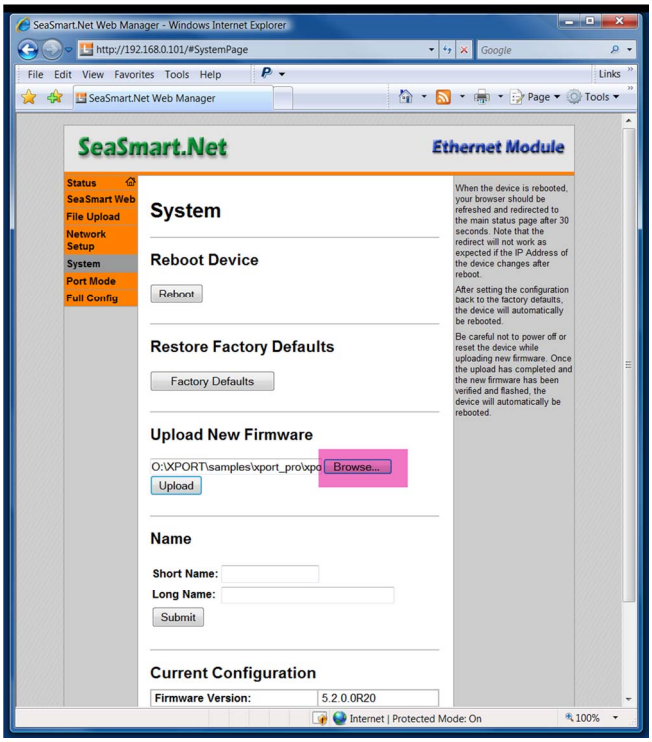
To change the static IP address or configure for DHCP, select the CONFIGURATION link. The configuration page will allow enable or disable DHCP Client. If DHCP Client is enabled, then no IP address is required as it will be automatically generated. If DHCP Client is disabled, a static IP address will need to be entered into the appropriate field.

Firmware Update System

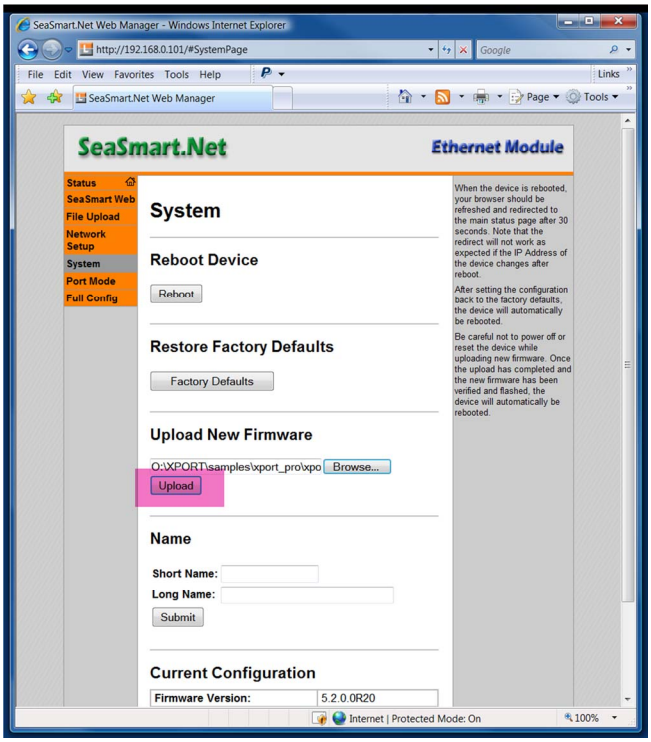
SeaSmart.Net adapter firmware can be modified in the field by performing a file upload using the SYSTEM menu option.

The firmware File must be compatible with the type of adapter used so care must be taken to ensure the correct version is selected. The Firmware file does not contain any of the Web Pages and will not overwrite any of the Web Server Content.

DO NOT REPOWER THE UNIT TILL THE UPDATE IS COMPLETE.

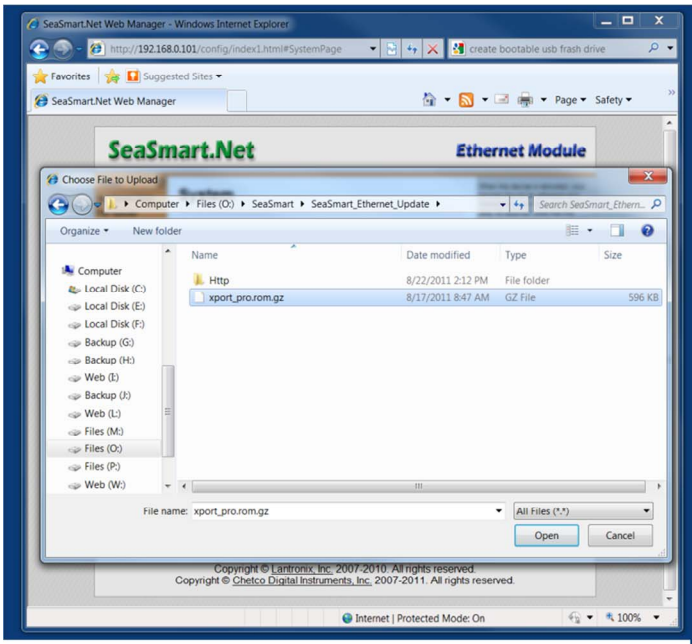


System Update – Select desired Firmware File

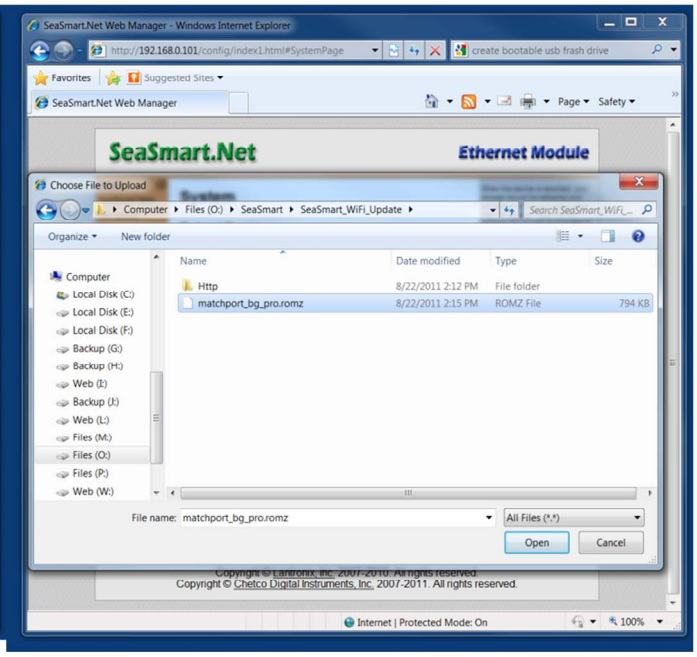


System Update – Upload file to SeaSmart.Net device

The process to update Firmware is to first select the desired file on the local PC and then to Upload (transfer) to the adapter. After the transfer is complete, the adapter will reboot.



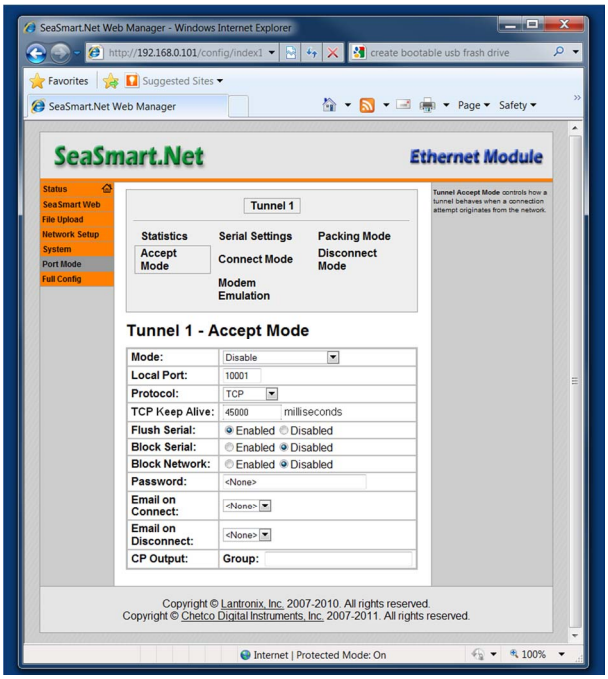
Firmware File for Ethernet adapter will be xport_bg_pro.rom.gz



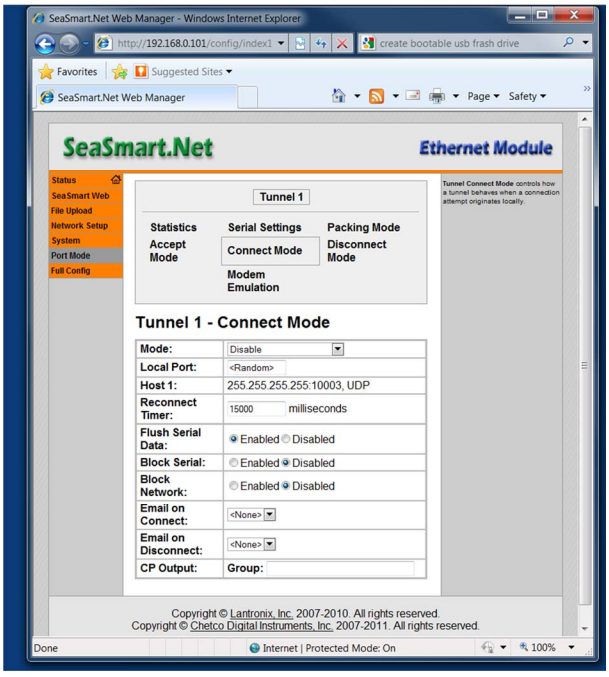
Firmware File for Ethernet adapter will be match_bg_pro.rom.gz

Port Mode

SeaSmart.Net devices support both passive connections (ACCEPT) and active connections (CONNECT). Passive connections allow other network devices to connect to the Tunneled Serial port using the SeaSmart.Net IP address and Port number. Passive connections are the most common and easiest to set up. Active connections allow SeaSmart.Net to initiate a TCP or UDP to supplied host IP address and Port number. Active connections are useful for HTTP POST to external Web Servers or UDP Broadcasts to multiple network clients.



Accept Mode – Select desired protocol and Port



Connect Mode – Select Host IP address and Port

ACCEPT MODE – To enable Accept Mode, change the Drop Down to Disabled. This will ensure that connections are always made regardless of live data at the interface. Other options allow connections to only be accepted when new data is available.

The most important settings for ACCEPT MODE is the PORT NUMBER and PROTOCOL (TCP/UDP) as they must match the device that is generating the ACCEPT request. The most common protocol is TCP as it provides reliable and buffered data transmission over the network including Internet connections. Only one TCP connection can be active at a time. The UDP protocol can be used if reliable data transmission is not required or when setting up a UDP broadcast to multiple network devices. When setting up a UDP Broadcast, one device is the master (CONNECT) and the others listeners (ACCEPT). Listeners must use the local device IP address to receive UDP broadcast packets.

SeaSmart.net adapters support several types of Accept modes. When both TUNNEL ACCEPT Modes are set to Disabled (default), data from one or both ports (NMEA 2000 or Serial) is passed-through (Tunneled) to the pre-selected TCP port (TUNNEL 1) using the following rules.

- TCP PORT 10001 – Translated NGT NMEA 2000 data to SeaSmart.net Protocol
- TCP PORT 10002 – Serial Data from External RS232 connector
- TCP PORT 10003 – Combined SeaSmart.net NMEA 2000 data and External Serial (RS232) data
- TCP PORT 10004 – RAW un-translated NGT NMEA 2000 data

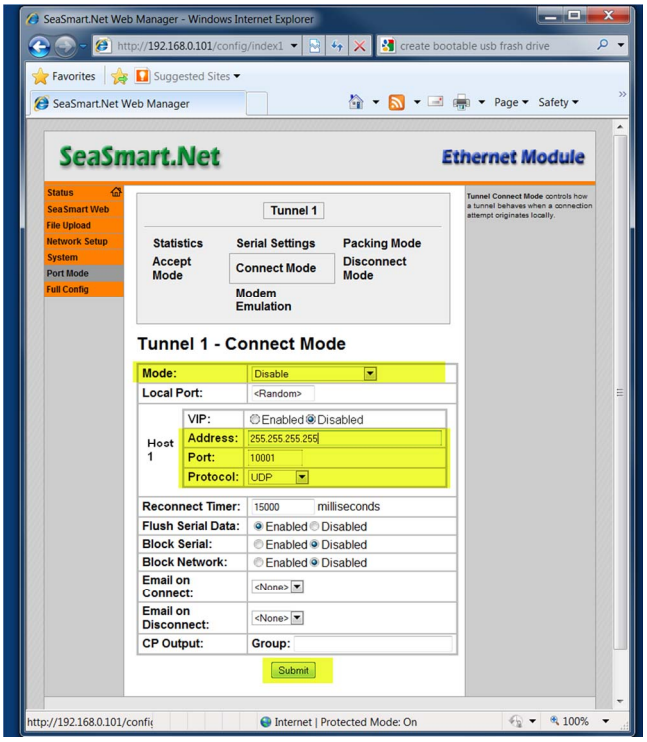
The setting of the Port number determines the operational mode for TUNNEL 1 with 10001 being the default mode and TUNNEL 2 set to DISABLED. In this mode, only one TCP port number will be able to ACCEPT incoming connections.

If TUNNEL 2 is set to ENABLED, serial (RS232) data from the external connector is passed through (Tunneled) to the specified Port. This allows a second TCP port to also ACCEPT incoming connections and supply NMEA 0183 or AIS data over an independent link from NMEA 2000 data.

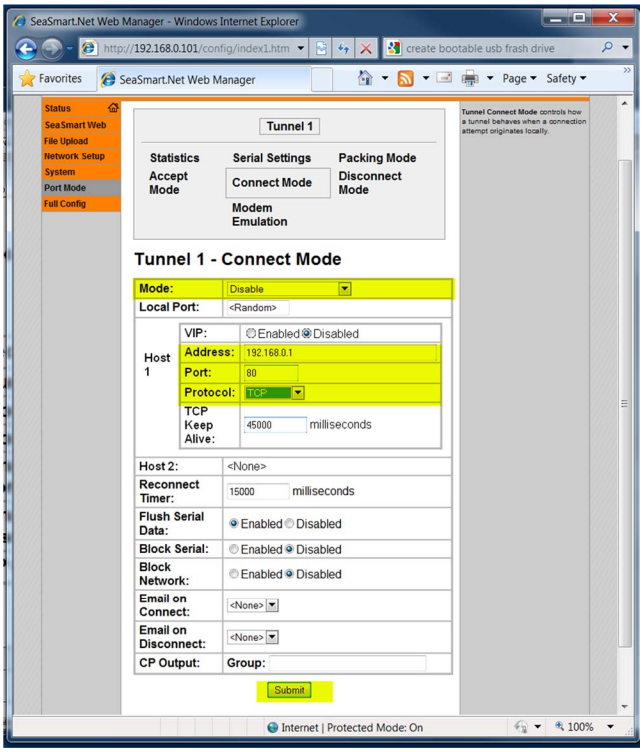
TUNNEL 1	TUNNEL 2	MODE
DISABLED	DISABLED	ACCEPT TUNNEL 1 ONLY (Ports 1, 2 or Both) 10001 = SeaSmart NMEA 2000 data 10002 = External Serial Data (NMEA 0183) 10003 = Combined SeaSmart and Serial data 10004 = RAW NGT NMEA 2000 data
DISABLED	ENABLED	ACCEPT TUNNEL 1 and 2 (Port 1 and Port 2)
ENABLED	DISABLED	NOT ALLOWED
ENABLED	ENABLED	NOT ALLOWED

CONNECT MODE – To enable Connect Mode, use the drop down menu and select DISABLED for Mode. Connections to designated Host IP Address will be initiated and held upon device power up. Under Host 1, enter the target IP Address, Port Number, and Protocol (TCP or UDP). The Local Host Port Number does not need to be specified as it is randomly generated.

