Encoded Solutions, LLC
NMEA-to-WIFI Multiplexer

Users Guide

Table of Contents

Copyright 2019 Encoded Solutions, LLC

Multiplexer Version 2.1.5

October 29, 2019

Installing the Multiplexer

Wiring

The NMEA0183 standard is a serial protocol that is essentially the same as the RS422 standard, which is a differential signal carried on two wires.   The Encoded Solutions NMEA-to-WIFI multiplexer uses the two-wire differential signal RS422 standard and is fully compatible with NMEA0183.

The multiplexer has a pluggable connector in order to facilitate making the wire connections. To remove the connector, loosen the two screws that hold it to the multiplexer and pull gently to separate it from the multiplexer. The connectors have a snug fit, so you might find it more convenient to pull it apart before you mount the multiplexer. You can also connect the wires without separating the connector if you prefer. After you've connected all the wires and re-plugged the connector, don't forget to gently snug up the two screws that hold the connector to the multiplexer.

The connections are as follows:

| 1	2	3	4	5	6	7	8	9	0	-	+
AIS In		NMEA 3 In		NMEA 2 In		NMEA In		NMEA Out		DC Ground	DC+ 12 to 30 V
B	A	B	A	B	A	B	A	B	A	-	+

To make wire connections, *completely* loosen the set screw for the desired connection location, insert the stripped wire end into the hole below the screw, and tighten the screw. Do not over-tighten the screws! Ensure that the bare stripped end of the wire, not the insulation, is clamped in the connector. We've included a screw driver with your multiplexer that fits these tiny screws.

Some devices have wires already connected which send or receive the NMEA data. Whether in the form of a connector, or wires, we will refer to them as connections. NMEA data connections are typically labeled "A" and "B", but may also be labeled "+" and "-" or "signal" and "ground".
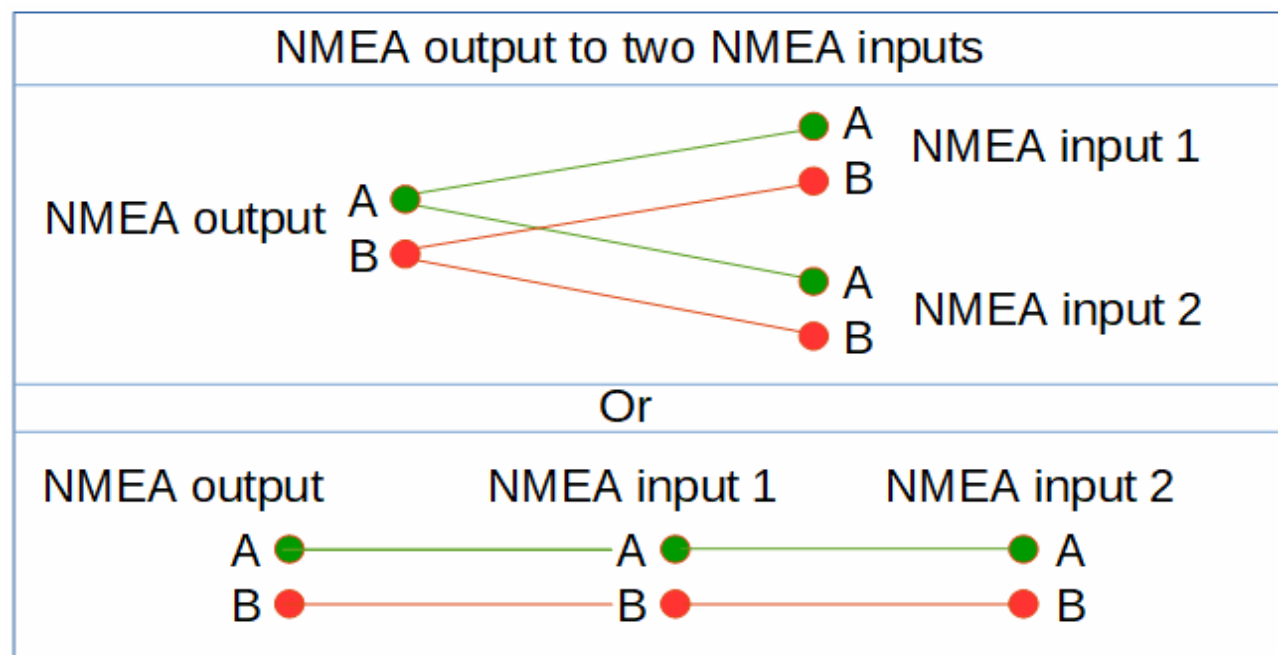
Some NMEA devices have only "send" or "output" connections, some have only "receive" or "input" connections, and some have both. Others have a single connection pair that can act as either "sender" or "receiver", which may require settings in the device to control whether it sends or receives data.

