



NGX-1 Configuration Manual for Actisense Toolkit

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About Actisense Toolkit

Actisense Toolkit is an app. created to interact with Actisense products on an NMEA 2000 bus.

Toolkit provides for the following:

- Visibility of **all** connected devices on the NMEA 2000 network.
- Includes a 'Properties' window showing information about each connected device.
- Provides a method to configure certain Actisense devices which are connected to the NMEA 2000 bus.
- Allows for upgrading & downgrading of firmware releases on certain Actisense products.
- Provides a facility to log NMEA 2000 data to a file for trouble shooting network issues later.
- Provides a facility to change the operating mode & baud rate of an NGX-1 ISO / NGX-1-USB.
- Provides a "custom gauge manager" to assist with an EMU-1 set-up.

Set up before using Actisense Toolkit

Before getting started, the NGX-1 needs to be powered and connected as per the [NGX-1 User manual](#).

- The NGX-1 needs to be connected to a working NMEA 2000 network (or bus) which fulfils the minimum network requirements (refer to [NGX-1 User Manual](#) for guidelines).
- The USB variant of the NGX-1 (product code: NGX-1-USB) requires the latest Actisense USB drivers to be installed. If there is a working internet connection on the PC when the NGX-1-USB is plugged in, and if the operating system settings allow automatic updates from Windows, the latest USB drivers will download automatically. If this fails, the same USB driver files are available from the [NGX-1 Downloads](#) page.
- Check that the NGX-1's COM port is not in use by another software application (e.g. NMEA Reader).
- Ensure the NGX-1 is powered from the NMEA 2000 bus, and the blue "power" LED is on.

Actisense Toolkit is able to configure any NGX-1 running Firmware version 1.280 or higher.

Connecting to the NGX-1

ISO variants (NGX-1-ISO)

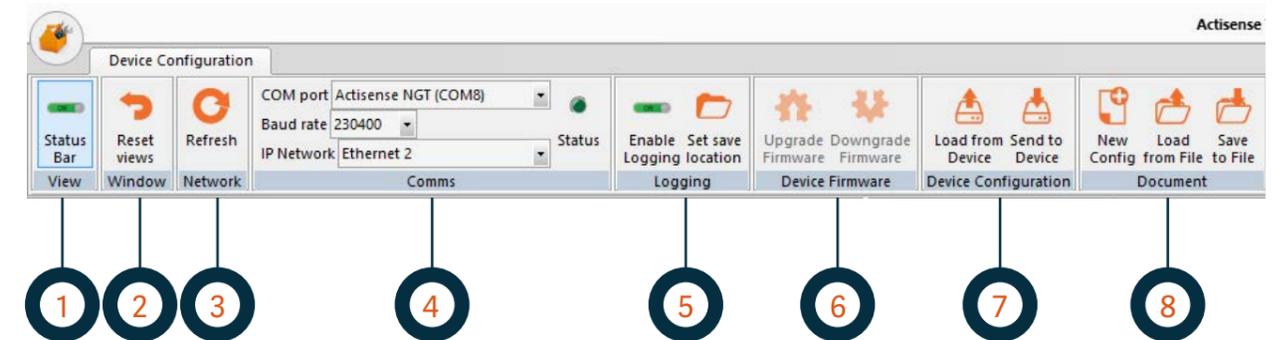
- Powered directly from the NMEA 2000 backbone.
- There are two connection methods available when configuring an NGX-1-ISO:
 - Connecting the ISO/NMEA 0183 cable to a PC using one of the three options detailed in the [NGX-1 User manual](#). (page 11 & 12)
 - Connecting an Actisense NGT-1 / NGX-1-USB (in transfer mode) to the same operational NMEA 2000 network and making a connection to a PC. This 'remote' method allows the NGX-1 to be reconfigured in-situ without the user needing to know where it is installed and without needing to temporarily rewire its ISO / NMEA 0183 cable. For an NGX-1 already installed on a vessel this should normally be a far easier method of configuration.