If using UDP Broadcasts, enter in the local network broadcast address (ends in 255). For example on the Private IP Network of 192.168.0.0 the broadcast address would be 192.168.0.255. UDP packets will then be sent to all devices on the local network. Each listening device must be set to ACCEPT on their own IP address.



Connect Mode – UDP Broadcast – Data is sent to all devices on the subnet using the specified port number. Each receiving device must be set to listen on its on interface IP address. Allows multiple devices to receive the same SeaSmart.net transmissions

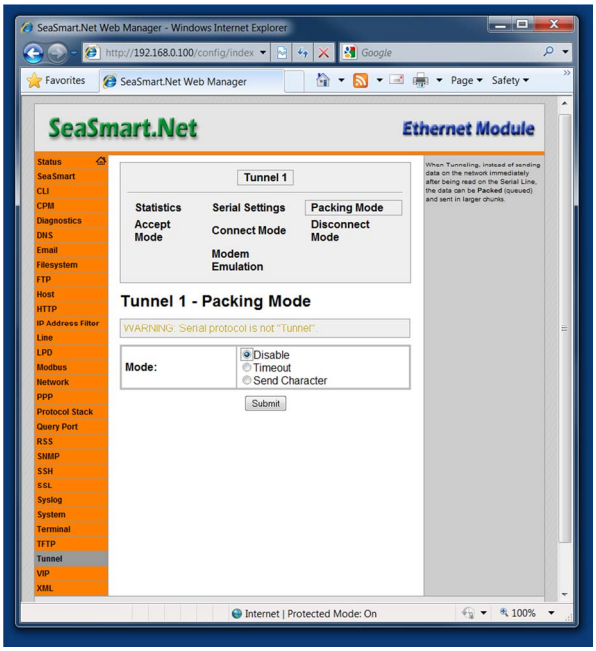


Connect Mode – Web Server Post – Setting the protocol to TCP and Port number to 80 will enable SeaSmart.net to POST data directly to a local Web Server running ASP. The live data can then be logged and viewed with any Browser.

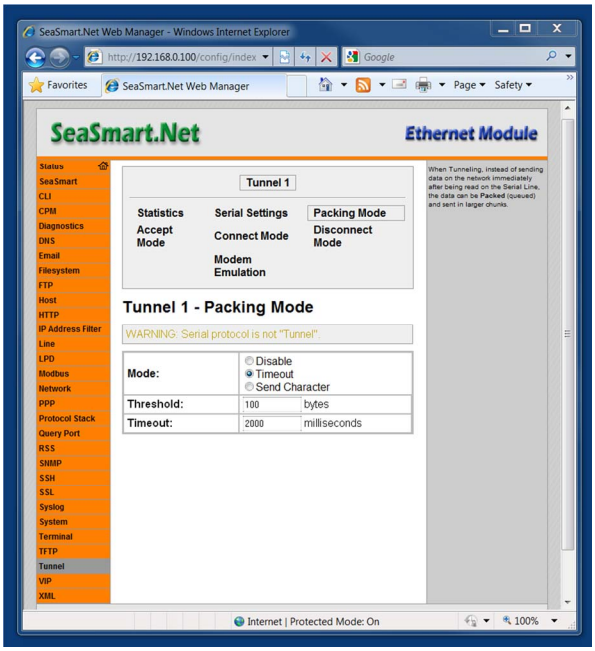
PACKING MODE – Controls how data is retrieved using HTTP GET requests. Received data is stored in a 64 Kbyte FIFO buffer which is read via HTTP GET (GETNMEAData). Three options are available to determine how data is retrieved

- **Disabled –** All new data since previous GET is retrieved and internal FIFO buffer cleared.
- **Timeout –** Data is retained for defined milliseconds and old data discarded
- **Threshold –** Data is retained based on defined buffer size and old data discarded.

In all cases, if conditions force internal 64 Kbyte buffer exceeded, the oldest data will be discarded.



NEWEST DATA RETRIEVED BY HTTP GET AND INTERNAL BUFFER CLEARED.



LATEST 2 SECONDS OF DATA RETRIEVED BY HTTP GET. INTERNAL BUFFER NOT CLEARED.

The **Tunnel Packing** parameters control how data is retrieved using HTTP Get Requests (GETNMEAData)

- **Packing Mode –** determines if data is packed before transmission in response to a HTTP GET or if the buffer is cleared after each request.
  - **Disabled –** All accumulated data since the last GET is passed on and the internal buffer cleared. If a GET request is not issued before the internal buffer is filled, data is FIFO and the oldest data discarded. The Internal FIFO buffer is 64K Bytes. If a GET request is made before the buffer fills, then all new data since the last request is returned and the buffer cleared.
  - **Timeout –** specifies to use a Timeout or Threshold value to determine how much data to return in response to a HTTP GET request. Data is returned and the internal buffer is not cleared until the Timeout or Threshold criteria are met. This is used to allow multiple HTTP clients to request the same data set.

- **Timeout –** Specifies the amount of data in terms of time (milliseconds) to return in response to a HTTP GET request. The Time Interval refers to the "Age" of the received NMEA data. Each record is tagged with a time stamp. Data is retained in the internal buffer until its "Age" exceed the interval and then it is discarded. This allows multiple HPPT clients to issue GET requests and all see "current data"
- **Threshold -** Specifies the amount of data in terms of Bytes (value * 10) to return in response to a HTTP GET request. Data is held in the internal buffer till it exceeds the Threshold value and then it is discarded. Each HTTP GET request returns the amount of data specified by the Threshold value times 10.

The Timeout and Threshold values work together in deciding how data is returned in response to a GET request. Both conditions are applied to the request. For Timeout to have priority, the threshold must be set to the minimum (100 = 1K bytes). Conversely, for Threshold to have priority, the Timeout must be set to the minimum (1 millisecond).

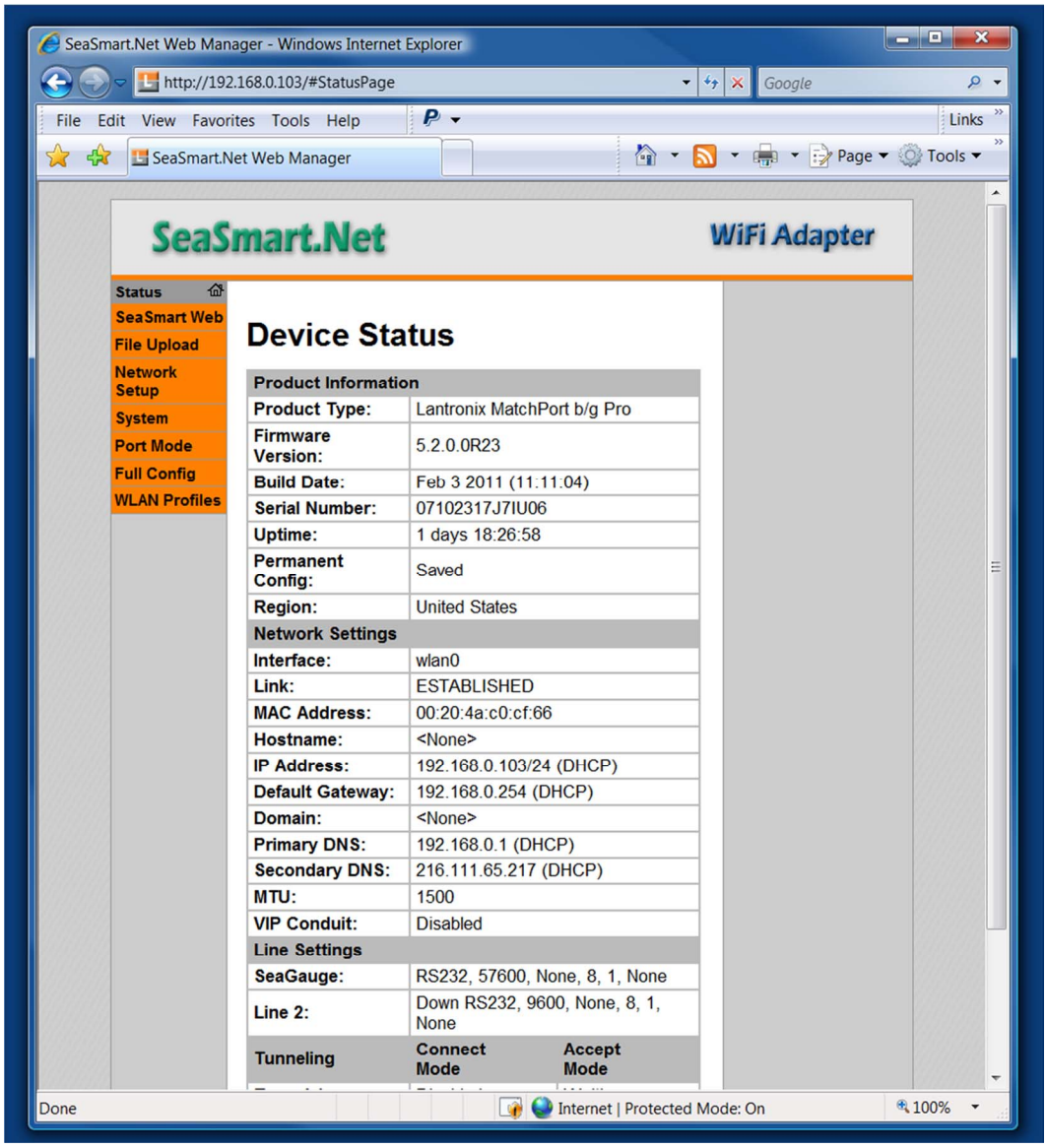
WLAN Profiles

SeaSmart.Net WiFi devices include an additional menu option for configuring Wireless Network interface options. There are two types of Wireless Networks supported, Ad Hoc and Infrastructure.

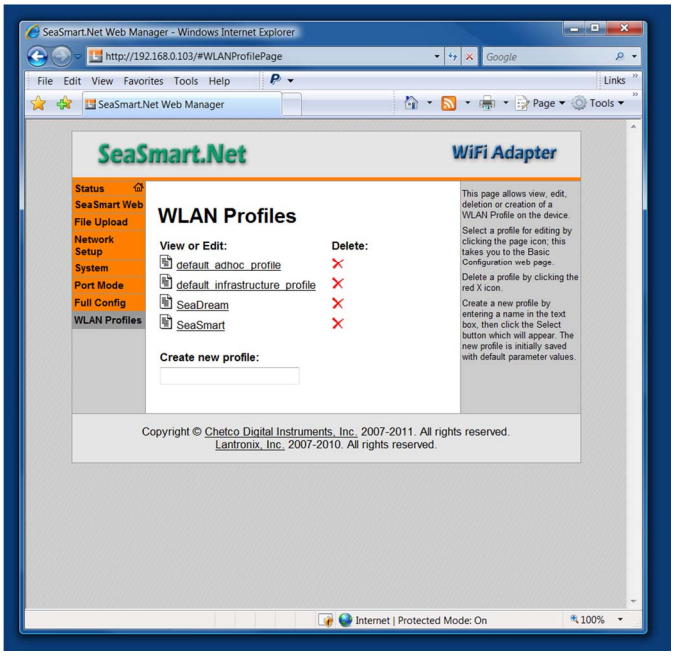
Ad Hoc – Point to Point connection between SeaSmartWiFi device and Host PC. Uses Auto-Config IP address and no DHCP server. Only requires a single host device (PC/Smart Phone/NetBook) to create a connection. This sort of network is suitable for direct link between SmartPhone and embedded Web Server.

Infrastructure – Multipoint connection where SeaSmart.Net device communicates with a network Access Point (router) to allow multiple devices to access the same data.

The default on initial power up is Ad Hoc with a SSID of **SeaSmart Ad Hoc** (pass phrase disabled).

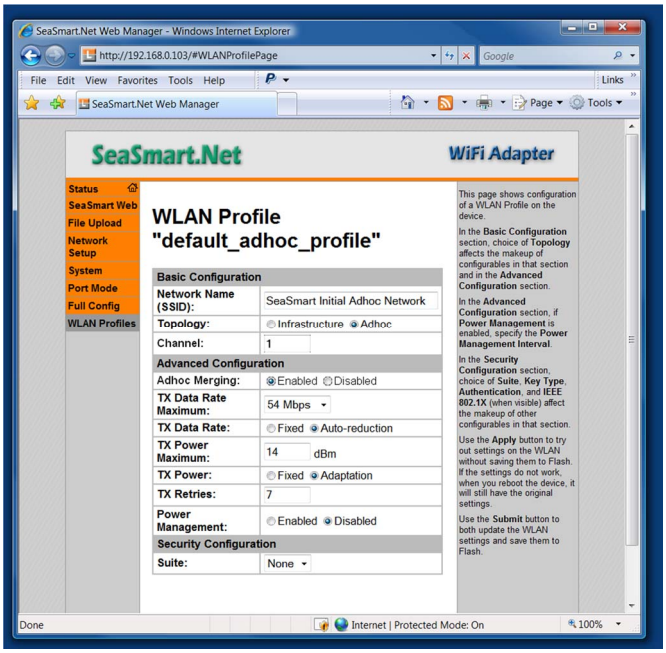


SeaSmart.Net WiFI modules can support multiple WLAN Profiles to allow for auto discovery of configured networks in a fall back boot mode. WLAN Profiles are tried in order until a successful connection is made.

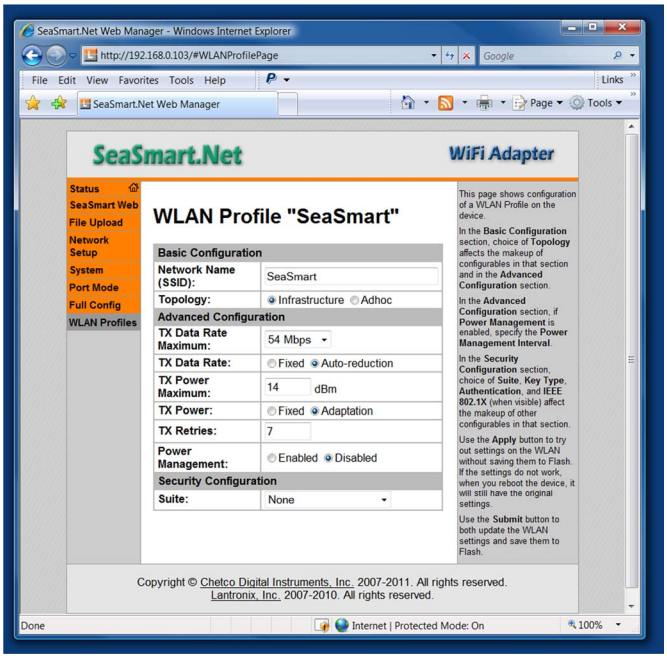


List of Profiles to be tried in order on Boot

The default is to start with a Ad Hoc Profile (SeaSmart Ad Hoc) since it is usually the simplest to set up and configure. After a successful Ad Hoc connection, the device can be reconfigured with additional WLAN Profiles to connect to other networks.