Each pair of data wires between NMEA devices is a one-way data path that has a single "talker" at one end which is sending the NMEA sentences. There will typically be a single "listener" at the other end which is receiving the NMEA sentences, but it is possible to connect more than one "listener" to a single "talker". Two "talkers" cannot be connected directly together to combine their data, as they can not coordinate with each other, and will interfere with each other when they send messages at the same time. This is why you need a multiplexer to combine data from multiple NMEA0183 talkers.

There will usually be a single one-way two-wire data path between two NMEA devices, where one device produces the data (GPS, Depth, Wind, etc) and sends it to another device that can also use that data (Chart Plotter, Auto Pilot, Multiplexer, Display, etc). To pass data from one NMEA device to another, connection "A" of the talker's output is connected to connection "A" of the listener's input, and connection "B" of the talker's output is connected to connection "B" of the listener's input, as shown here.

NMEA output to NMEA input

NMEA output   A ●————————————● A   NMEA input
   B ●————————————● B
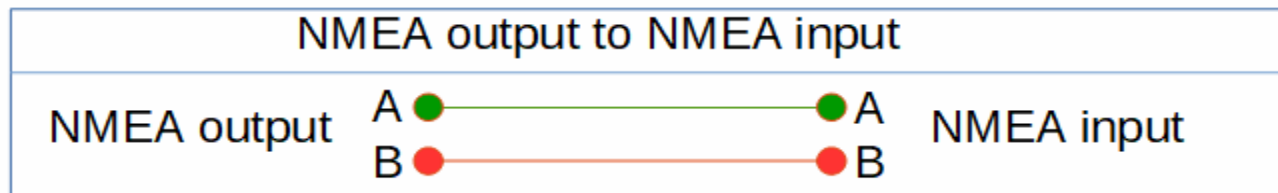
To pass data from one NMEA "talker" to more than one NMEA "listener", connection "A" of the talker's output is connected to connection "A" of each listener's input, and connection "B" of the talker's output is connected to connection "B" of each listener's input, as shown here.

NMEA output to two NMEA inputs

NMEA output   A ●
             B ●

● A   NMEA input 1
● B

● A   NMEA input 2
● B

Or

NMEA output   NMEA input 1   NMEA input 2
   A ●————————————● A ————————————● A
   B ●————————————● B ————————————● B

Please note that not all NMEA0183 devices follow the standard! Some devices have a single-wire talker, or a single-wire listener instead of the two-wire differential signals of the standard. These devices will still usually have two data connections, often with one being labeled "+" or "data" instead of "A" and another labeled "data ground" or "-" instead of "B". If you are connecting a single-wire NMEA talker to the Encoded Solutions multiplexer, you will only connect the talker's "+" or "Data"

Encoded
Solutions,
LLC

connection to the multiplexer's "A" input connection. The NMEA talker's "data ground" or "-" will not be connected, as shown here.
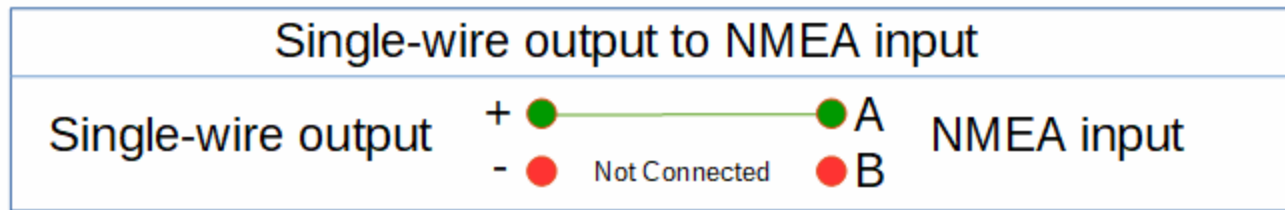
If you connect a single-wire talker's "-" or "ground" to the multiplexer's "B" connection then the multiplexer will not receive data from the single-wire device.