USB variants (NGX-1-USB)

- Powered directly from the NMEA 2000 backbone.
- The NGX-1-USB will automatically connect with Toolkit at 115,200 baud and be configured into 'transfer' mode.

Useful Tip: To share an NGX-1 between Toolkit and another application, instead of closing the Actisense Toolkit (and needing to re-load device configurations), select 'Offline' in the COM port's drop down list so that the NGTX-1 COM port is closed, allowing it to be used/opened by another program such as NMEA Reader.

Toolkit Ribbon Menu



1. View

Toggle the status bar on/off (at the bottom of the User Interface) that indicates the 'current state' details in a single place (such as 'PC Receive Load' and 'NMEA 2000 Bus Load' when an NGT-1 is in use). Use this facility if you have a small screen and need to increase the visible area.

2. Window

Resets the layout of all windows to the factory default. Use to show closed/hidden windows.

3. Network

Refreshes the 'Serial/CAN Device List' network view. New devices added to the network will be automatically detected and added to the corresponding device list. [Should the "Device list" view appear "greyed out", use the refresh icon to restore the devices to the listing.](#)

4. Comms

'COM Port' selects the COM port connected to the device to configure/update.
 'Baud rate' selects the baud rate that matches the serial device being used with Toolkit.
 'IP Network' selects the IP Network adapter that Toolkit will use to communicate with IP devices.

5. Logging

Enable / Disable data recording to EBL files (for both Serial/CAN & IP networks).
 Select the desired save location for the EBL files.

6. Device Firmware

Upgrade / Downgrade the firmware inside an Actisense device. Ensure the device you wish to modify is selected in the 'Serial/CAN Device List' or 'IP Device List' window before using one of these options. Also available using the right-click device context-sensitive menu. Greyed out options are not available.

7. Device Configuration

'Load from Device' reads the current configuration from the selected device and displays it as a configuration document.
 'Send to Device' writes the active configuration document to the selected device.

8. Document

'New Config' starts a new device configuration using a pre-set default as a starting point.
 'Load from File' selects and opens a previously saved device configuration document for editing or sending to a device.
 'Save to File' saves the active configuration document to file so it can be reopened later or share

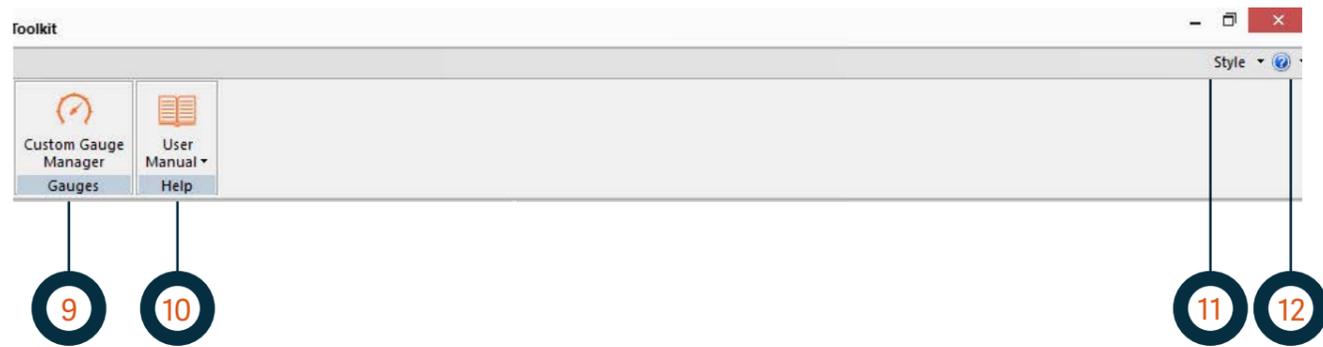
9. Gauges (see overleaf)

'Custom Gauge Manager' is for use with [Actisense EMU-1](#) devices only.

10. Help (see overleaf)

Provides access to the product help documentation for [EMU-1](#), [PRO-BUF-1](#), [NGW-1](#) and [NGX-1](#) devices.

Toolkit Ribbon Menu (contd)



11. Style

Change the graphical appearance of Toolkit to suit the user.