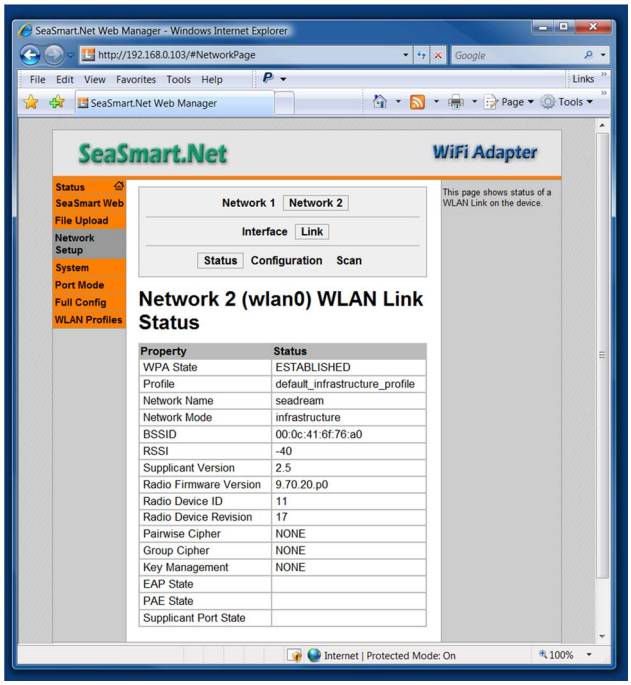


Default Ad Hoc Profile

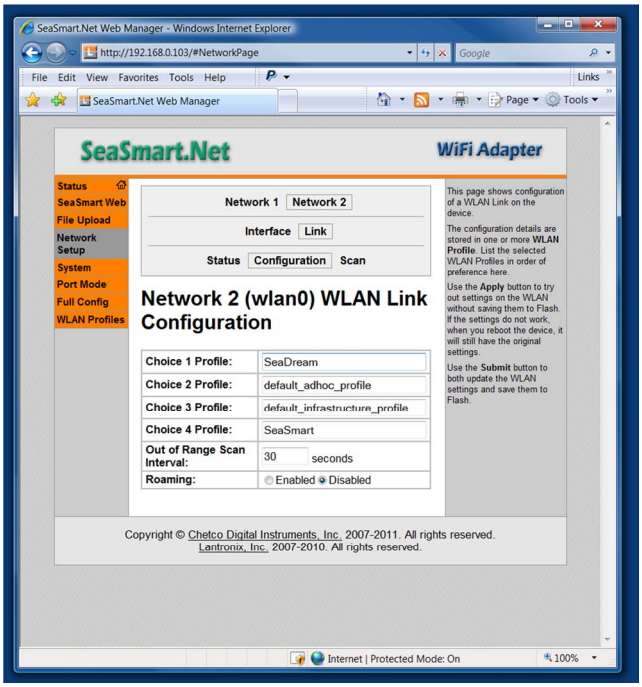


Infrastructure Profile

To Apply WLAN Profiles, first create them in the WLAN Profiles Page and then add them in order in the Network Setup Page.

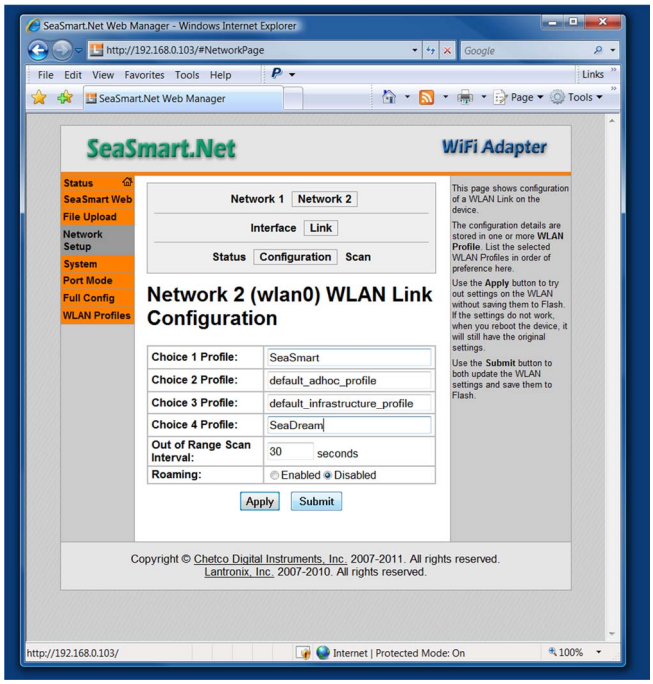


Select NETWORK 2 for Wireless Status



List of Profiles to try on Boot up

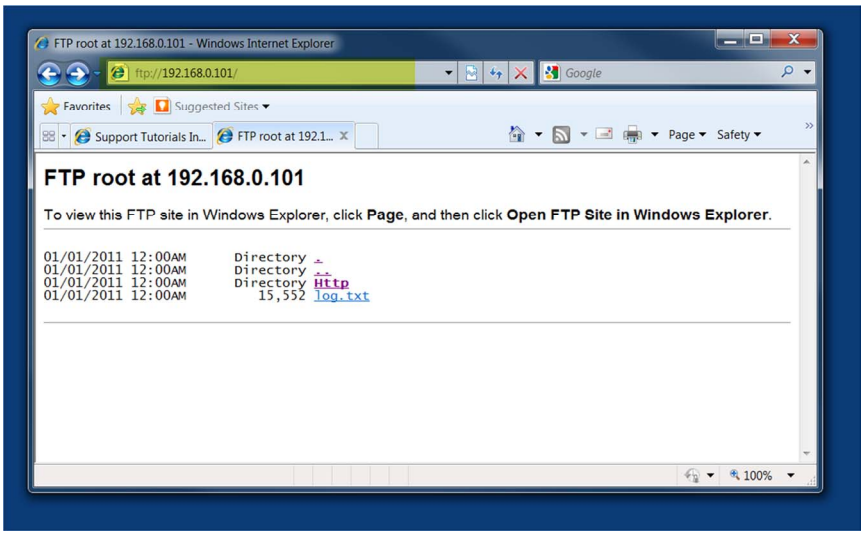
Always leave a Ad Hoc profile in the list so that recovery can be performed in case a listed network becomes unavailable. Ad Hoc connections can be performed directly with WiFi enabled PC/Laptop.



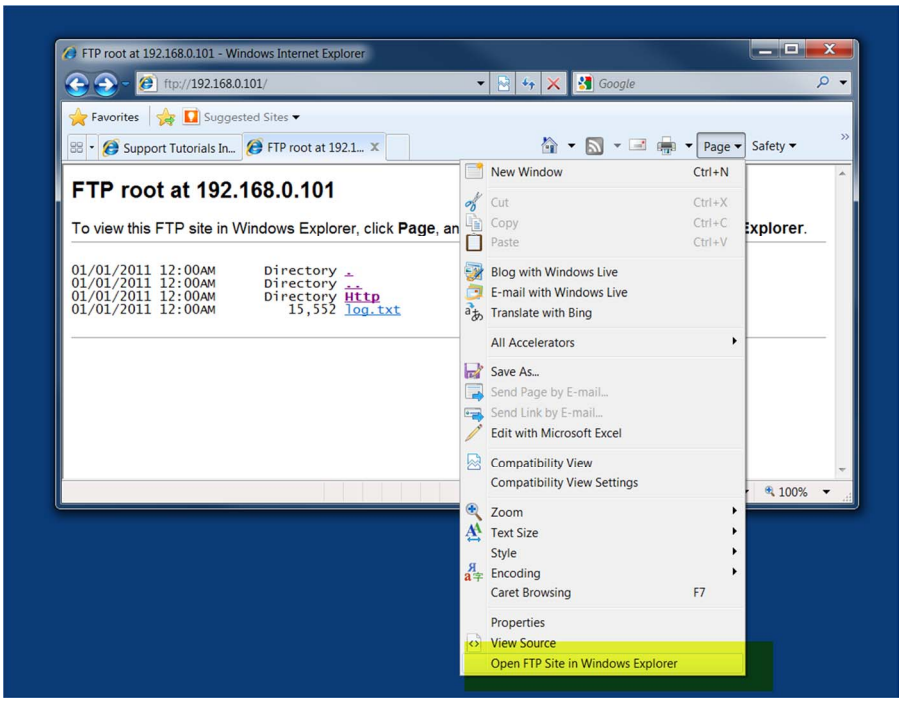
Select Submit to save changes and reboot device to restart network scan/connection

FTP File Update

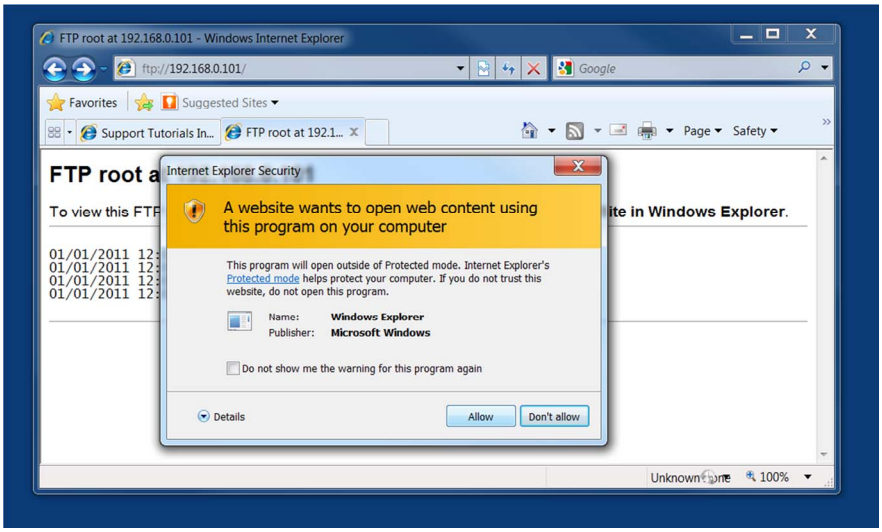
SeaSmart.net supports updates via FTP and Browser interfaces. To update all the content of the Web Server, it is usually easier to use FTP. Most Browsers including Internet explorer include FTP upload support. This example uses the native FTP services built-in to Windows Vista and Windows 7. Any other FTP program will work in uploading files.



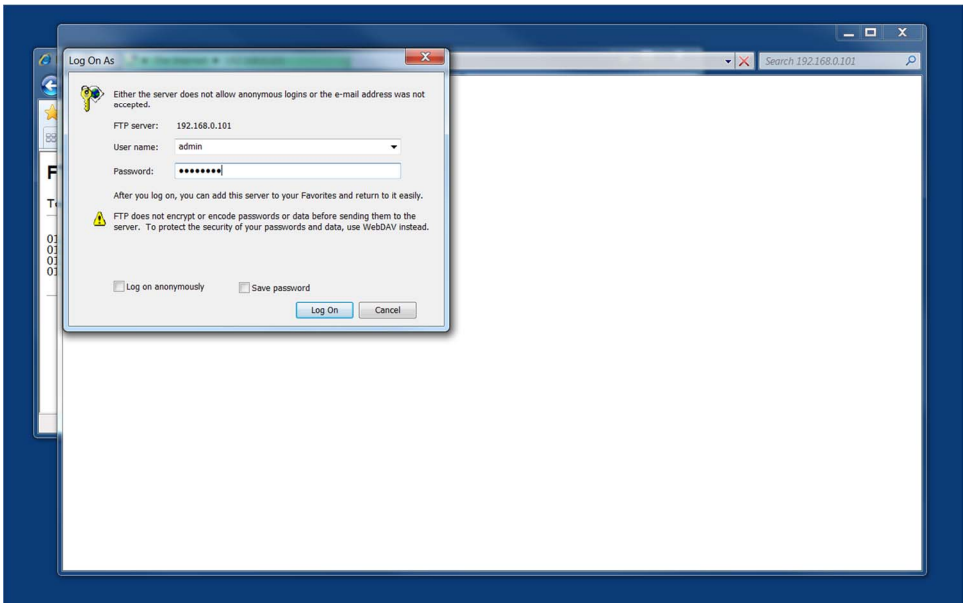
Enter ftp://[the adapter IP address]



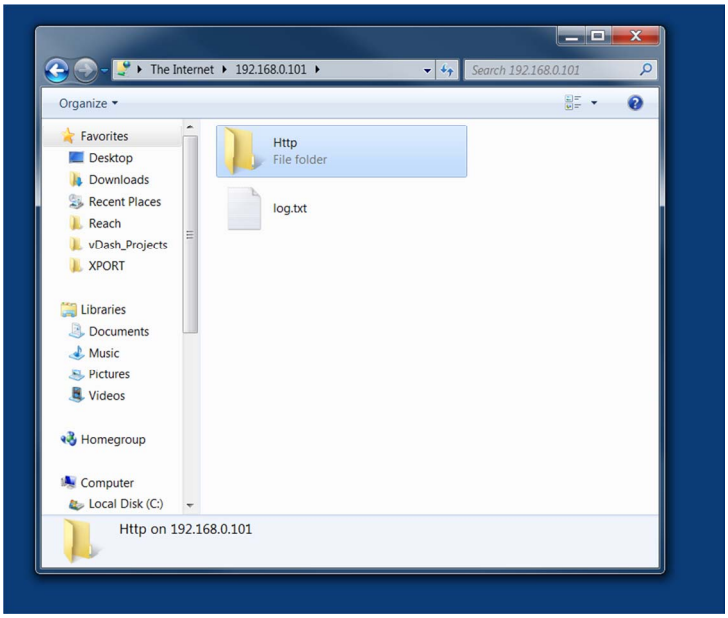
Under PAGE – Open in Windows Explorer



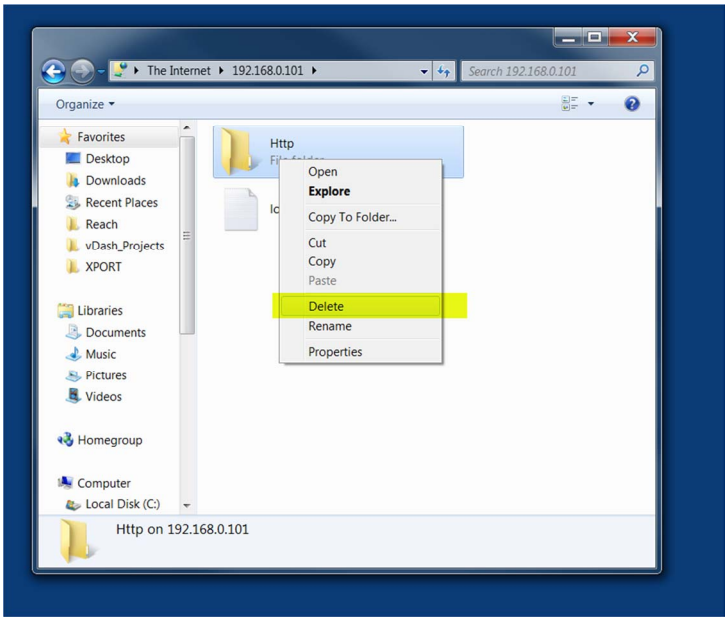
Allow the Site to be Open in Explorer



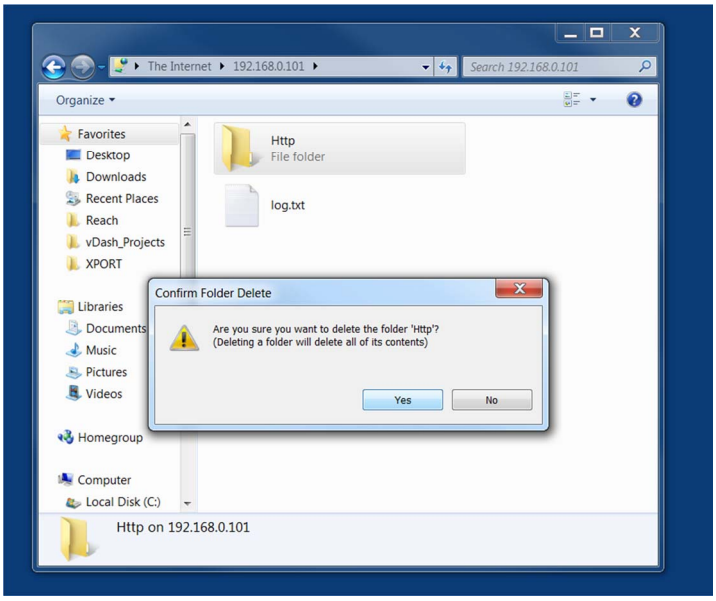
Enter username “admin” and password “seasmart”



