Maretron® MConnect®

Vessel Monitoring and Control Software for NMEA 2000® Networks

User's Manual

Revision 1.2.0

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2 Introduction

Thank you for purchasing the Maretron MConnect Vessel Monitoring and Control System. MConnect is a cost-effective way to view hundreds of datapoints required to effectively monitor the complex systems found on today's boats. In addition, the control functionality allows switching of digital loads using Maretron's MPower products, and those from other manufacturers. Also, Conditions and Actions allow a limited amount of automation.

With two NMEA 2000 CAN ports, MConnect can monitor both redundant networks and systems with separate Vessel Monitoring and Navigation buses.

MConnect is an HTML 5 web server. This means that it does not have a display, but it will serve an HTML page over the Ethernet connection that can be displayed on a web browser. In particular, it is designed to work with the built-in browsers on marine MFDs. ***See list.***

The webpage can also be displayed on computers, mobile phones, and tablets.

It will support multiple simultaneous users, each operating independently with different screen layouts.

MConnect includes new engaging modern graphics for all its on-screen components, and for OEMs and users that require their own look, it also has custom components where you can add your own graphics.

3 Software Version

This manual corresponds to MConnect Version 1.2.0

4 MConnect System Features

MConnect has a Client / Server architecture.

The server is contained within the MConnect device and receives data from the NMEA 2000 buses.

The clients are loaded from the MConnect device onto a web browser running on the device that displays the data.

MConnect Provides:

- Monitoring of more than 500 Parameter types received over the NMEA 2000 data, including:
    - AC Parameters (Average and Phase specific)
    - Breakers
    - DC Voltages and Currents
    - Depth
    - Electric Drives and Electric Energy Storage
    - Engine and Transmissions
    - Environment (Wind, Temperature, Pressure, Humidity)
    - Fuel Management
    - GPS (Position, Course, Speed over Ground)
    - Heading
    - HVAC
    - Indicators and Switches
    - Lighting Zones and Scenes
    - Pressure / Vacuum and Temperatures
    - Rudder

  - Tank Levels
  - Video
  - Watermakers (requires a compatible Watermaker)
- Some automation through Conditions and Actions
- The ability to control compatible NMEA 2000 switches and circuit breakers.
- A VPN to allow monitoring from anywhere in the world with an internet connection. If a direct connection to the boat is not possible, MConnect comes with a pre-installed TailScale VPN. Setting this up is simple once you create a TailScale account.

MConnect is integrated with the following:

- Mastervolt switches
- Fusion Radios
- Lumishore Lighting Systems
- Reverso Outboard Flushing Systems
- Shadow-Caster Lighting Systems

Compared to N2KView, MConnect does not provide:

- Alerts - This release of MConnect does not support Alerts.
- Anchoring - This release of MConnect does not support Anchor Watch functions.
- BNWAS – This release of MConnect does not have a BNWAS function.

5 Setting Up

This section will help you discover the MConnect product on your network and display the default demo configuration.

5.1 Discover MConnect

5.1.1 On a PC, mobile phone or browser

MConnect uses the mDNS protocol which enables devices on the same subnet to discover each other without using a DNS table from a server.

On the URL line of your browser, type “mconnect.local” to connect to the MConnect Web Server.