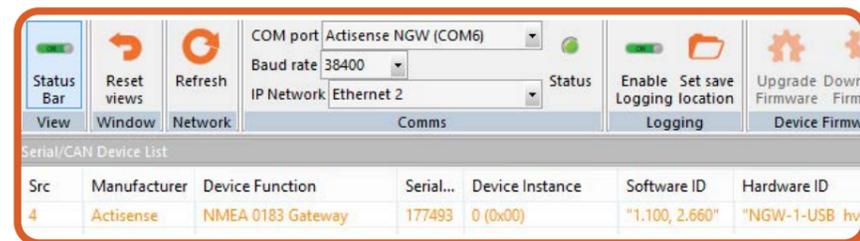
12. About

Access the Toolkit software version number. This is an important detail to share with Actisense Tech Support if you have an issue with Toolkit.

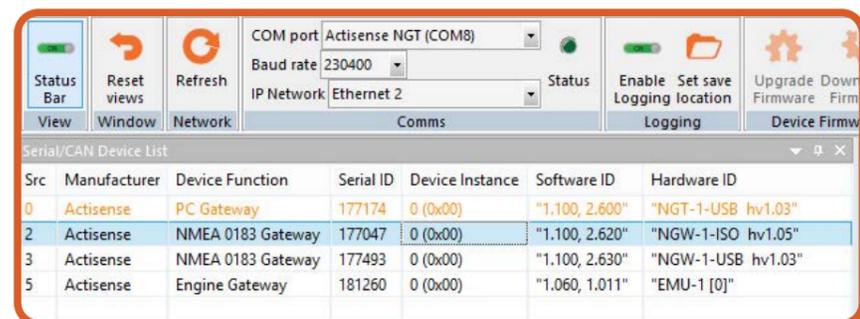
COM port set up

Choosing the Actisense NGX-1's COM port and baud rate (typically 4800 or 38400) will create a **direct** connection that will display the NGX-1's details in the 'Serial/CAN Device List'.

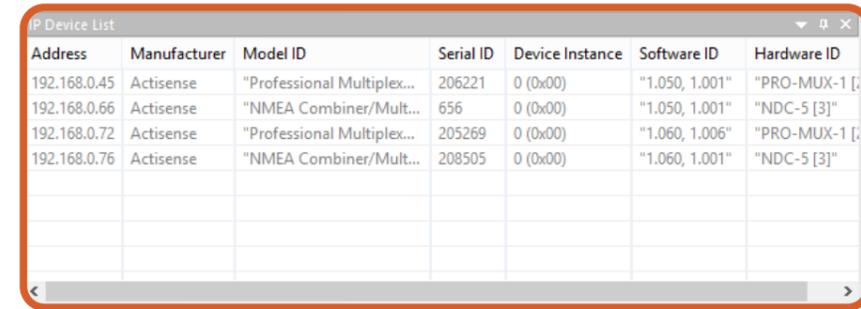
Alternatively, the Actisense NMEA 2000 PC interface (NGT-1) can make **remote** configuring an NGX-1 device much quicker and easier because it can remain in situ, removing the need to locate and rewire. Choosing the NGT-1's COM Port and baud rate (typically 115200 or 230400) will create a **remote** connection to the NGX-1 that will display the device details of all NMEA 2000 devices on the network.



Busy NMEA 2000 buses (with load above 45%) will require the NGT-1 to be configured to use the maximum NGT-1 baud rate of 230400 - **this baud rate change can be performed using NMEA Reader on the 'Hardware Config' tab.**