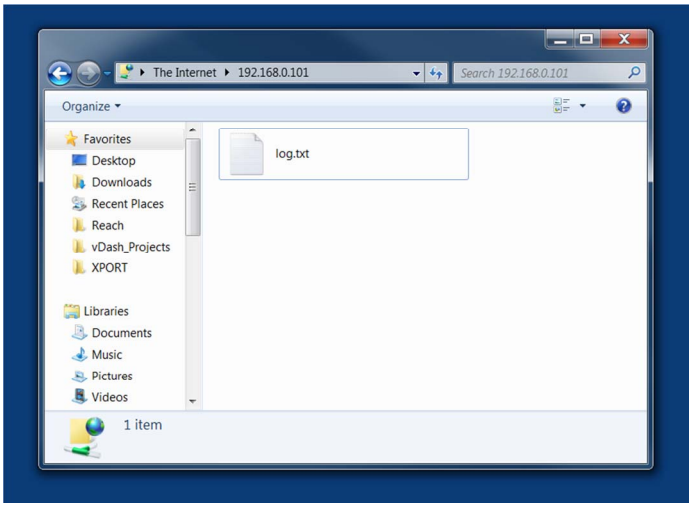
The Http directory contains all of the Web Content



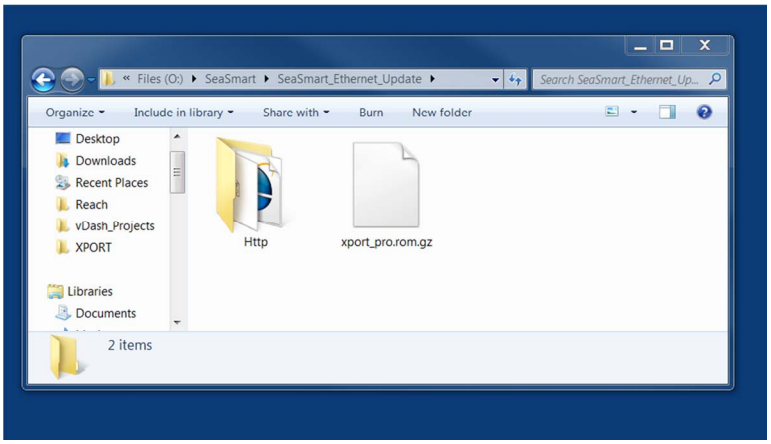
To Delete the existing Directory – Right Click and choose Delete



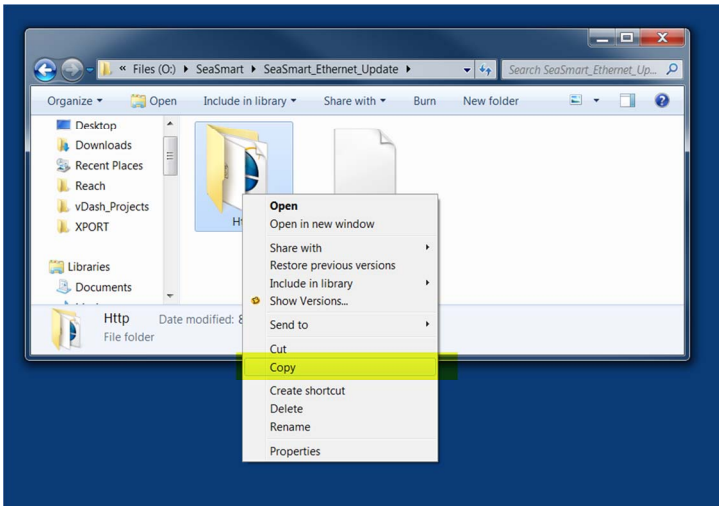
Confirm the Delete Http Directory



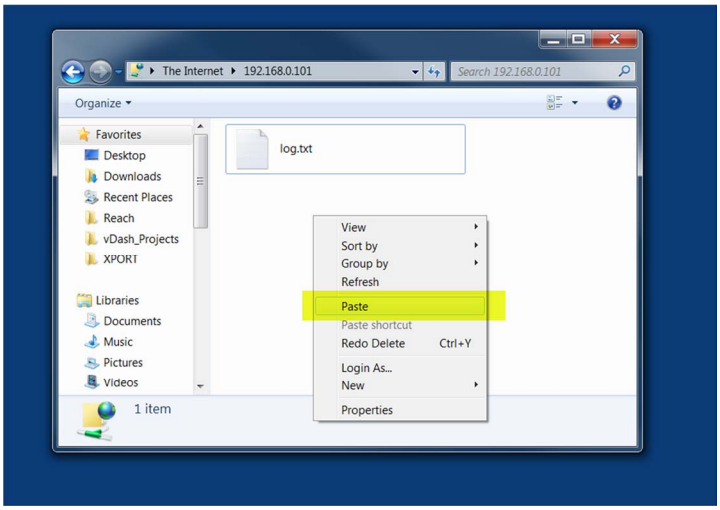
Directory is removed from adapter.



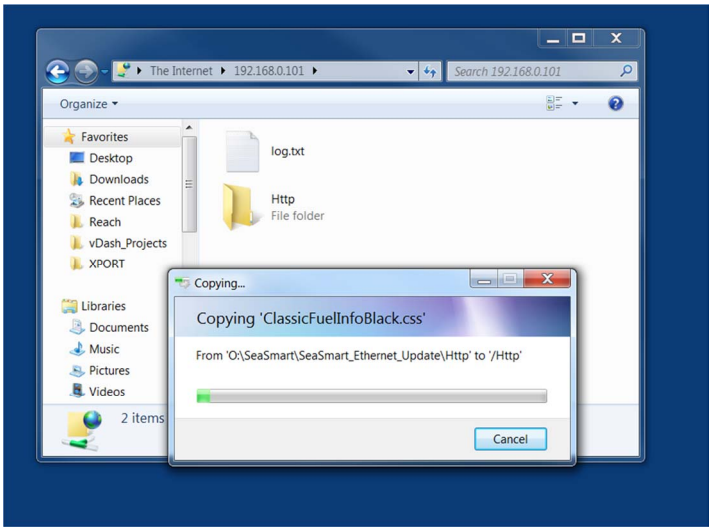
Prepare to copy new Http directory from SeaSmart update folder



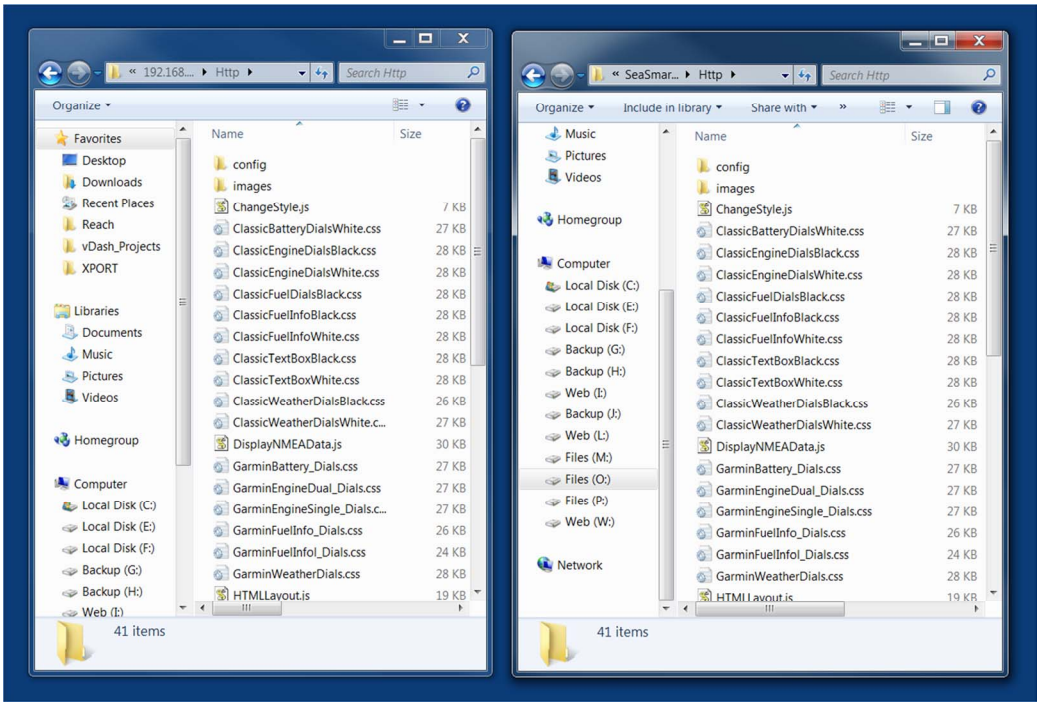
Right Click and select COPY from update folder



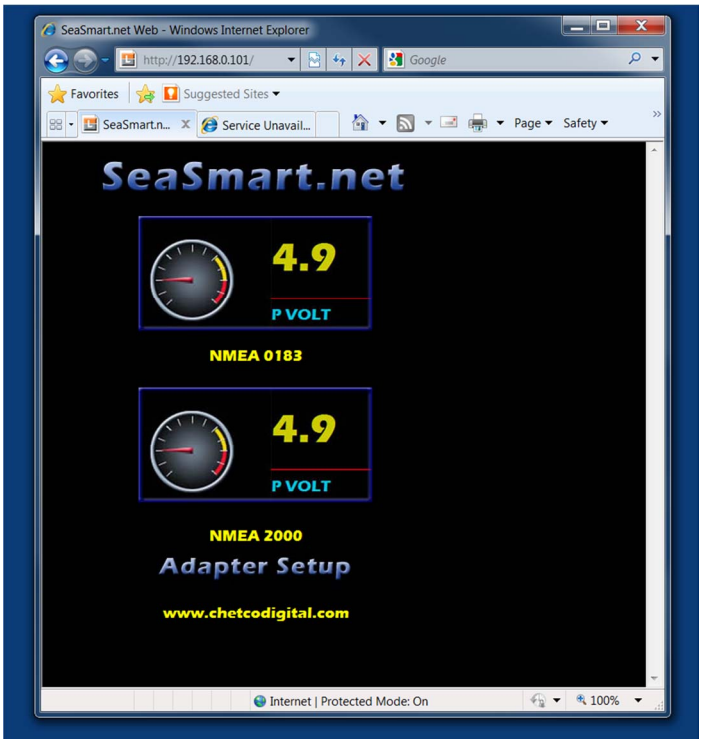
In FTP directory – Right Click and select PASTE



File Copy Status



After Copy is complete – verify all files were transferred by viewing contents of directories and checking number of files in each sub directory with source. Occasionally, some files may not be copied due to Flash Compaction timeout. If this occurs, repeat the upload process and confirm file overwrite.

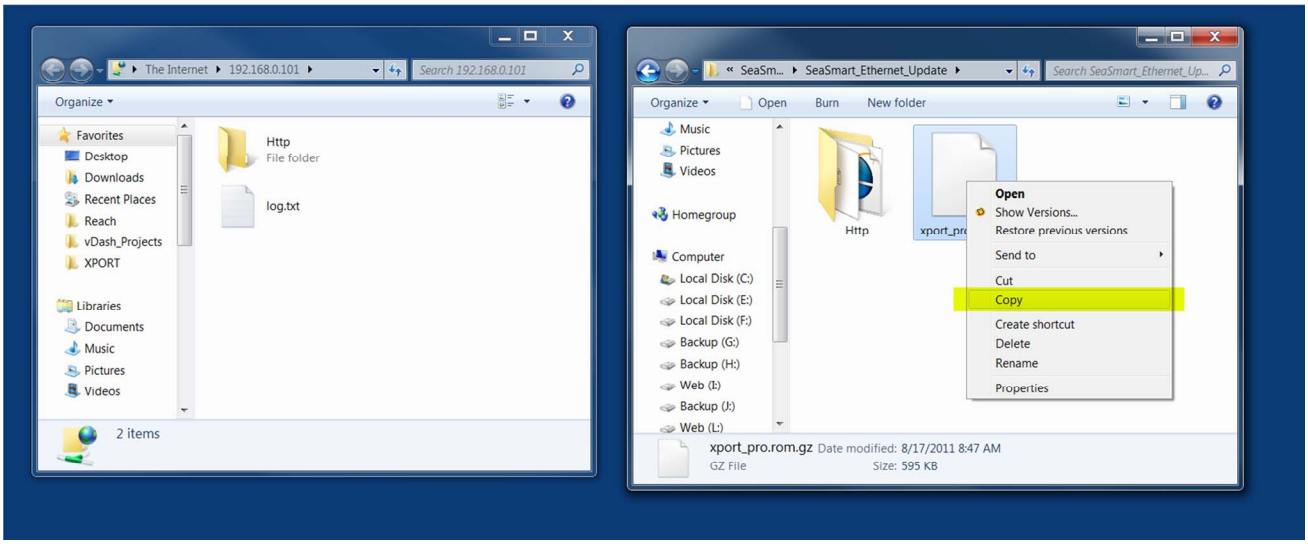


Restart Browser and Refresh to verify new site content is restored.

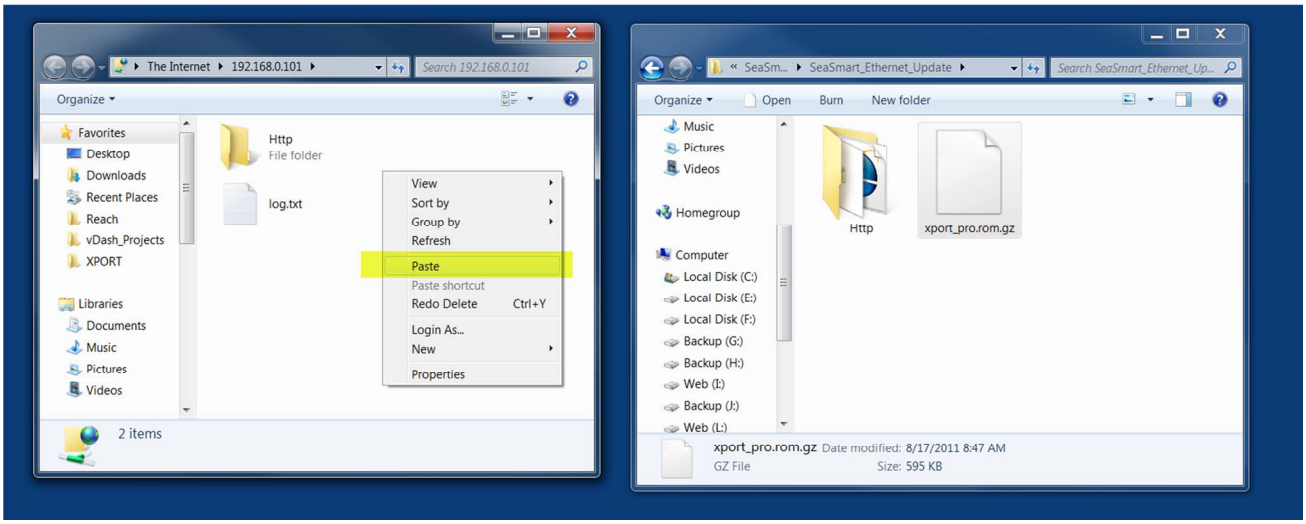
FTP Firmware Update

The SeaSmart Firmware can be updated via FTP transfer. The firmware file is copied to the root directory and the device rebooted. Upon reboot, the new firmware will be load into operational Flash memory and uploaded file deleted.