When making the data connections to the multiplexer, if you get the wires reversed (A and B swapped), or if you connect the "-" of a single-wire device to the "B" of the multiplexer, you won't do any damage, it just won't pass data. If you connect an instrument to the multiplexer and the multiplexer is not passing data from that instrument, you can safely swap the A and B data wires to see if that is the problem. If that does not solve the problem, you can safely try using just the "+" or "data" wire from the instrument to the multiplexer without connecting the "data ground" or "-" to the multiplexer's "b" connection.

The multiplexer's "AIS In" port can be used for either AIS at 38,400 baud or for NMEA at 4,800 baud, but if you are connecting an AIS to the multiplexer it *must* use the AIS input port. You cannot use any of the other three standard NMEA input ports for AIS. By default the AIS port speed is set to 38,400 baud. If you connect a standard NMEA device to the AIS input port, you must also change the speed setting for this port to 4,800 Baud in the multiplexer setup.

Mounting

The multiplexer is designed to be mounted on a vertical surface with the connector at the bottom. It can be mounted using the supplied mounting screws which are sized to go in the open slots on each side of the multiplexer. We recommend that you drill 7/64 pilot holes in the mounting surface for the screws. The multiplexer should be mounted:

- in a clean, dry, protected location without excess heat

- where large metallic objects will not block the WIFI signals

- where there is room for the connector and the wires attached to it

- where the status LED can be seen and the buzzer can be heard

- where there is access to the incoming and outgoing NMEA data wires

- where it is not close to high voltage wires

- where it is not co-located with other transmitting devices or receivers

Setting Up the Multiplexer

Connecting Your Computer to the Multiplexer via WIFI

When the multiplexer has not been initialized it will start in setup mode. When it is powered up, the LED will be lit steady red which indicates that the multiplexer requires setup before it will process NMEA data. In setup mode the multiplexer's network name is **nmea2wifi** and it is unsecured, meaning it does not require a password. Connect your computer to the multiplexer like you connect to any other WIFI host device. After you connect your computer to the multiplexer you can access the setup page to configure the multiplexer.

NOTE: When the multiplexer is not in setup mode you must use the network name and password previously specified in order to connect to it.

Accessing the Setup Page

The multiplexer setup page is accessed using a web browser on a computer that is connected to the multiplexer via WIFI. The setup page is accessed by typing **10.11.12.1** into the browser's address field. The address field is where you would normally type a web address, such as www.encodedsolutions.com.

If you have previously changed the "Multiplexer IP Address" of the multiplexer, then you must type that IP address instead of 10.11.12.1 to access the setup page.

When the multiplexer is connected to a remote WIFI and the option to "Allow Setup from Remote WIFI" is enabled, the setup page can also be accessed from computers that are connected to the remote WIFI. To access the setup page from a computer that is connected to the remote WIFI, use the IP address that was assigned to the multiplexer by the remote WIFI instead of 10.11.12.1. That IP address will be shown on the setup page after the multiplexer is connected to the remote WIFI; see Connection Status below.

Multiplexer Parameters

The multiplexer parameters section of the setup page contains parameters that apply to operation of the multiplexer as a WIFI host. The parameters are described in detail below.

Multiplexer IP Address

The "Multiplexer IP Address" is the IP address the multiplexer will use when it operates as a WIFI host. It is also used by the multiplexer to determine what IP addresses will be assigned to computers that are connected via WIFI directly to the multiplexer.