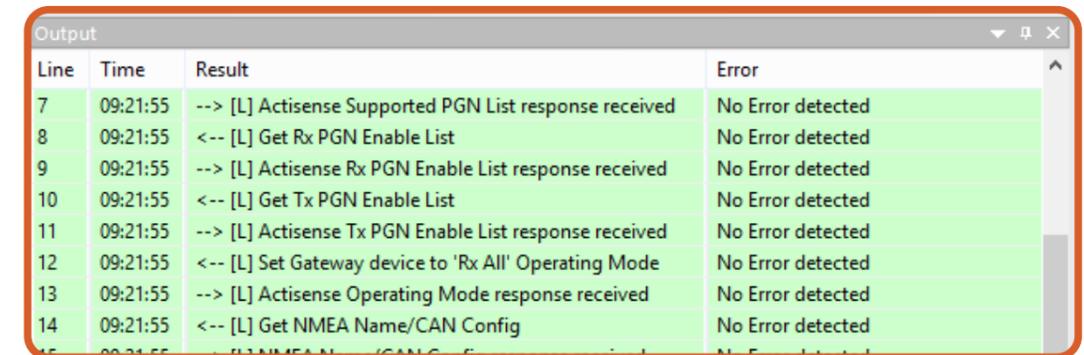


As the NGX-1 is not an IP device, its details will appear in the 'Serial/CAN Device List' and not in the 'IP Device List'.



Output Log window

The 'Output' log shows the result of every communication event between Toolkit and the Actisense devices it communicates with. This can occur when opening a COM port, upgrading or downgrading device firmware or when configuring a device.



Right-clicking in the 'Output' log window provides three useful menu options:

- 'Export log to File' option allows the log details to be saved to file to allow sharing with Actisense Tech Support.
- 'Email log to Tech Support' option allows easier sharing of log details with Actisense Tech Support when the default email client is configured and available. It opens an email with the exported log file attached.
- 'Clear log' option to clear the current event log.

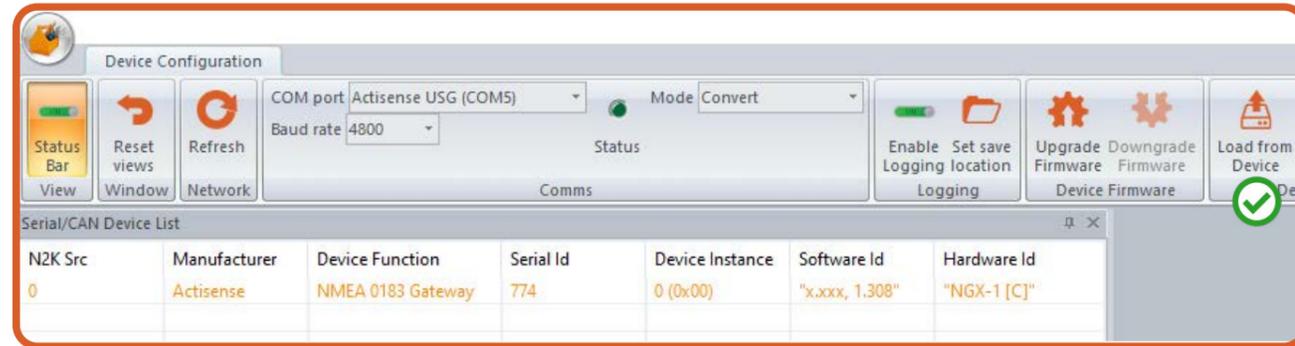
Configuring the NGX-1-ISO

This section of the manual explains the following 3 options.