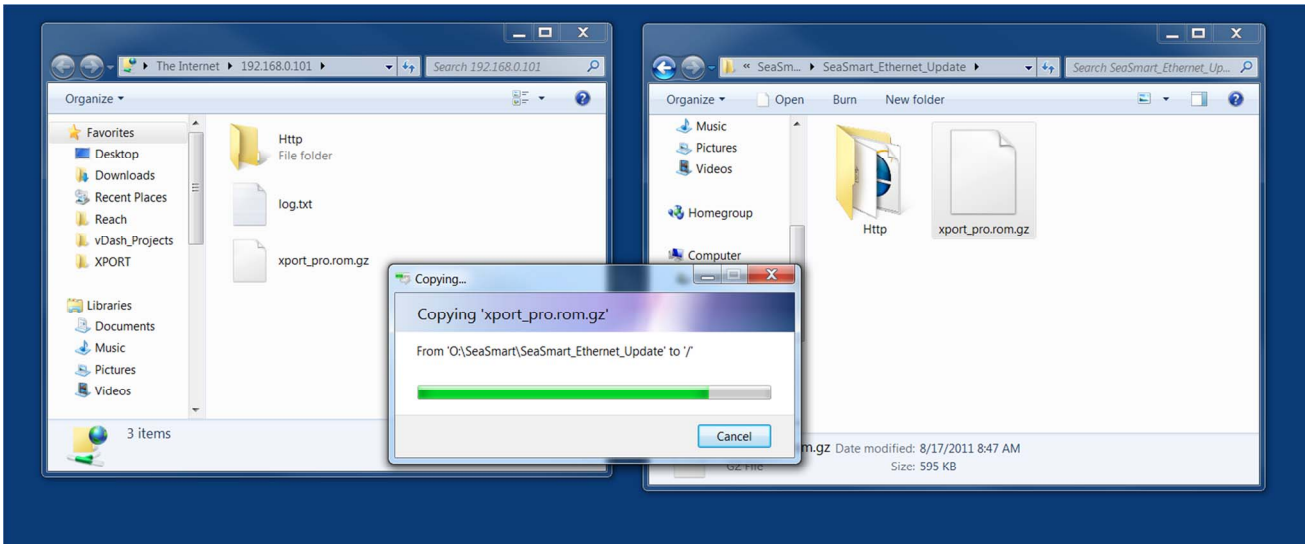
The Firmware update should be performed after new Web Content is uploaded.



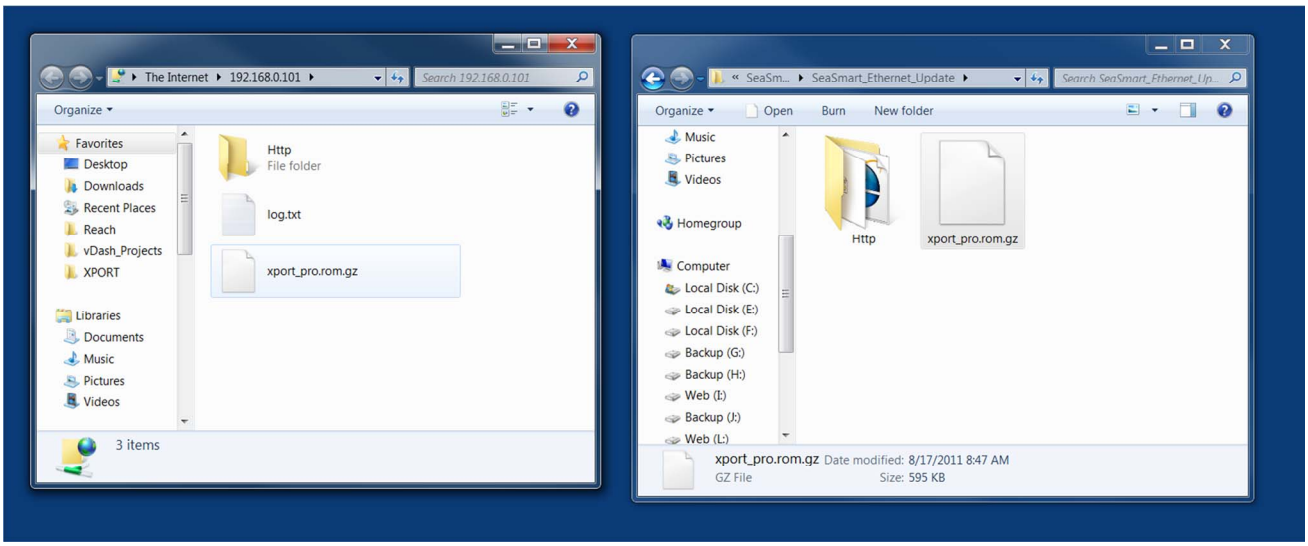
Right Click the correct Firmware file from the SeaSmart Update Folder and select COPY



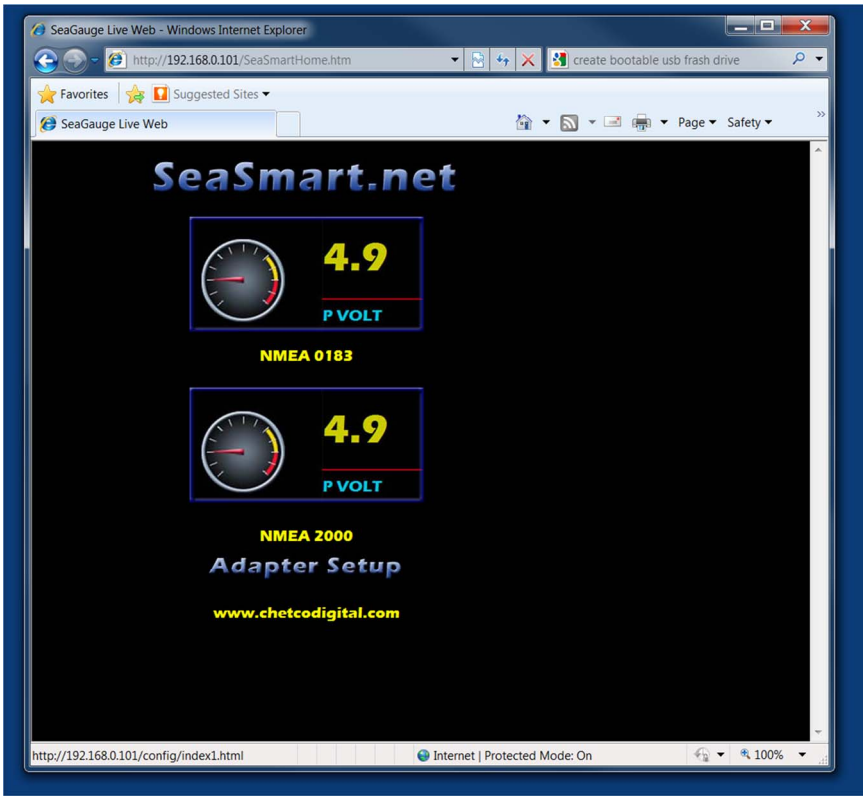
Right Click the FTP root directory and select Paste to transfer file



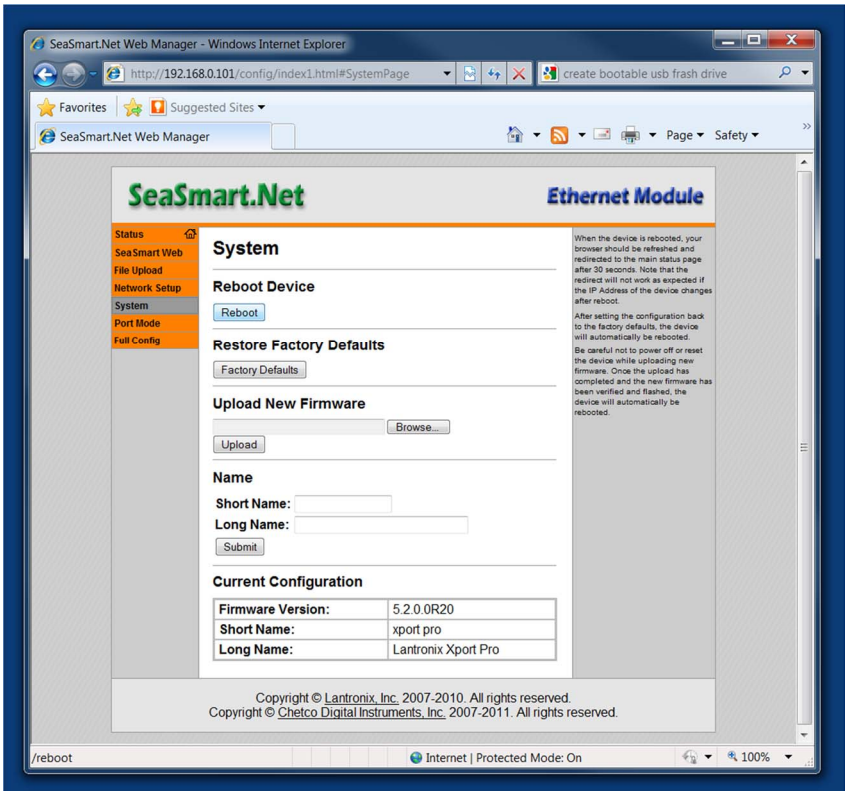
The file will be uploaded to the SeaSmart adapter root directory



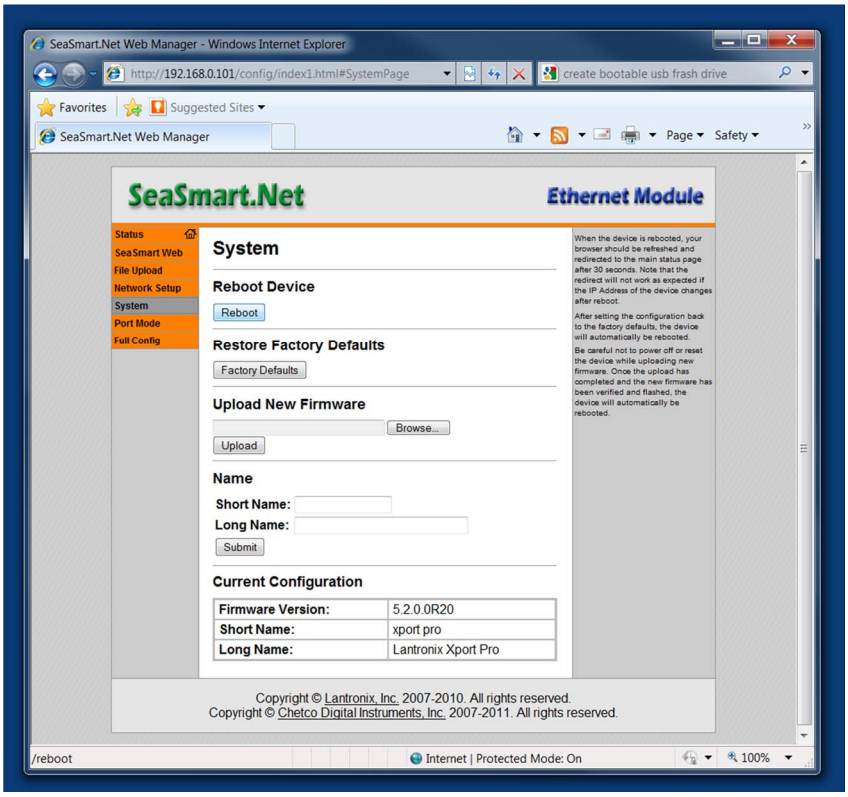
The new firmware will not be loaded until the device is rebooted or power cycled



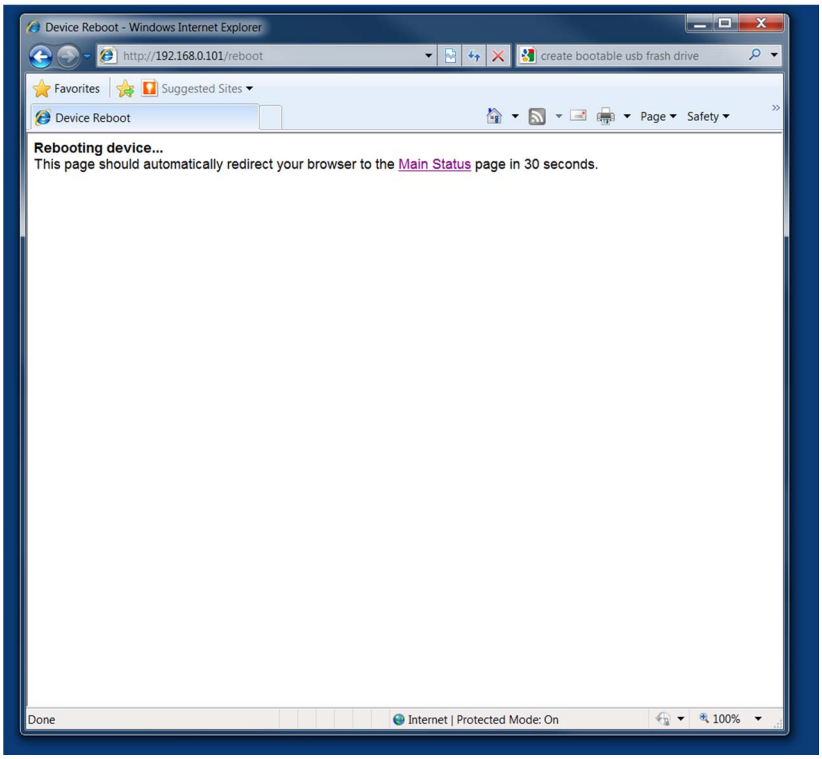
To reboot – go to the main SeaSmart Web page and select "Adapter Setup"



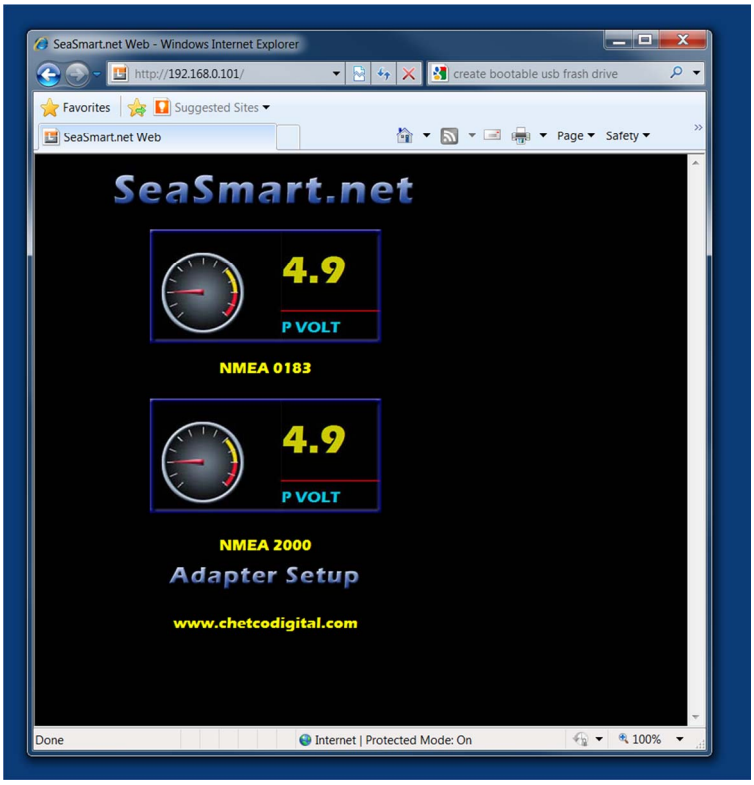
Then select SYSTEM



Select REBOOT



While restarting the new Firmware file will be copied to operational FLASH memory and the old file deleted



After Reboot – the main SeaSmart Web Page should appear.