The default IP address of the multiplexer is 10.11.12.1 and computers connecting directly to the multiplexer will be assigned an IP address in the range of 10.11.12.2 to 10.11.12.254. Under normal circumstances, you do not need change the multiplexer IP address.

The multiplexer IP address it is restricted as shown below. The four individual parts of an IP address that are separated by the "." are referred to as octets.

- the first octet must be 10, 172, or 192
- if the first octet is 10, the second octet may be 0 to 255 inclusive
- if the first octet is 172, the second octet must be 16 to 31 inclusive
- if the first octet is 192, the second octet must be 168
- the third octet may be 0 to 255 inclusive
- the fourth octet must be 1 (you cannot change this on the setup screen)

So, valid address ranges for the multiplexer are in the ranges shown below:
- 10 . [0 to 255] . [0 to 255] . 1
- 172 . [16 to 31] . [0 to 255] . 1
- 192 . 168 . [0 to 255] . 1

If you change the multiplexer's IP address you will need to use the new IP address instead of the default IP address to access the setup page.

Tech Note: The multiplexer's IP address is the same as the multiplexer IP address except that it ends in 0 instead of 1. The network mask for the multiplexer is always 255.255.255.0 so IP's assigned to computers connecting directly to the multiplexer will be the same as the multiplexer IP address except that they will end in a number from 2 to 254. The multiplexer uses DHCP and does not allow for static IP address assignment.

Network Name (SSID)

The "Network Name" field, also known as SSID, is the name used to identify the multiplexer as a WIFI host. This is the name that you will use to connect your computer via WIFI to the multiplexer.

The network name must be from 1 to 32 characters long and it can contain any printable characters from the ASCII character set, including spaces (ASCII characters with values 32 to 126 inclusive).

New Password

The "New Password" field is used to set or change the password you will use to connect to the multiplexer via WIFI. You should only enter a password in this field when you want to change the multiplexer's password. Otherwise, leave this field blank; the existing password will not be affected. The multiplexer is required to have a password, so you cannot erase the password, you can only change it to another valid password.

The password must be from 8 to 64 characters and it can contain any printable characters from the ASCII character set, including spaces (ASCII characters with values 32 to 126 inclusive).

WIFI Channel

Using the "WIFI Channel" field you can select the WIFI channel that the multiplexer uses. If the multiplexer is located within close proximity to another WIFI host, there is less potential for the devices to interfere with each other if the WIFI channels on the two hosts are different. When the multiplexer connects to a remote WIFI, the multiplexer will switch its channel to the channel used by that WIFI and will disregard the WIFI Channel selected here while it is connected.

Protocol

The multiplexer can use either Transmission Control Protocol (TCP) or User Datagram Protocol (UDP) to transmit and receive NMEA data via WIFI.

TCP is a connection-based protocol that inherently provides receipt verification, error detection, and re-transmission functions. When the protocol is TCP, the multiplexer will only allow four simultaneous TCP connections. This includes TCP connections with computers that are connected directly to the multiplexer's WIFI, and TCP connections with computers that are communicating with the multiplexer through a remote WIFI. Only four computers will be able to send and receive NMEA data through the multiplexer when the protocol is TCP.

UDP is a connection-less protocol and, while relatively reliable, is a "send and forget it" protocol with no receipt verification, error detection, or re-transmission functions. When the protocol is UDP, the multiplexer supports NMEA data send and receive with four computers connected directly to the multiplexer's WIFI and, if the multiplexer is connected to a remote WIFI, it simultaneously supports NMEA data send and receive with any number of computers that are connected to that same remote WIFI, limited only by the capacity of the remote WIFI.

TCP Port

The "TCP Port" field is used to specify the TCP port on the multiplexer that software on the WIFI-connected computers must connect to in order to send and receive NMEA sentences. When a TCP

connection is made with the multiplexer, the port on the computer (the "other end" of the connection) is automatically assigned, so only one port is specified in order to make a TCP connection.

Valid values for TCP Port are 1024 to 65535 inclusive. The default TCP Port is 10110. This is the official port assigned by the Internet Assigned Numbers Authority for the transmission of NMEA0183 data.