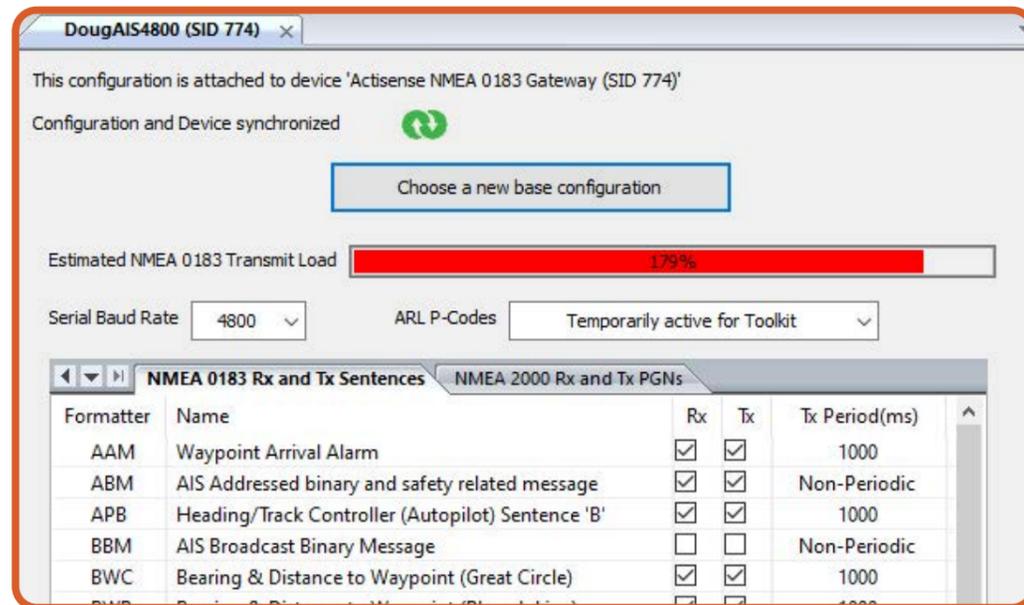
- How to alter the baud rate of an NGX-1-ISO to suit a particular installation requirement.
- How to select a new pre-configured base configuration.
- How to alter the included conversions to allow data to pass between the NMEA 0183 and NMEA 2000 networks.
- How to alter the period of transmission of the various 0183 sentences of PGN's

Please note. Altering the settings of an NGX-1-ISO from within Toolkit is only possible when the NGX-1 is in "convert" mode. It is not possible to alter the NGX-1 while in "Transfer" mode.

Once Toolkit is open, and showing the NGX-1-ISO you wish to configure, make sure the NGX-1 is highlighted, and from the top ribbon, press "Load from Device" from the ribbon menu on the RHS.



Toolkit will load the current configuration from the NGX-1-ISO and present the results as shown below.



The above window give the user access to various parameters, and allows them to be altered before being committed back to the NGX-1-ISO and saved.

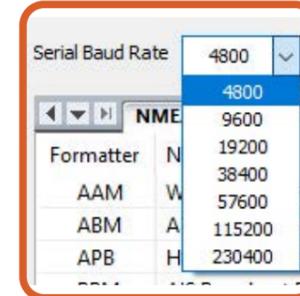
Specifically, these are:

- Change the baud rate
- Choose a new base configuration (three common options are included)
- Change the included conversions by ticking Rx & Tx boxes on the NMEA 0183 and NMEA 2000 tabs.
- Change the frequency of the message being sent.

Altering the baud rate

Toolkit will report the current baud rate detected from the NGX-1-ISO in the "Serial Baud Rate" box.

Select the required baud rate from the drop down menu shown below:



If only the baud rate needs changed, this can be committed to the device by pressing "Send to Device".



This change will be transmitted to the NGX-1-ISO and after a few seconds the new baud rate will be reflected in the COM port window, and the NGX-1-ISO will continue to operate at the new required baud rate.

NOTE: Please wait for the update window to close to allow for the NGX-1 to fully update.

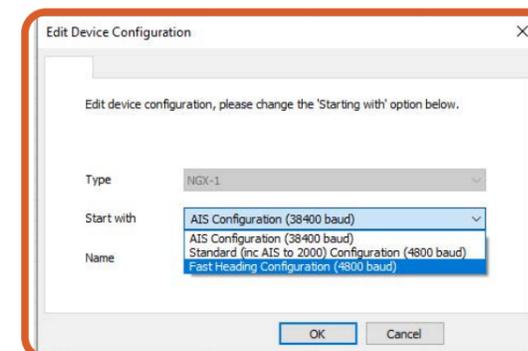
Select a new base configuration

Since the NGX-1-ISO will normally be installed for conversion purposes only, three of the most common configurations have been included for the user to avoid confusion over which conversions require set or cleared.