XML Config

SeaSmart.net adapters can be configured by loading XML files. XML files contain records to set various parameters. XML files can configure all or just some of the SeaSmart.net adapter settings.

The device server DTD states the following:

- The XML document element is a <configrecord> element. This is the root element.
- A <configrecord> must have one or more <configgroup> elements and can have a
- version attribute.
- A <configgroup> must have one or more <configitem> elements and can have name
- and instance attributes.
- A <configitem> element must have one or more <value> elements and can have a
- name attribute.
- A <value> element can have only data and can have a name attribute.

NOTES: THE NAME FOR EACH <CONFIGGROUP> (SPECIFIED WITH THE NAME ATTRIBUTE) IS THE GROUP NAME LISTED IN THE WEB MANAGER XCR GROUPS. AN EMPTY OR MISSING <VALUE> ELEMENT IN EACH PRESENT <CONFIGGROUP> CLEARS THE SETTING TO ITS DEFAULT.

Attributes

- Use the "name" attribute to identify a group, item, or value. It is always a quoted string.
- Use the "instance" attribute to identify the specific option, like the serial port number. the "instance" attribute is always a quoted string.

Quick Syntax Tour for XCRs

Simple XML Group Example

```
<?xml version="1.0" standalone="yes"?>
<configrecord>
<configgroup name = "serial command mode" instance = "1">
<configitem name = "mode serial string">
<value>disable</value>
</configitem>
</configgroup>
</configrecord>
```

The first line:

<?xml version="1.0" standalone="yes"?>

is the "XML declaration." It is required and indicates the XML version in use (normally version 1.0). The remainder of the file consists of nested "elements," some of which have "attributes" and "content."

- An element typically consists of two tags, a “start tag” and an “end tag,” possibly surrounding text and other elements.
- The start tag consists of a name surrounded by angle brackets, like <configrecord>.
- The end tag consists of the same name surrounded by angle brackets, but with a forward slash preceding the name, like </configrecord>.
- The element content is everything that appears between the start tag and end tag, including text and other (child) elements.

In addition to content, an element can contain attributes—name-value pairs included in the start tag after the element name.

- Attribute values must always be quoted, using single or double quotes.
- Each attribute name should appear only once in an element.

SeaSmart.net uses the following attributes to label the group configuration settings.

Record, Group, Item, and Value Tags

A <configgroup> is a logical grouping of configuration parameters and must contain one or more <configitem> elements. It must have a name attribute and may have an instance attribute.

A <configitem> is a specific grouping of configuration parameters relevant to its parent group. An item takes the name attribute and must contain one or more value elements. For example, the line group might have parameters such as baud rate, data bits, and parity.

A value may specify the value of a configuration parameter. It may take the name attribute. In our example, a value of 9600 might be specified for baud rate; 7 may be specified for data bits, and even may be specified for parity.

- _ A name attribute identifies the group, item, or value. It is always quoted (as are all XML attributes). For example, a group that contains serial port parameters has the name “line”.
- _ An instance attribute identifies which of several instances is being addressed. It is always quoted. For example, the serial port name has the instance “1” to indicate serial port 1 or “2” to specify serial port 2.

The following figures show examples of XML configuration records and the use of the

<configrecord>, <configgroup>, <configitem>, and <value> XML elements.

Figure 4-3. XML Group Example

```
<?xml version=”1.0” standalone=”yes”?>
<configrecord>
<configgroup name = “serial command mode” instance = “1”>
<configitem name = “mode”>
<value>disable</value>
</configitem>
</configgroup>
</configrecord>
```

Figure 4-4. XML Example with Multiple Named Values

```
<?xml version=”1.0” standalone=”yes”?>
<configgroup name = "ssh server">
<configitem name = "host rsa keys">
<value name = "public key"></value>
<value name = "private key"></value>
</configitem>
</configgroup>
```

Figure 4-5. XML Example with Multiple Items

```
<?xml version=”1.0” standalone=”yes”?>
<configgroup name = "email" instance = "1">
<configitem name = "to">
<value>john.doe@somewhere.com</value>
</configitem>
<configitem name = "from">
<value>evolution@xportar.com</value>
</configitem>
</configgroup>
```

Figure 4-6. XML Example with Multiple Groups

```
<?xml version=”1.0” standalone=”yes”?>
<configgroup name = "ftp server">
<configitem name = "state">
<value>enable</value>
</configitem>
<configitem name = "admin username">
<value>admin</value>
</configitem>
<configitem name = "admin password">
<value><!-- configured and ignored --></value>
</configitem>
</configgroup>
```

```
<configgroup name = "tftp server">
<configitem name = "state">
<value>enable</value>
</configitem>
<configitem name = "allow file creation">
<value>disable</value>
</configitem>
</configgroup>
```

Importing and Exporting an XML Configuration File

An XML configuration record can be imported or exported using the following methods:

- Filesystem - XCRs can be saved to the device server's file system and imported or accessed as needed. See the Best Practices section below or the *File System Browser Page* in the User Guide.

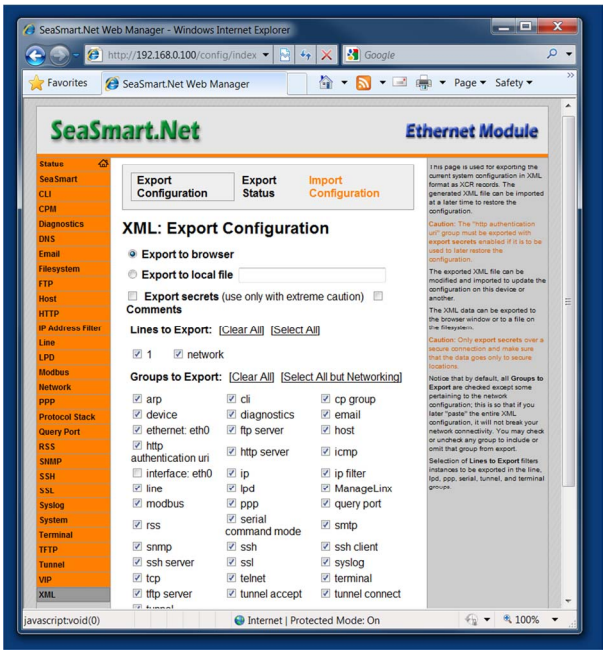
- CLI - an XML configuration record can be imported (captured) or exported (dumped) directly to a Telnet, SSH, or serial line CLI session. Capturing an XML configuration record can be started by pasting a valid XCR directly into the CLI prompt. Evolution OS will immediately process the configuration record, changing any settings specified in the XCR. This can be done on any level, including the root. Special tags in the XML allow for providing root and enable level passwords so that this can also be done at the password prompt.

- Web browser - the Web interface can be used to import and export an XCR to the device server's file system. It can also be used to import an XCR from an external source such as your local hard drive.

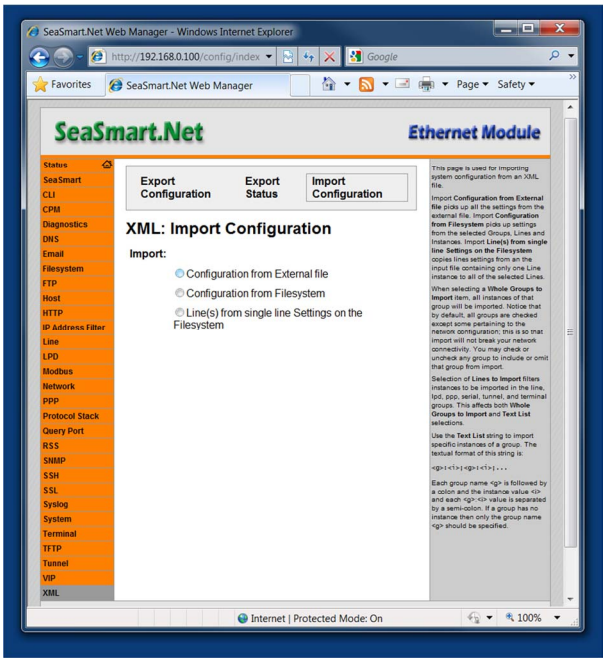
- FTP - The device server's FTP server will export and import XCRs when a get or a put on the file xport_pro.xcr is requested. On export (FTP get of xport_pro.xcr), the FTP server obtains the current XCR from Evolution OS™ and sends it as a file. On import (FTP put of xport_pro.xcr), the FTP server processes the file by sending it directly to the XML engine. In both cases the device server's filesystem is not accessed. The file xport_pro.xcr is not read from, or written to the file system. See the FTP Page in the User Guide.

NOTE: THE TRIVIAL FILE TRANSFER PROTOCOL (TFTP) IS NOT SUPPORTED FOR IMPORTING XML CONFIGURATION FILES BECAUSE IT DOES NOT PROVIDE ANY SECURITY FEATURES.

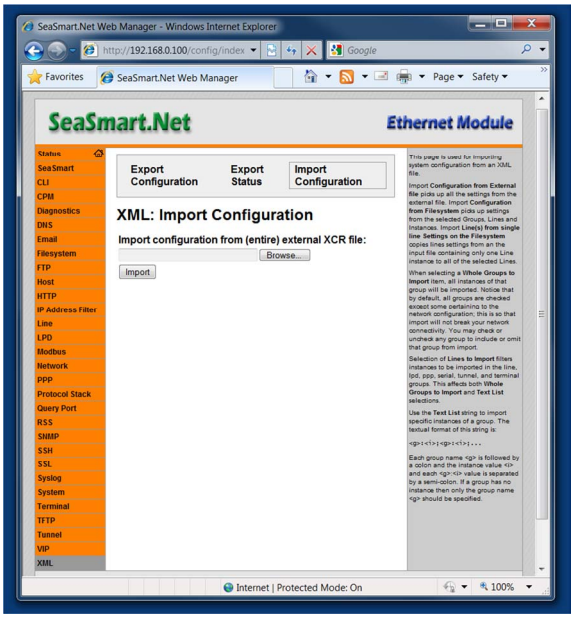
WEB INSTALL OF SEASMART.XML FILE



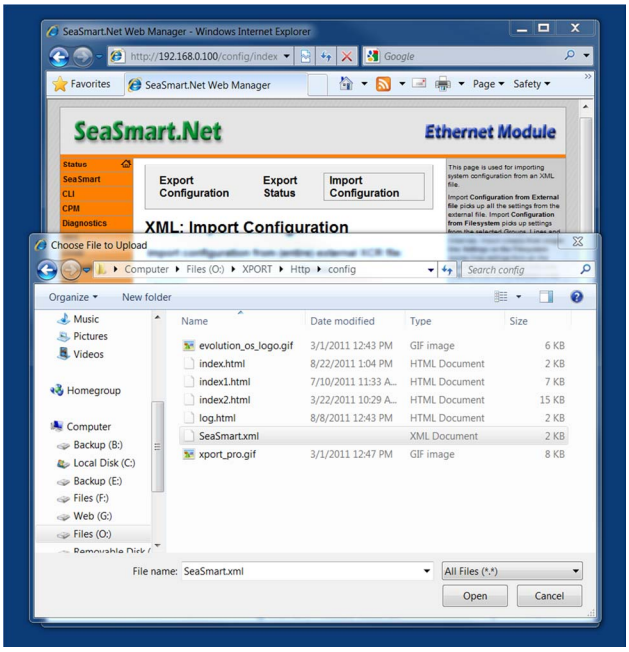
SELECT THE XML LINK FROM THE FULL CONFIG TAB



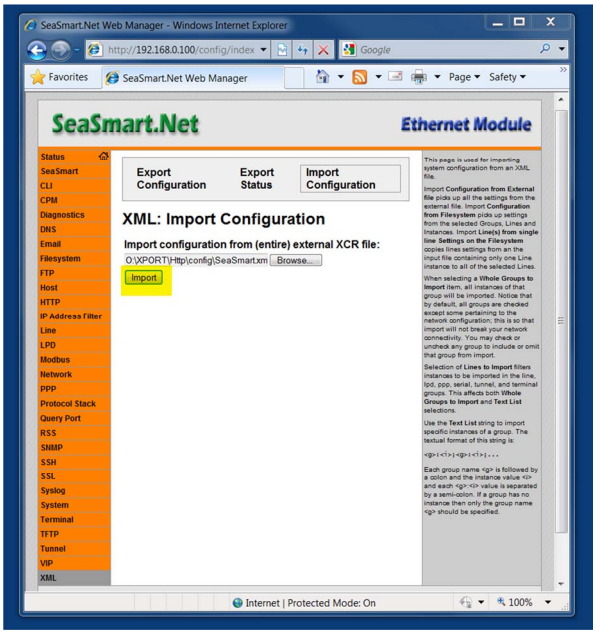
SELECT IMPORT CONFIGURATION



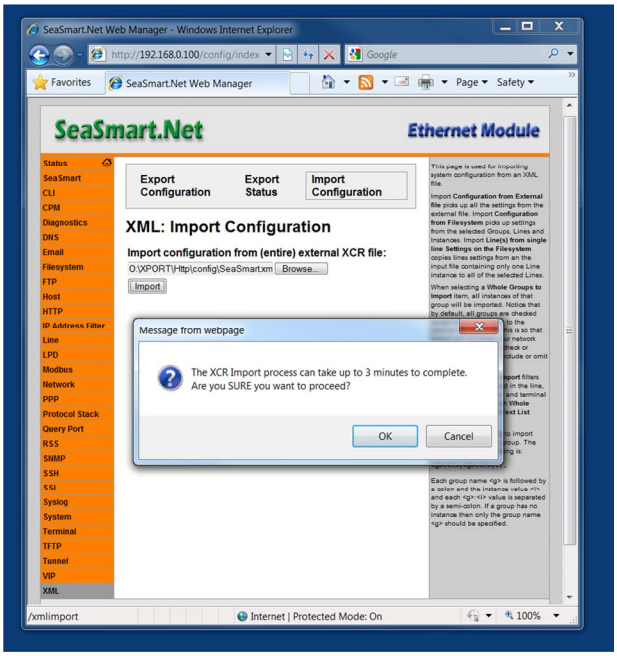
SELECT BROWSE TO CHOOSE THE FILE TO IMPORT