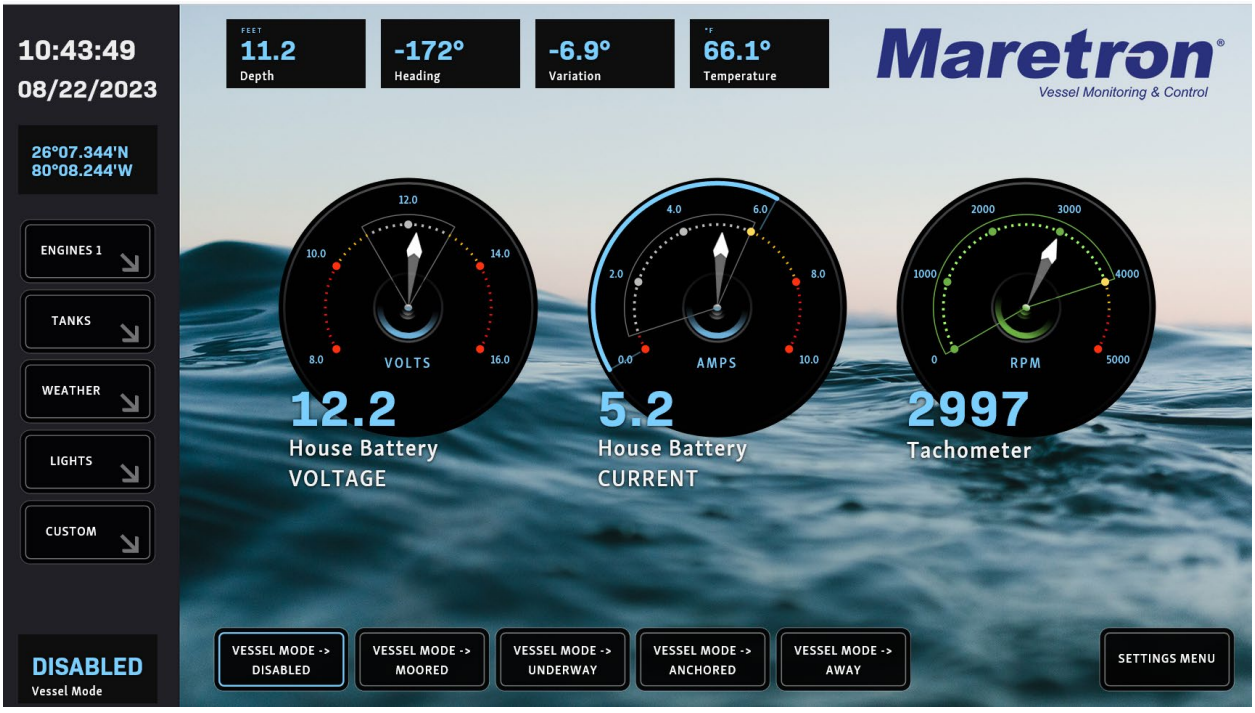


Figure 1 – MConnect Sample Screen

5.1.2 Using the IP Address

As a fallback, which should only be required if the mDNS functions are not possible, you can also display the pages by typing the IP address of the MConnect box. The easiest way to obtain this address is to insert a USB drive into the box and remove it thirty

seconds later. MConnect will write a small file to the USB drive, called *mconnect-data.json,* with the following contents.

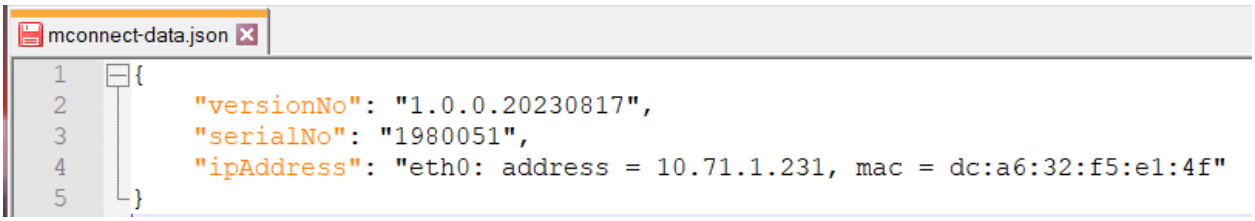


Figure 2 – mconnect-data.json file

The IP address is typically assigned by a DHCP server (a router or MFD) on your network. If no network device assigns an IP address to the MConnect within a certain time frame, the MConnect will assign itself IP Address 169.254.174.73. If a router is added later, it is necessary to restart the MConnect so that it waits for a new IP assignment.

5.1.3 Compatible Devices

MConnect has been tested to work with the following MFDs:

- B&G
- Garmin
    - GPSMAP 943xsv Software Version 25.30 Supported
    - GPSMAP 943xsv Software Version 30.10 Supported
    - GPSMAP 943xsv Software Version 33.30 Supported
    - GPSMAP 8617 Software Version 30.10 Supported
    - GPSMAP 8617 Software Version 31.10 Supported
- Nobletec
- Raymarine
- Navico / Simrad
- Furuno
- Q

MConnect is pre-installed with software to communicate with these MFDs, and an option to display the MConnect webpage will be automatically added to the list of applications supported by the MFD.

5.2 Installing Cameras

MConnect supports MJPEG video streams from the following camera manufacturers:

5.2.1 Axis

All cameras supporting the VAPIX protocol are supported. The following cameras have been tested by Maretron:

- Axis 212 PTZ Network Camera. This is a wall-mounted camera with software pan, tilt and zoom.
- Axis 215 PTZ Network Camera. This is a sophisticated camera with hardware Pan Tilt and Zoom. It requires a 12V power supply which is supplied with the camera.
- Axis P3301 Fixed Dome Network Camera
- Axis Single Video Server 241S
- Axis Quad Video Server 241Q
- Axis Q7401 Video Encoder
- Axis Quad Video Server 240Q
- Axis M3113 Network Camera
- Axis M3114 Network Camera
- Axis M3343 Network Camera
- Axis M5525 PTZ Network Camera
- Axis P3245 PTZ Network Camera
- Axis P3265 PTZ Network Camera

Other Axis cameras supporting the Vapix Protocol will also work.