These can be selected from the "Choose a new base configuration". The options available for base configuration are:

- **AIS configuration(38400)** - enables almost all of the conversions an NGX-1 is capable of performing and the 38,400 baud rate can handle.
- **Standard (inc AIS to 2000) Configuration (4800 baud)** - The 'Standard Configuration' contains a subset of the possible conversions due to the much smaller 4,800 baud bandwidth used by standard NMEA 0183 devices (Tx conversions for NMEA 0183 RMC & RMD are disabled)
- **Fast Heading Configuration(4800 baud)** - This configuration allows heading to be converted at 10x/second. This is enabled for HDT

Select the required base configuration and press "OK".



Press "Send to Device" when complete to commit the change.

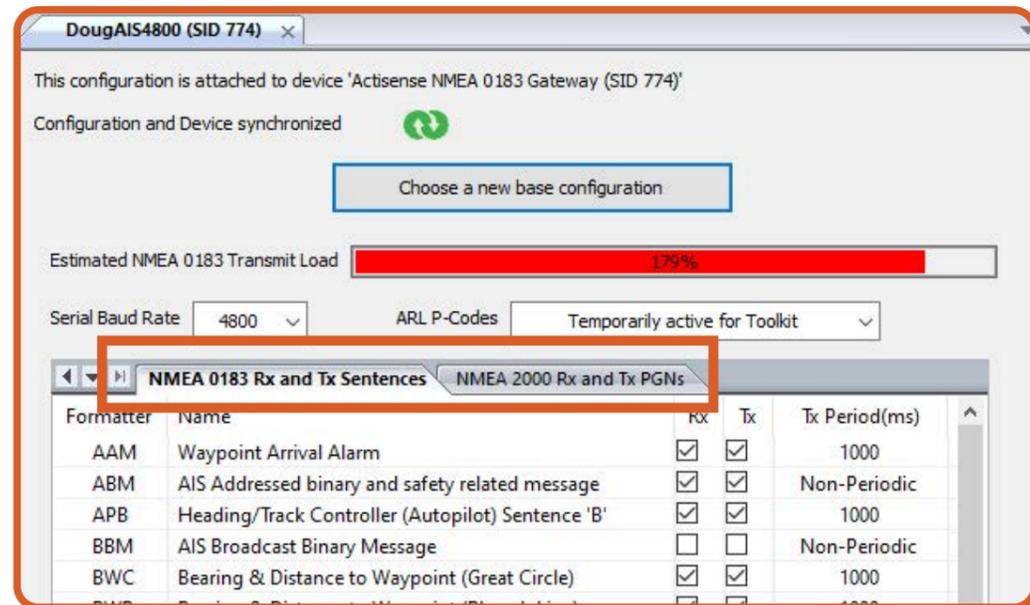
Altering the conversions (Tx & Rx)

Within the Toolkit configuration window, there are two tabs shown for NMEA 0183 & NMEA 2000 Rx & Tx conversions. "Load from Device" will indicate which conversions are currently active or blocked. If you require a conversion to be included, the corresponding Rx and/or Tx check boxes need to be ticked as shown in the pictures below.

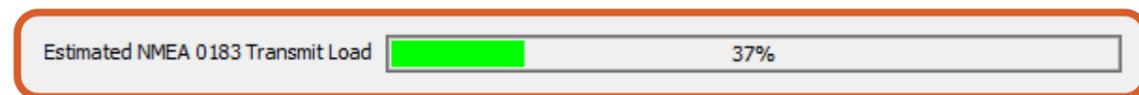
In order to get the most benefit from this facility, you will require to have good understanding of your network and more importantly which devices on the network require which data and in which form (either NMEA 0183 or NMEA 2000)

Please see page 20 of the [NGX-1 user manual](#) for a more detailed explanation of how the Rx & Tx lists operate.

Once any changes are made to the conversion lists, press "Send to Device" from the top ribbon to save these changes.



As NMEA 0183 bandwidth is a limited resource, Toolkit visualises the estimated volume of NMEA 0183 data the configuration could allow the NGW-1 to generate if all enabled NMEA 2000 PGNs were received within 2 seconds of each other. As this 'Estimated NMEA 0183 Transmit Load' bar is the estimated worst-case load on the NGW-1's NMEA 0183 Talker output, it should be used as a guide and not a strict rule.