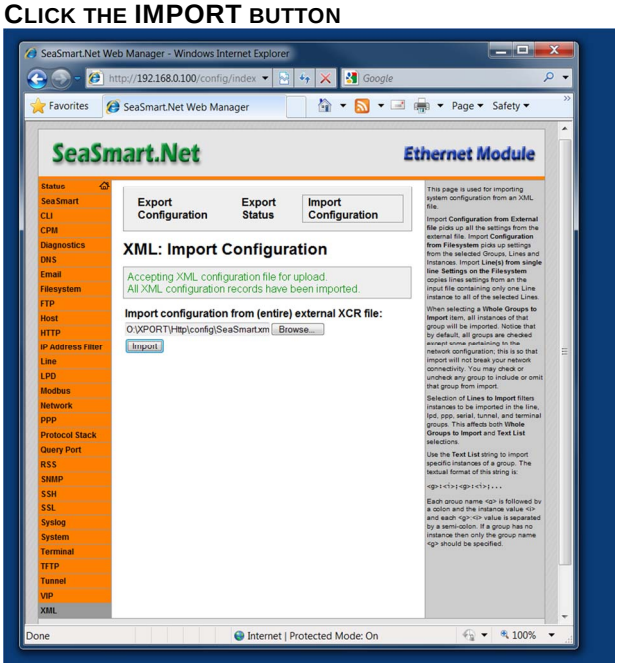
PICK A SEASMART.XML FILE TO IMPORT



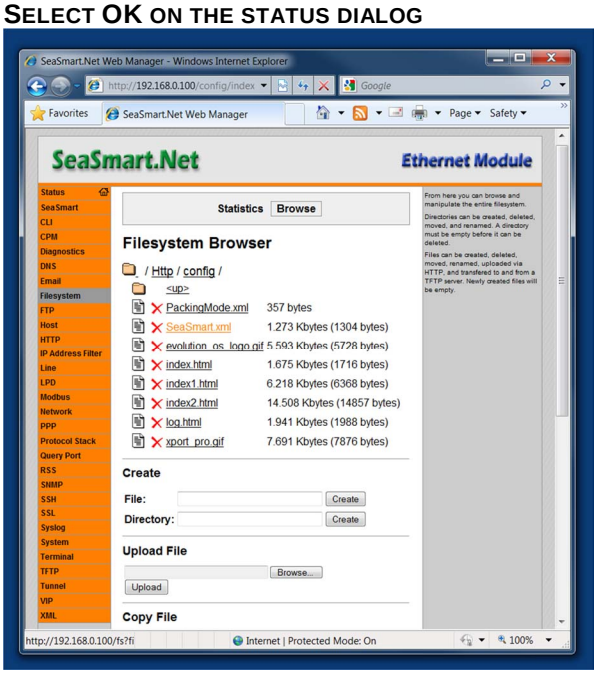
CLICK THE IMPORT BUTTON



SELECT OK ON THE STATUS DIALOG



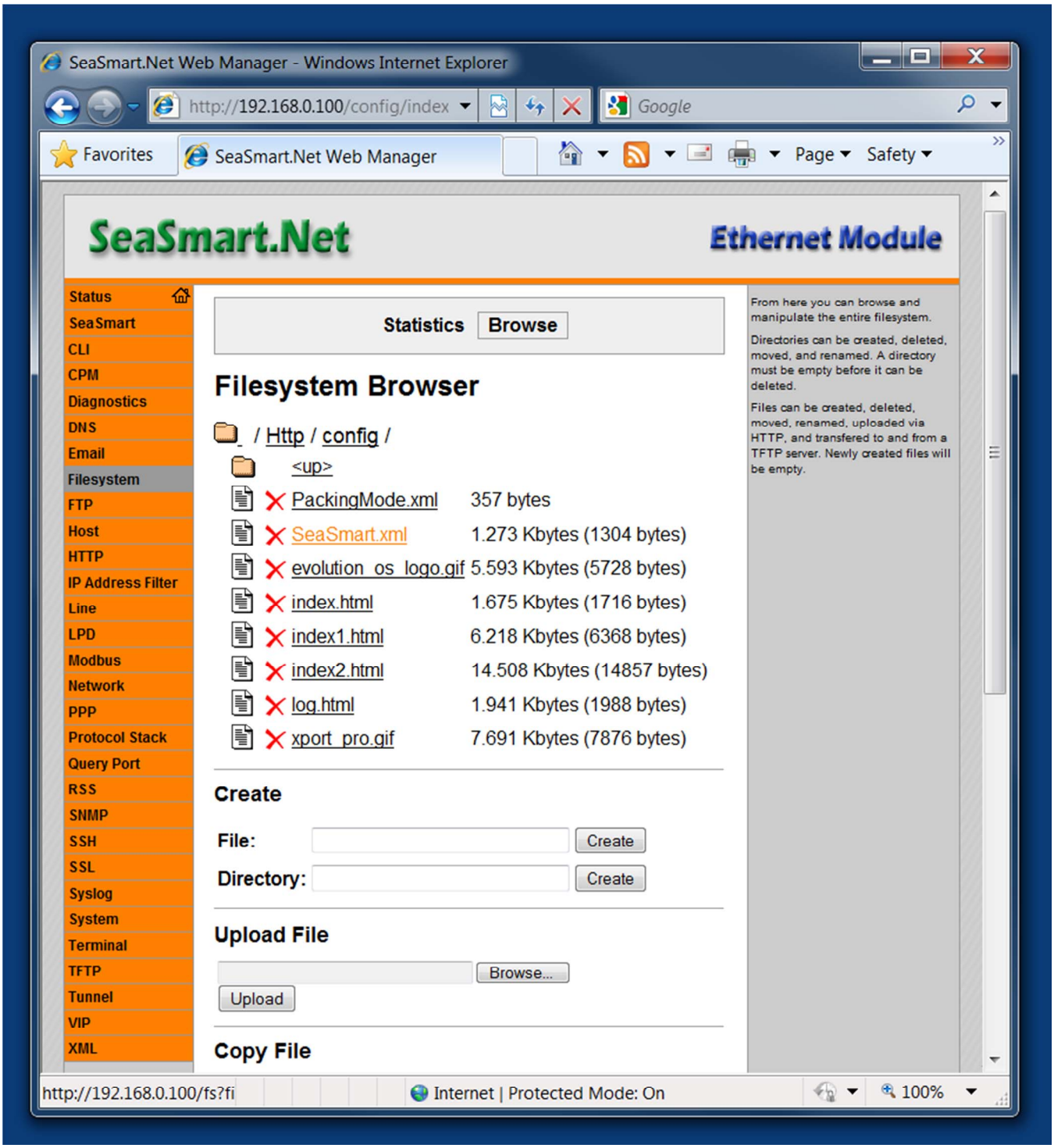
AFTER IMPORT, REBOOT (REPOWER) THE DEVICE TO APPLY CHANGES.



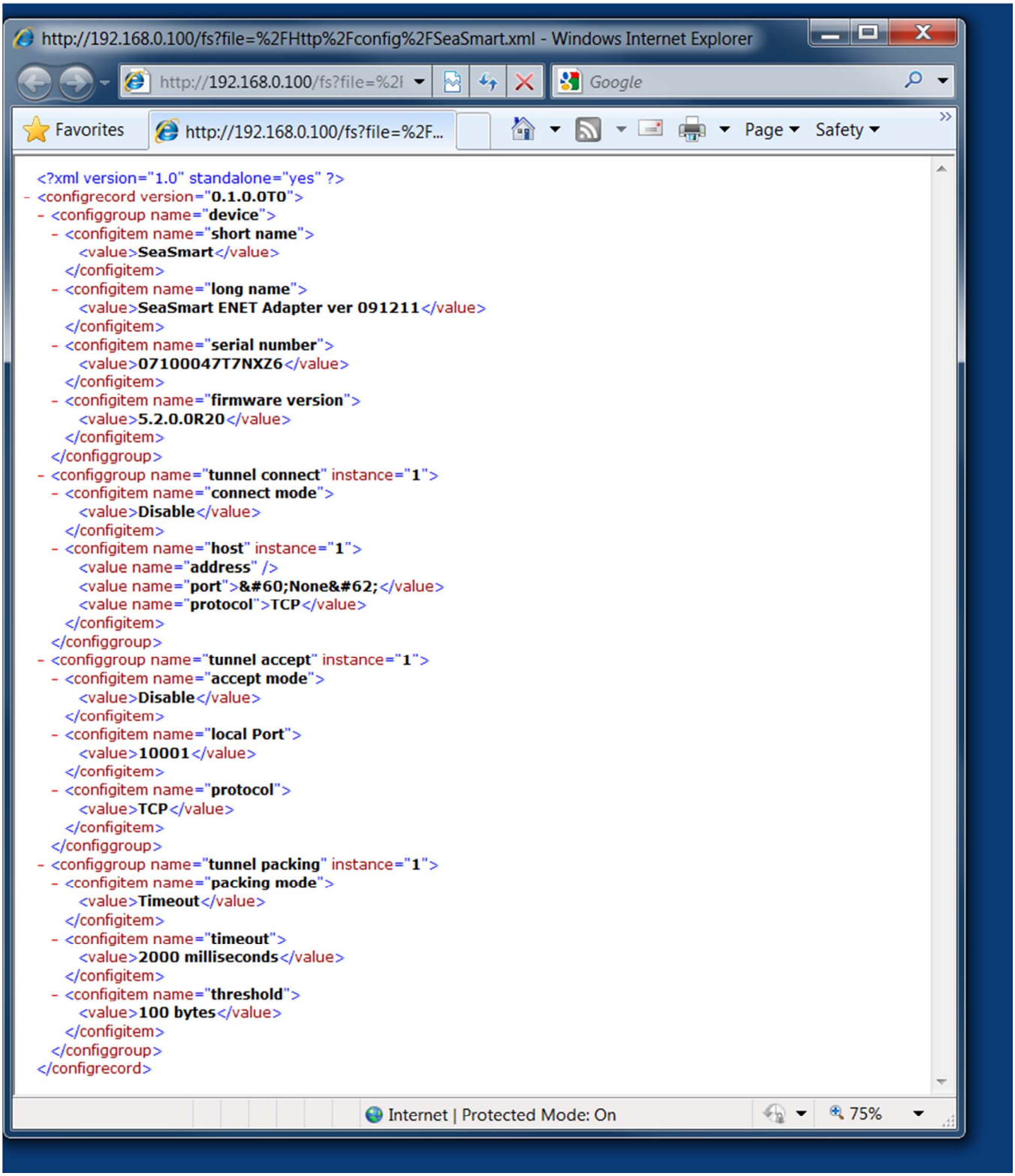
A NEW SEASMART.XML FILE WILL BE CREATED IN THE CONFIG DIRECTORY.

SeaSmart XML

The SeaSmart XML file is stored in the Config directory. The file is automatically generated from the current configuration upon each boot (repower) of the adapter.



The contents of the SeaSmart.xml file can be read to determine the current operational mode of the adapter. The SeaSmart.xml file can also be modified and reloaded to alter device settings.



The SeaSmart.xml contains ConfigGroups to define operational parameters

- **Device –** Device name and version information
- **Tunnel Connect –** describes which port and protocol to use when clients initiate connections to SeaSmart adapters
- **Tunnel Accept –** describes ports and protocols SeaSmart adapters will use to initiate connections to clients
- **Tunnel Packing –** describes how data is packed before being sent in response to HTTP client requests.

The **Device Config Group** contains both log and short device names. The Long name also contains the device and firmware revision number. The Serial number firmware version are unique to the device and cannot be altered.

The **Tunnel Connect Config Group** contains the following Config Items

- **Connect Mode –** This value is always set to DISABLE to allow the SeaSmart adapter to override the native protocol translator and utilize the $PCDIN protocol
- **Host –** Defines the IP address, Port Number and Protocol to use when initiating connections to remote clients. Normally used for HTTP Posting to remote Web Servers and UDP broadcasts. If the IPaddress is empty or Port number set to NONE – Host connections are disabled.

The **Tunnel Accept Config Group** contains the following Config Items

- **Accept Mode -** This value is always set to DISABLE to allow the SeaSmart adapter to override the native protocol translator and utilize the $PCDIN protocol.
- **Local Port –** the port number clients use to connect to SeaSmart adapters. Possible port numbers are:
    - **10001 –** Protocol Translation of RAW NMEA 2000 binary data to the $PCDIN protocol
    - **10002 –** Pass-through of the unprocessed RAW NMEA 2000 binary data
- **Protocol –** Defines TCP or UDP protocol.

The **Tunnel Packing Config Group** contains parameters to control how data is retrieved using HTTP Get Requests (GETNMEAData)

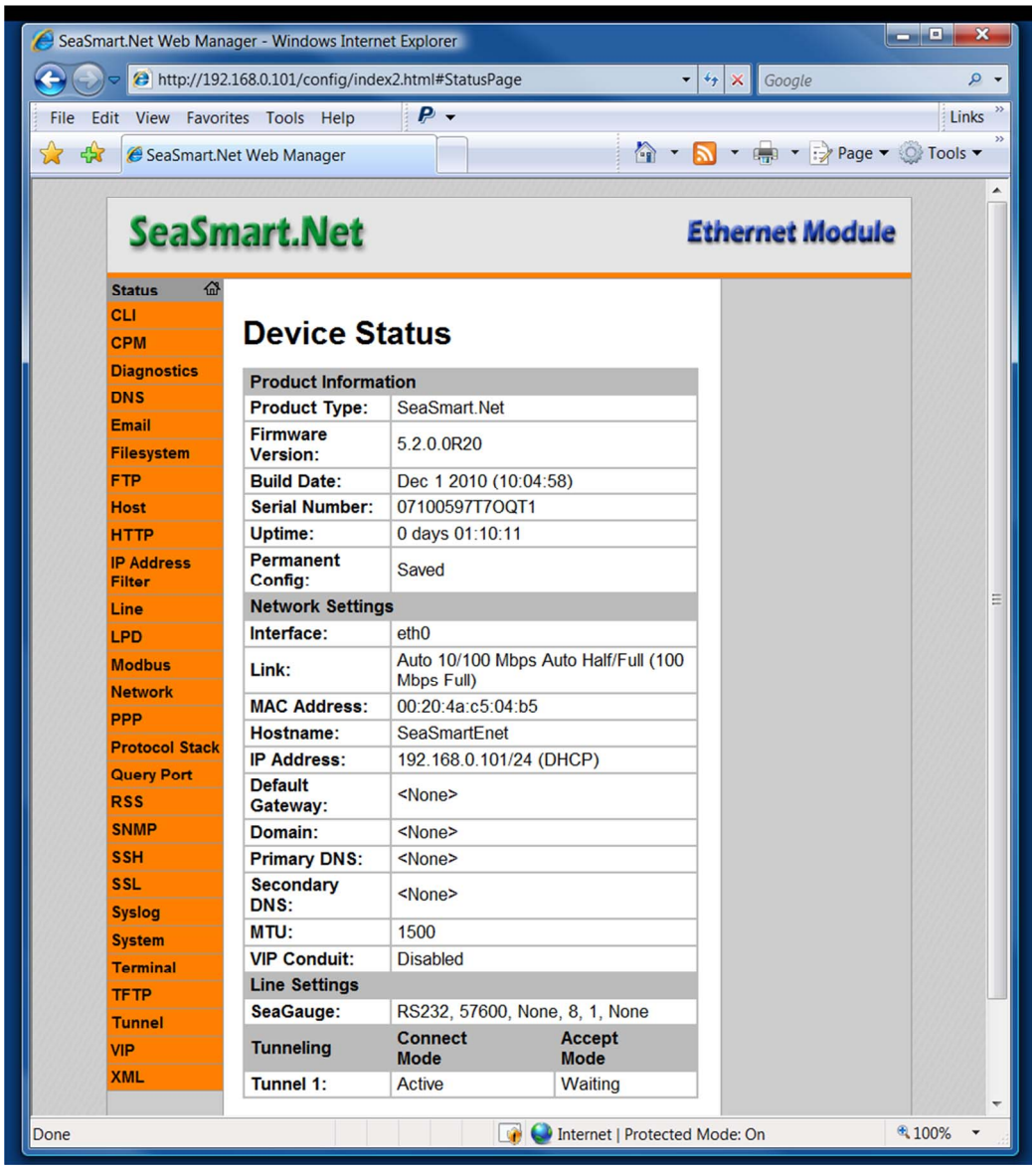
- **Packing Mode –** determines if data is packed before transmission in response to a HTTP GET or if the buffer is cleared after each request.
    - **Disabled –** All accumulated data since the last GET is passed on and the internal buffer cleared. If a GET request is not issued before the internal buffer is filled, data is FIFO and the oldest data discarded. The Internal FIFO buffer is 64K Bytes. If a GET request is made before the buffer fills, then all new data since the last request is returned and the buffer cleared.
    - **Timeout –** specifies to use a Timeout or Threshold value to determine how much data to return in response to a HTTP GET request. Data is returned and the internal buffer is not cleared until the Timeout or Threshold criteria are met. This is used to allow multiple HTTP clients to request the same data set.