"TCP Port" is applicable only when "Protocol" is TCP, and is ignored if "Protocol" is UDP.

UDP Send Port

The "UDP Send Port" field is used to specify the UDP port to which the multiplexer will send the NMEA sentences. You must specify separate send and a receive ports when using the UDP protocol in order to have bi-directional NMEA data.

In order to receive NMEA sentences via UDP on a WIFI-connected computer, in the software on the remote computer you must specify the same port for its UDP receive (or UDP input) as you have specified here for "UDP Send Port".

Valid values for UDP Send Port are 1024 to 65535 inclusive. The default UDP Send Port is 10110. This is the official port assigned by the Internet Assigned Numbers Authority for the transmission of NMEA0183 data.

"UDP Send Port" is applicable only when "Protocol" is UDP, and is ignored if "Protocol" is TCP.

UDP Receive Port

The "UDP Receive Port" field is used to specify the UDP port that the multiplexer will use to receive NMEA sentences. The multiplexer will "listen" on this UDP port for NMEA sentences sent by WIFI-connected computers.

In order to send NMEA sentences to the multiplexer via UDP from a WIFI-connected computer, you must specify the same UDP send (or UDP output) port in the software on that computer as you have specified here for "UDP Receive Port".

Valid values for UDP Receive Port are 1024 to 65535 inclusive. The default value for UDP Receive Port is 10111. This is an available port that is directly adjacent to the official port (10110) that is assigned by the Internet Assigned Numbers Authority for the transmission of NMEA0183 data.

"UDP Receive Port" is applicable only when "Protocol" is UDP, and is ignored if "Protocol" is TCP.

AIS Port Speed

Use the "AIS Port Speed" selector to choose the baud rate (speed) of the AIS data port. If you are using the AIS port to receive AIS data, select 38,400 baud. If you are using the AIS port to receive standard NMEA data, select 4,800 Baud.

Send to NMEA Output

When the multiplexer receives NMEA data on it's four wired NMEA input ports, it can forward that data directly to its wired NMEA output port independently of the WIFI operations. In other words, it can act as a standard wired NMEA multiplexer.

To enable direct input/output port forwarding, select "Yes" from the selection box in front of the port(s) you want forwarded directly to the wired NMEA output port.

The NMEA output port is buffered to enable more than one NMEA port to be forwarded directly to the NMEA output port without overflow, but the output port speed is still only 4800 baud so it's capacity is limited. If the total amount of data you are trying to send on the NMEA output port exceeds that which can be carried at 4800 baud, the output port will overflow and data will be lost. Keep in mind that NMEA sentences received via WIFI from connected computers are also sent out on the NMEA output port. The multiplexer will beep and flash blue when the amount of data to be sent exceeds the capacity of the NMEA output port.

Note that if you are receiving AIS data on the AIS port at 38,400 baud and you forward that port to the NMEA output, you will almost certainly overflow the NMEA output port buffer when AIS data is received.

Remote WIFI Parameters

While it is serving as a WIFI host to computers connecting directly to it, the multiplexer can also connect as a client to another WIFI host. When it is connected to the remote WIFI the multiplexer can send NMEA data to, and receive NMEA data from, computers that are connected to that remote WIFI. The remote WIFI connection parameters apply only to the operation of the multiplexer as a client on the remote WIFI. They have no affect on computers connected directly to the multiplexer via WIFI.

Each remote WIFI connection parameter field is described below.

Connect to a Remote WIFI

Use this selector to specify whether the multiplexer can connect to a remote WIFI host or not. If you select "Yes", you must also specify the name (Remote WIFI Name) and password (Remote WIFI Password) for the WIFI host you want to connect to.

When the multiplexer is trying to connect to a remote WIFI host, the LED will blink alternately red and green. If the remote WIFI connection cannot initially be made then the multiplexer will try to find the remote WIFI host and to connect to it automatically, until it connects successfully. If the multiplexer is connected to the remote WIFI host and it loses this connection, there will be a beep and the LED will begin to blink alternately red and green. When this occurs, the multiplexer will try to re-connect to the remote WIFI host automatically.