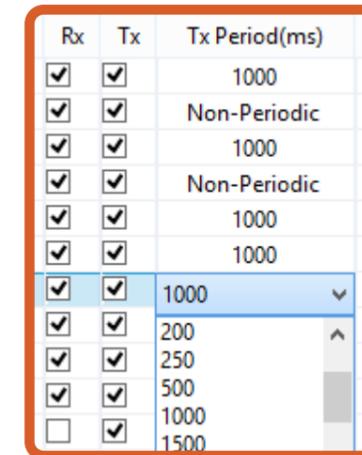


Whilst any estimated load above 100% could result in the NGW-1's NMEA 0183 Talker output becoming overloaded (and the true transmit periods of some sentences become longer than what was defined in the configuration), in reality, values above 100% can result in the expected transmit periods because not all conversions will be active at the same time due to input data availability.

Altering the Tx frequency

Toolkit allows the Tx frequency of NMEA 0183 messages or NMEA2000 PGN's to be varied in order to tailor the network traffic to your individual requirements.

Select the drop down box next to each Rx & Tx pair and alter the Tx period to the required setting in milliseconds. Once any required changes are made, press "Send to Device" from the top ribbon to save these changes



Firmware updates via Toolkit

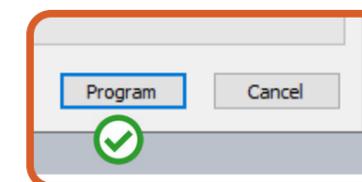
Toolkit has an in-built facility to allow for the upgrading of the NGX-1 firmware as and when updates become available. Any firmware update will be made available via the Actisense website in the form of a .zip file, which should be downloaded and stored on the local PC which is running toolkit. Toolkit will ask for this file later in the process.

Select the NGX-1 you wish to update from the device list, and press the "Upgrade Firmware" icon from the top ribbon as shown below.

PLEASE NOTE: Prior to an update, the NGX-1-ISO should be running at a fast baud rate of 115,200 baud or above. The firmware update is a large file, and trying to update the NGX-1 while it is running at 4,800 baud will take quite a long time.



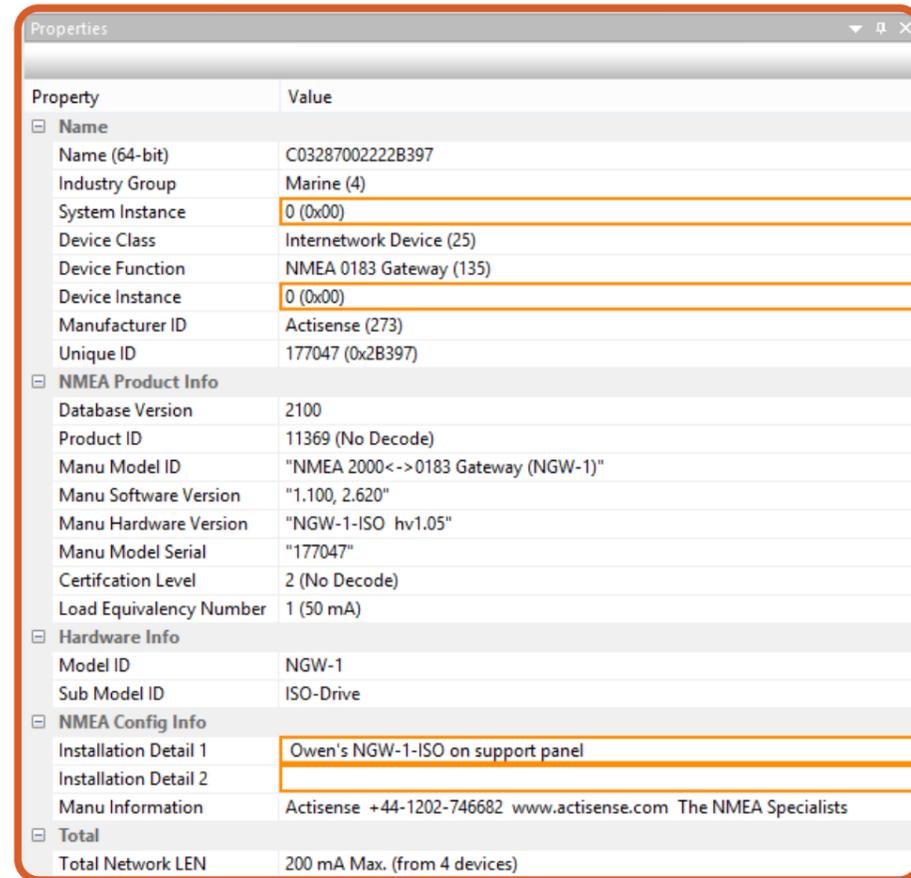
- Attach the .zip file which was downloaded from the Actisense website and press "Open"
- Either press "Program" to begin the update, or "Cancel" if you don't wish to proceed at this time.