- **Timeout –** Specifies the amount of data in terms of time (milliseconds) to return in response to a HTTP GET request. The Time Interval refers to the "Age" of the received NMEA data. Each record is tagged with a time stamp. Data is retained in the internal buffer until its "Age" exceed the interval and then it is discarded. This allows multiple HPPT clients to issue GET requests and all see "current data"
- **Threshold -** Specifies the amount of data in terms of Bytes (value * 10) to return in response to a HTTP GET request. Data is held in the internal buffer till it exceeds the Threshold value and then it is discarded. Each HTTP GET request returns the amount of data specified by the Threshold value times 10.

The Timeout and Threshold values work together in deciding how data is returned in response to a GET request. Both conditions are applied to the request. For Timeout to have priority, the threshold must be set to the minimum (100 = 1K bytes). Conversely, for Threshold to have priority, the Timeout must be set to the minimum (1 millisecond).

Full Config

Advanced configuration options can be accessed from the Full Config Web Page



Please consult the XPORT_PRO_USERS_GUIDE for further information on advanced settings.

Connections

Power – Supply Power to adapter Conxall 2-pin

	1 (dot)	12 Volts DC (Red) (11.5 V min to 14.5 V max) 200 mA max
	2	System Ground (Black)

NMEA 2000 – Conxall (4-pin) to Mico-C drop cable

	1 (dot)	Blue N-
	2	Red +12V (25 mA max)
	3	Black Ground
	4	White N+

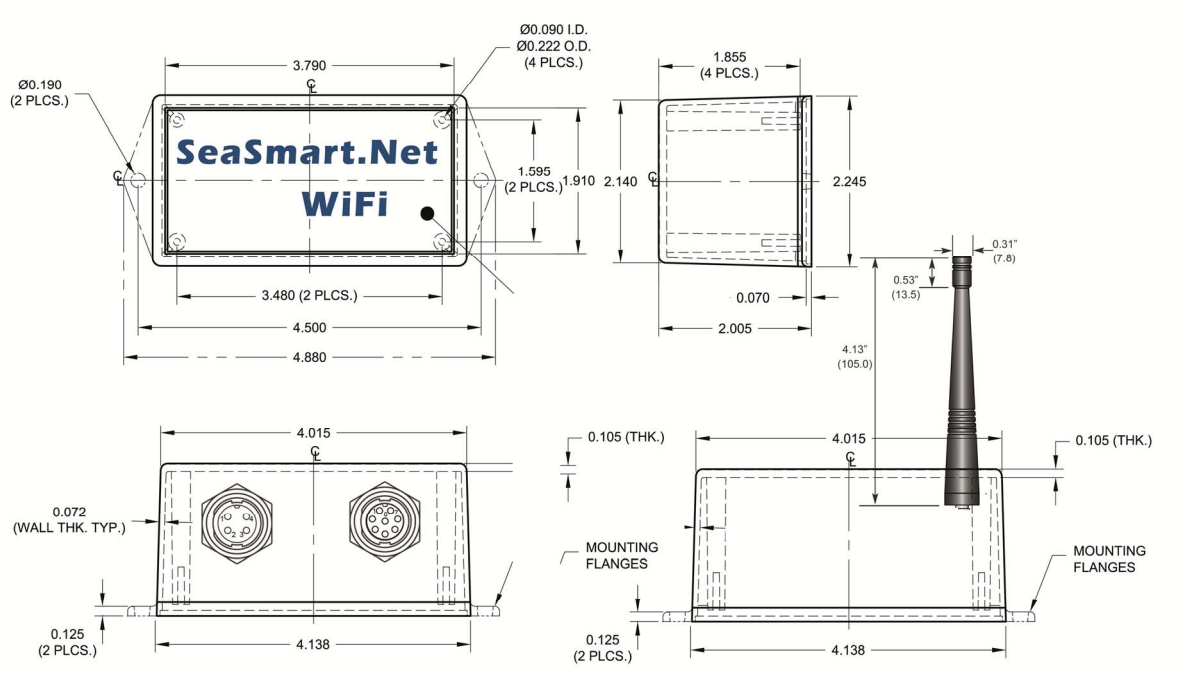
Serial/USB – Conxall 8-pin to USB or Conxall 8-Pin to Conxall 8-pin Serial (RS232)

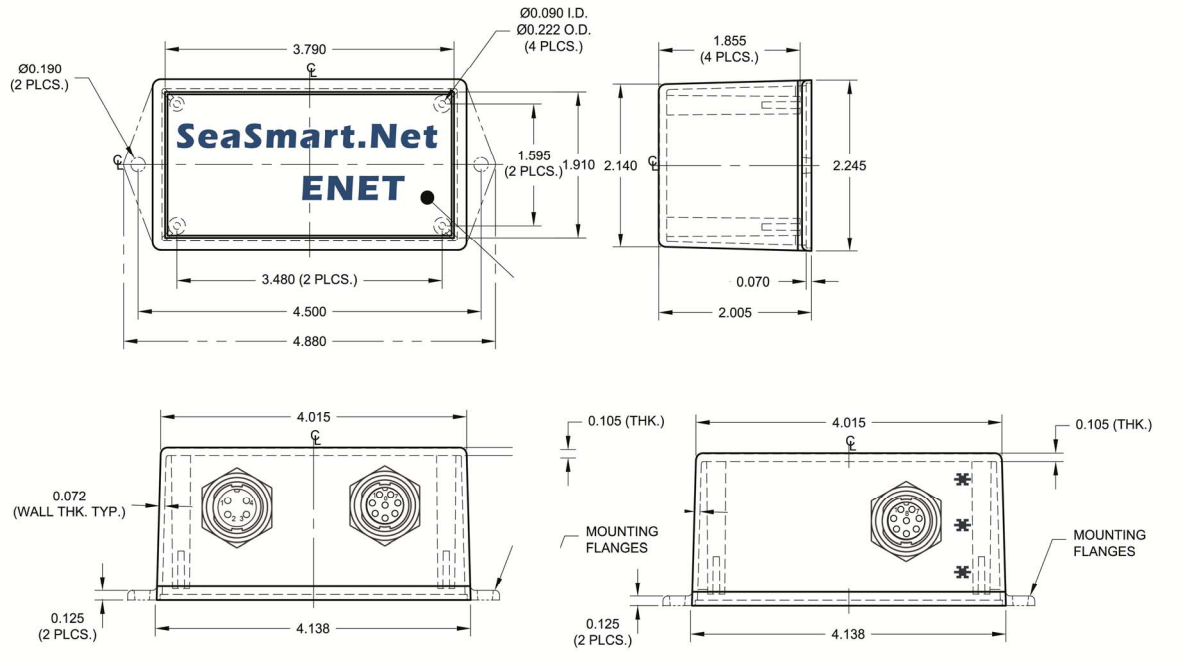
	1 (dot)	No Connect
	2	TX RS232
	3	USB -
	4	+ 5 V (input from USB only) 150 mA max
	5	USB +
	6	RX RS232
	7	No Connect
	8	Ground

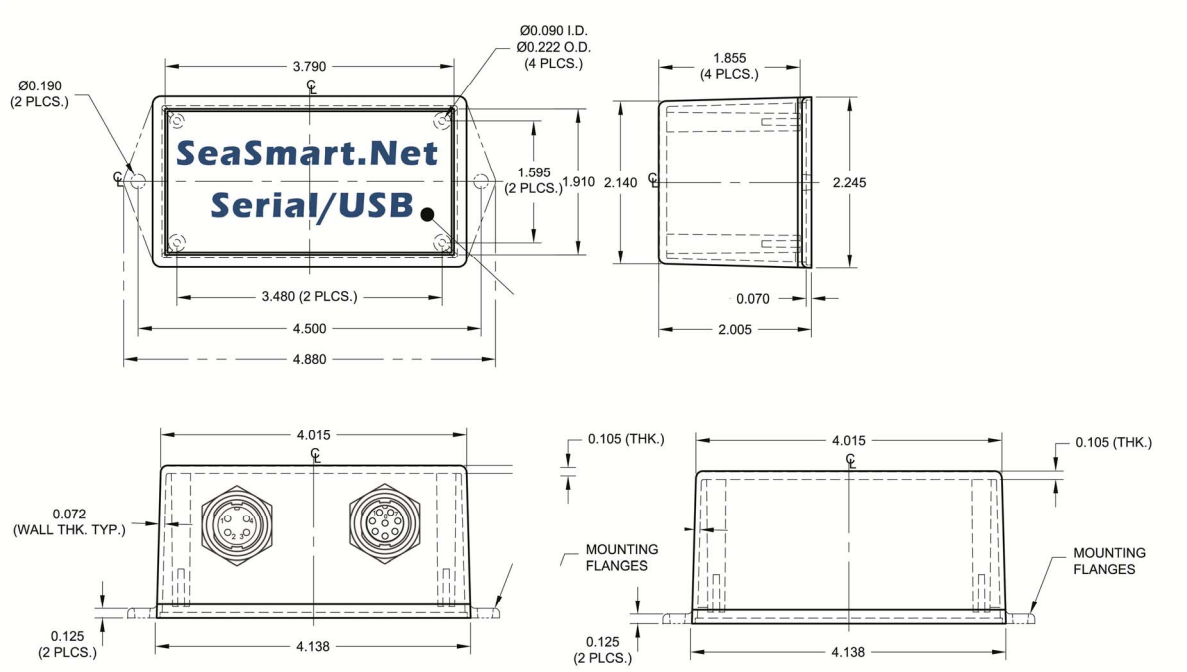
Ethernet – Conxall 8-pin to (keyed) to RJ45

	1 (dot)	No Connect
	2	TX + (Green/white)
	3	TX- (Green)
	4	Key Pin
	5	RX- (Orange)
	6	RX+(Orange)
	7	No Connect
	8	Key Pin

Dimensions


Ø0.090 I.D.
Ø0.222 O.D.
(4 PLCS.)
Ø0.190
(2 PLCS.)
3.790
SeaSmart.Net
WiFi
1.595
(2 PLCS.)
1.910
3.480 (2 PLCS.)
4.500
4.880
1.855
(4 PLCS.)
2.140
2.245
0.070
2.005
0.31"
(7.8)
0.53"
(13.5)
4.13"
(105.0)
4.015
0.072
(WALL THK. TYP.)
0.125
(2 PLCS.)
4.138
0.105 (THK.)
MOUNTING
FLANGES


Ø0.090 I.D.
Ø0.222 O.D.
(4 PLCS.)
Ø0.190
(2 PLCS.)
3.790
SeaSmart.Net
ENET
1.595
(2 PLCS.)
1.910
3.480 (2 PLCS.)
4.500
4.880
1.855
(4 PLCS.)
2.140
2.245
0.070
2.005
4.015
0.072
(WALL THK. TYP.)
0.125
(2 PLCS.)
4.138
0.105 (THK.)
MOUNTING
FLANGES


Ø0.090 I.D.
Ø0.222 O.D.
(4 PLCS.)
3.790
Ø0.190
(2 PLCS.)
SeaSmart.Net
Serial/USB
1.595
(2 PLCS.)
1.910
3.480 (2 PLCS.)
4.500
4.880
1.855
(4 PLCS.)
2.140
2.245
0.070
2.005
4.015
0.072
(WALL THK. TYP.)
0.125
(2 PLCS.)
4.138
0.105 (THK.)
4.015
0.105 (THK.)
MOUNTING
FLANGES
MOUNTING
FLANGES
0.125
(2 PLCS.)
4.138

One Year Warranty

"We", "our", or "us" refers to Chetco Digital Instruments, the manufacturer of this product. "You" or "your" refers to the first person who purchases this product as a consumer item for personal, family, or household use.

We warrant this product against defects or malfunctions in materials and workmanship, and against failure to conform to this product's written specifications, all for one year (1) from the date of original purchase by you. WE MAKE NO OTHER EXPRESS WARRANTYOR REPRESENTATION OF ANY KIND WHATSOEVER CONCERNING THIS PRODUCT. Your remedies under this warranty will be available so long as you can show in a reasonable manner that any defect or malfunction in materials or workmanship, or any nonconformity with the product's written specifications, occurred within one year from the date of your original purchase, which must be substantiated by a dated sales receipt or sales slip. Any such defect, malfunction, or non-conformity which occurs within one year from your original purchase date will either be repaired without charge or be replaced with a new product identical or reasonably equivalent to this product, at our option, within a reasonable time after our receipt of the product. If such defect, malfunction, or non-conformity remains after a reasonable number of attempts to repair by us, you may elect to obtain without charge a replacement of the product or a refund for the product. THIS REPAIR, REPLACEMENT, OR REFUND (AS JUST DESCRIBED) IS THE EXCLUSIVE REMEDY AVAILABLE TO YOU AGAINST US FOR ANY DEFECT, MALFUNCTION, OR NON-CONFORMITY CONCERNING THE PRODUCT OR FOR ANY LOSS OR DAMAGE RESULTING FROM ANY OTHER CAUSE WHATSOEVER. WE WILL NOT UNDER ANY CIRCUMSTANCES BE LIABLE TO ANYONE FOR ANY SPECIAL, CONSEQUENTIAL, INCIDENTAL, OR OTHER INDIRECT DAMAGE OF ANY KIND.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

This warranty does NOT apply in the following circumstances: (1) when the product has been serviced or repaired by anyone other than us, (2) when the product has been connected, installed, combined, altered, adjusted, or handled in a manner other than according to the instructions furnished with the product, (3) when any serial number has been effaced, altered, or removed, or (4) when any defect, problem, loss, or damage has resulted from any accident, misuse, negligence, or carelessness, or from any failure to provide reasonable and necessary maintenance in accordance with the instructions of the owner's manual for the product.

We reserve the right to make changes or improvements in our products from time to time without incurring the obligation to install such improvements or changes on equipment or items previously manufactured.

This warranty gives you specific legal rights and you may also have other rights which may vary from state to state.

REMINDER: You must retain the sales slip or sales receipt proving the date of your original purchase in case warranty service is ever required.

Chetco Digital Instruments, INC.
14377 Highway 101 South Unit C
Harbor, OREGON 97415
541-661-2051

SeaSmart.Net SOFTWARE LICENSE AGREEMENT

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5. Prices and programs are subject to change without notice.

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We back your investment in quality products with quick, expert service and genuine replacement parts. If you're in the United States and you have questions, please contact the Factory Customer Service Department using our number listed below. You must send the unit to the factory for warranty service or repair. Please call the factory before sending the unit. You will be asked for your unit's serial number (shown above). Use the following number:

541-469-4783

U.S.A.only. Monday through Friday, except holidays.

Your unit is covered by a full one-year warranty. (See inside for complete warranty details.) If your unit fails and the failure is not covered by the original warranty, Chetco Digital Instruments has a flat-rate repair policy that covers your unit and accessories packed with the unit at the factory. There is a 180-day warranty on all non-warranty repairs from the factory, which is similar to the original warranty, but is for 180 days rather than one year. For further details, please call us at the above number.

Remember, non-warranty repairs are subject to Chetco Digital Instruments published flat rate charges and 180-day warranty.

CHETCO DIGITAL INSTRUMENTS, INC

BOX 5359

Brookings, OR 97415

541-469-4783

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