When "Connect to a remote WIFI" is "yes" and the multiplexer is not connected to the remote WIFI, the LED will blink alternately red and green the multiplexer will not process NMEA data.

When the LED is blinking alternately red and green you can connect your computer directly to the multiplexer via WIFI and access the setup page. The connection status is shown on the setup page.

Allow Setup from Remote WIFI

This selector controls whether or not computers that are attached to the same remote WIFI as the multiplexer can access the multiplexer's setup page. If "Allow Setup from Remote WIFI" is "Yes", any computer that is connected to the remote WIFI, as well as any computer connected directly to the multiplexer, can access the multiplexer's setup page. If it is "No", only computers connected directly to the multiplexer can access it's setup page. To access the setup page from a computer connected to the remote WIFI host, you must use the IP that the remote WIFI has assigned to multiplexer instead of the multiplexer's IP address in your browser's address window.

Remote WIFI Name (SSID)

The "Remote WIFI Name" field is used to specify the name of the remote WIFI host to which the multiplexer will connect. The remote WIFI name must be from 1 to 64 characters long and it can contain any printable characters from the ASCII character set (ASCII characters with values 32 to 126 inclusive).

Remote WIFI Password

The "Remote WIFI Password" field is used to specify the password of the remote WIFI host to which the multiplexer will connect. The remote WIFI password may be empty for an unprotected WIFI, or up to 64 characters for a protected WIFI. This field can contain any printable characters from the ASCII character set, including spaces (ASCII characters with values 32 to 126 inclusive).

Note that the actual remote WIFI password is never shown on the multiplexer setup screen. If a remote WIFI password has previously been entered, you will see a hidden password indicator in this field. To change the remote WIFI password, simply replace the hidden password indicator with the new password. You can delete the remote WIFI password by clearing this field before saving.

UDP Send-to

The "UDP Send-to" field is applicable only when the multiplexer is connected to a remote WIFI host and the "WIFI Protocol" is UDP. The options are as follows:

All	NMEA sentences will be sent to the broadcast address of the remote WIFI and so will be available to all computers connected to the remote WIFI.
Specified IP	NMEA sentences will be sent to the exact IP address specified in the "UDP Send-to IP Address" field.
Disabled	NMEA sentences will not be sent to computers connected to the remote WIFI.

UDP Send-to IP Address

The "UDP Send-to IP Address" is applicable only when the multiplexer is connected to a remote WIFI host, the "WIFI Protocol" is UDP, and the "UDP Send-to" field is set to "Specified IP". NMEA sentences will be sent to the single computer that is connected to the remote WIFI and that has the exact IP address you specify here. If the IP address you specify here is not the valid IP address of a single computer on the remote WIFI then NMEA sentences will not be sent to this IP address.

Allow Receive-from

The "Allow Receive-from" field is applicable only when the multiplexer is connected to a remote WIFI. This field applies to both TCP and UDP protocols. When the protocol is TCP, computers on the remote WIFI must have a TCP connection with the multiplexer to send NMEA data to it. When the protocol is UDP, any computer with a WIFI connection to the remote WIFI can send NMEA data to the multiplexer. This feature allows you to further limit which computers on the remote WIFI can send NMEA data to the multiplexer.

The options are as follows:

All	For UDP, NMEA sentences will be accepted from any and all computers connected to the remote WIFI. For TCP, the computer must also have a TCP connection with the multiplexer.
Specified IP	For both TCP and UDP, NMEA sentences will be only be accepted from the computer on the remote WIFI with the exact IP address specified in the "UDP Receive-from IP Address" field. For TCP, the computer having this exact IP address must also have a TCP connection with the multiplexer.
Disabled	NMEA sentences will not be accepted from any computer on the remote WIFI.

Allow Receive-from IP Address

The "Allow Receive-from IP Address" field is applied only when the multiplexer is operating as a client on a remote WIFI and the "Allow Receive-from" field is set to "Specified IP". The multiplexer will only accept NMEA sentences from the computer that is connected to the remote WIFI that has the exact IP address specified. If "WIFI Protocol" is TCP, the computer must also have a TCP connection with the multiplexer.