- Once the update window has closed, the unit will continue to run with the new firmware installed.

Properties window

The 'Properties' window details all information available on the selected device in the 'Serial/CAN Device List' or 'IP Device List' windows. NMEA 0183 devices will populate any information fields not relevant to them as 'Not Available'.



An orange border to an information field indicates that on some devices the user can configure the value stored inside the selected device: 'System Instance', 'Device Instance', 'Installation Details 1' and 'Installation Details 2'.

The 'System Instance' defaults to 0 and can be set to an integer between 0 and 15. Every device on an NMEA 2000 network is required to have the same 'System Instance' value. On vessels with redundant NMEA 2000 networks, one network will use 'System Instance' 0 and the other 'System Instance' 1.

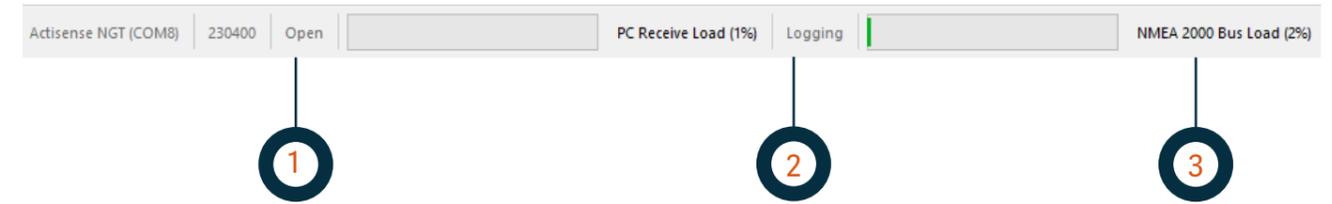
The 'Device Instance' defaults to 0 and can be set to any integer between 0 and 255. It can be used to differentiate between multiple instances of the same type of device on an NMEA 2000 network (e.g. multiple GPS or depth devices).

Whilst this requirement was important in the past (due partly to display device limitations), it should be noted that the majority of NMEA 2000 devices manufactured since 2015 no longer require their 'Device Instance' value to be changed to a unique value. Instead, the entire 64-bit NMEA Name is used to uniquely identify each instance of a device, not just the 'Device Instance' part of the NMEA Name. However, it can still help human users grasp the different instances.

'Installation Detail 1' and 'Installation Detail 2' are two 70-character fields that can be configured with useful install, location and power details to help future users find the physical device and understand how it's powered. For example "Behind starboard panel 5, powered from breaker 12". This feature is not supported by all NMEA 2000 devices.

Status Bar

The Status Bar shows all of the current Toolkit 'state' details in a single place.



- 1. COM Port status**
Indicates the name, baud rate, open status and data load (in percent) of the current Toolkit COM port.
- 2. Logging status**
Indicates if log files (for both Serial/CAN and IP networks) are being saved to the defined log location. The default save location for log files is the user's documents folder and this can be changed using the 'Set save location' ribbon menu option.
- 3. NMEA 2000 Bus Load**
When an NGX-1 is interfacing Toolkit to an NMEA 2000 network, this bus load bar indicates the data load (in percent) of the NMEA 2000 network. This load bar will not be active if an NGX-1 is not in use.

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