Connection Status

When "Connect to a Remote WIFI" is "yes", the status of the multiplexer's connection with the remote WIFI will be shown here. This is not a user-entered field, but provides important information. If the multiplexer is connected to the remote WIFI then the multiplexer's IP address on the remote WIFI will be shown here, and the LED will be steady green. If the LED is alternating red and green, the connection status with the remote WIFI will be shown here.

"Connection Status" is only refreshed when the setup page is loaded, so to see the current connection status you may need to refresh the setup page.

Current Password

In order to prevent unauthorized changes to the settings you must enter the current password in the "Current Password" field before pressing the "Save" button. If the multiplexer has not been initialized you will not be prompted for a current password.

LED Brightness for Normal Operation

During normal operation the green LED will be lit steady. You may want the LED to be bright during the day to see the operational status, and dim during night, so it does not disrupt your nighttime vision.

You can change the brightness of the green "Normal Operation" LED by selecting the desired brightness in the "Green LED Brightness" field of the setup form and pressing the "Update Brightness" button. It is not necessary to enter the Current Password to change the brightness. The setup page will be refreshed with the new brightness value.

Please note that the "Green LED Brightness" value only affects the brightness of the steady green LED when the multiplexer is operating normally. When setup is required, or for alarms or when flashing or blinking to provide notifications, the LED will be at full brightness.

It is also possible to change the brightness directly without accessing the multiplexer setup page. You can access a brightness setting page by entering 10.11.12.1/bri in your web browser. You can also set the brightness directly by entering 10.11.12.1/bri=X where 10.11.12.1 is the IP address of the multiplexer and X is any numeric value from 0 (off) to 10 (full bright). The format of the entry in the address bar is important:

- there are no spaces
- the IP address is followed by a /
- bri is lower case, followed by =
- the brightness value is 0 to 10

The multiplexer will respond by changing the brightness of the LED and sending your browser the brightness setting page showing the current brightness value. If you do not want the multiplexer to send you a response page, you can append /n to the address like this:

    10.11.12.1/bri=10/n   (for full brightness)

    10.11.12.1/bri=0/n   (to turn the light off)

When you include the /n, the only indication you have that this command was successful is that the brightness of the LED will change. If you do this from within your browser, your browser will wait for a while for the multiplexer to respond before eventually timing out, unless you cancel it or close your browser.

HINT: You can create shortcuts in your browser for the brightness setting commands and, with a single click, set the desired daytime or nighttime LED brightness.

NOTE: Before version 2.1.5, a colon was required after the brightness value, like 10.11.12.1/bri=8:

Factory Reset

It is possible to reset the multiplexer to its factory defaults. (If you forget your password, for example, and can no longer change the multiplexer parameters!) To perform a factory reset do the following steps:

- power the multiplexer down

- push and hold the reset button located inside the cover to the left of the connector

- while continuing to hold the reset button power up the multiplexer

- continue to hold the reset button until the multiplexer beeps and the red light comes on (about 5 seconds)

The multiplexer will then be set to it's factory defaults and the LED will be solid red. After doing a factory reset you must set up the multiplexer and assign it a password before the multiplexer will process your NMEA data. The network name will be **nmea2wifi** and there will be no password.

NOTE: when you power up the multiplexer while holding the reset button, the LED will not be lit until the multiplexer beeps and the red light comes on. If the LED is lit before the beep, the button was not properly pressed on power-up and the multiplexer will not reset. Power down and try again.

Lights and Sounds

Green steady	The multiplexer is operating normally. NMEA data is being processed and the setup page can be accessed. NOTE: The "normal operation indicator" green LED can be turned off, so the multiplexer may be operating normally without any LED's being lit.
Red steady	Set-up is required before normal operation can begin. You must connect directly to the multiplexer WIFI using default parameters to access the setup page and set a password. NMEA data is not being processed.
Alternating green and red	The multiplexer has been set up as client on a remote WIFI, but has not yet connected to the remote WIFI. It will continue to try to make this connection without intervention. The connection status can be seen on the setup page. Computers can connect to the multiplexer and access the setup page. NMEA data is not being processed.
Red flash and beep	An overflow occurred on one of the three standard NMEA input ports. The NMEA sentences that caused the overflow are discarded and the multiplexer will continue to process NMEA data.
Purple flash and beep	An overflow occurred on the AIS/NMEA input port. The NMEA/AIS sentences that caused the overflow are discarded and the multiplexer will continue to process NMEA data.
Blue flash and beep	An overflow occurred on the NMEA output port. The NMEA sentences that caused the overflow are discarded and the multiplexer will continue to process NMEA data.
Cyan flash and beep	An overflow occurred on the WIFI input or output. We've never been able to make this happen in all our testing, and we tried hard, but it may be possible. The NMEA/AIS sentences that caused this will be discarded.
Red pulsing and siren	The multiplexer is locked and needs to be powered down and re-started. It will not accept connections, serve the setup page, or process NMEA data.

Overflow Conditions

During normal operation, input port overflows should never occur. If you are experiencing overflows on the input ports, the most common cause is that the multiplexer is receiving data that is not properly formatted or corrupted. Properly formatted NMEA sentences cannot be longer than 79 characters, must start with $, and must be terminated by the ASCII carriage return/line feed combination. AIS sentences are similar, but start with a ! instead. The line feed characters are used to define the end of the sentence, so if a line feed character is missing an error will occur.

Improperly formatted sentences may be caused by reversed data wiring between the NMEA device and the multiplexer, by data loss between the two devices, or by incorrect baud rates. Data loss can be caused by interference on the wires, broken wires, or poor connections.

A blue flash and beep indicates an overflow on the NMEA output port. The NMEA output port operates at 4,800 baud; about 530 characters, or about 8 or 9 average-length NMEA sentences per second. All NMEA sentences that are sent from computers connected to the multiplexer via WIFI are forwarded to the NMEA output port. Additionally, you may have chosen to forward NMEA data from any of the incoming NMEA ports directly to the NMEA output port too. If the combined number of NMEA sentences exceeds the capacity of this port, it will overflow. The only way to correct this is to reduce the amount of data being sent to the NMEA output port.

If you send AIS data to the NMEA output connection, it will almost certainly overflow when AIS data is received because of the higher capacity of the high speed AIS connection and the fact that AIS data is usually received a few sentences at a time.

Legal

Suitability for your use

The Encoded Solutions NMEA-to-WIFI multiplexer is designed to pass NMEA0183 sentences between WIFI devices and wired NMEA0183 devices aboard your boat. There is no other implied purpose. The reliability of the transmission of data between devices connected to the multiplexer is subject to a multitude of factors which can cause the multiplexer to fail to pass any or all NMEA sentences to or from devices that are connected to it at any time. We neither claim nor imply that this device is suitable for any particular application; it is entirely up to you to determine whether or not this device is suitable for your particular application.

Software Copyright and Licensing

The multiplexer contains copyrighted software. You may not copy or reproduce the copyrighted software in any form. In addition to the copyrighted software, the Encoded Solutions NMEA-to-WIFI multiplexer utilizes the avr-libc software libraries in an unmodified format.

```
    notice, this list of conditions and the following disclaimer in
    the documentation and/or other materials provided with the
    distribution.

  * Neither the name of the copyright holders nor the names of
    contributors may be used to endorse or promote products derived
    from this software without specific prior written permission.

  THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS"
  AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE
  IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE
  ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE
  LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR
  CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF
  SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS
  INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN
  CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE)
  ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE
  POSSIBILITY OF SUCH DAMAGE.

********************************************************************************
```

FCC Statement

The Encoded Solutions NMEA-to-WIFI multiplexer contains the WIFI module FCC ID: 2AC7Z-ESPWROOM02. The following statement relates to this WIFI module only.

This device 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 device 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 device 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 the receiver.

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

• Consult the dealer or an experienced radio/TV technician for help.

Any changes or modifications to this device not expressly approved by Espressif may cause harmful interference and void the user's authority to operate this module. 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.

This device complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

This device must not be co-located or operating in conjunction with any other antenna or transmitter.