5.2.2 Hatteland

The Seahawk range of cameras is supported.

5.2.3 Omnisense

The Onmisense IP cameras are supported.

6 Using MConnect

6.1 Touch Screen Operation

MConnect was designed so that all functions in operational mode can be performed with either a keyboard / mouse or a touch screen.

6.2 Keyboard Operation

A keyboard is suggested to configure MConnect. There are a few fields that need to be entered with text. In normal operation, if a keyboard is connected, short cuts can be used to easily navigate from screen to screen.

6.3 NMEA 2000 Considerations

This section describes some requirements for the NMEA 2000 networks to be monitored with MConnect.

6.3.1 Instancing

The one aspect of NMEA 2000 that you need to be aware of as a user of MConnect is the concept of instance numbers, or instancing. To enable parameters from different devices to be distinguished, an instance number is associated with the source of each parameter. This may be done as a Device Instance or a Data Instance, depending on the message format used to transport the data on the NMEA 2000 bus. The user does not need to know whether Device Instancing or Data Instancing is used to configure MConnect. When configuring each component on the display, the instance number associated with the source of the data should be known to ensure that the component is monitoring the correct instance of the parameter.

For example: when configuring a control to monitor the Port Engine RPM, the instance number should be set to 0; setting it to 1 would monitor the RPM of the Starboard Engine.

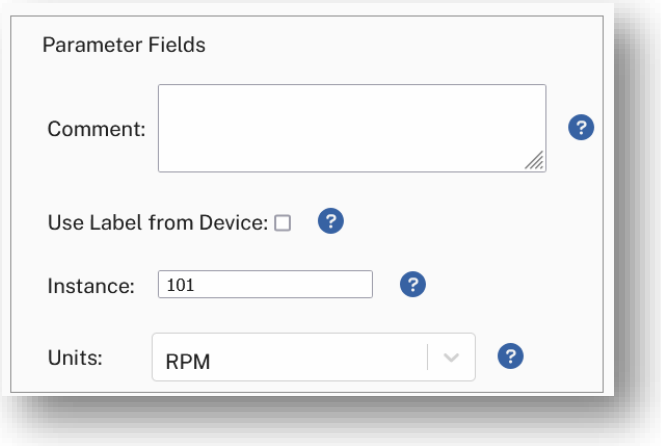


Figure 3 – Setting Instance Number

For simple configurations, where there is only one source of data, MConnect allows the Instance Number to be set to “Any”, represented by the value “-1”. If this is chosen, the component will lock on to the first matching parameter received on the NMEA 2000 bus, regardless of its Instance Number. If there are more than two matching parameters on the bus, this will lead to unpredictable behavior. If there is only one matching parameter, it is an easy way to set up the component without knowing what the real Instance Number is.

Instance Numbers can either be allocated to the Device as a whole (Device Instancing) or to individual data elements (Data Instancing).

6.3.1.1 Device Instancing

The *device instance* is a value ranging between 0 and 255 that every NMEA 2000 device transmits when it joins the bus and upon request thereafter. This becomes important when you have multiple devices that transmit the same data. It is possible, for example, to have two GPS antennas on a vessel, with one serving as a primary antenna and others serving as backups. If this is so, the NMEA 2000 standard requires that the two different antennas have two different device instance numbers. If you are using a certified NMEA 2000 product, the NMEA 2000 standard requires that a user be able to set the device instance in each product. Consult the device documentation or contact your device manufacturer to determine how to set the instance into a particular device.

6.3.1.2 Data Instancing

Certain NMEA messages, such as those from batteries, tanks, engines, and transmissions, have *data instances* embedded in the messages. These data instances are used, if programmed, to relate data to specific data sources. Data instances are also required by the NMEA 2000 standard to be field-programmable, so please consult your device's documentation for details on how to program this value.

In order to support "plug-and-play" operation, if MConnect receives the same data from multiple devices that have the same device instance programmed, it will "lock on" to the first unit it receives data from until either 1) it stops receiving data from the first unit, in which case it will switch to the second unit, or 2) it starts receiving data from another unit with higher Priority, in which case it will use the data from that unit.

6.3.2 Data Source Types

The NMEA 2000 standard provides for the transmission of data from similar devices, but for different sources. For example, the NMEA 2000 standard supports twelve different types of fluid tanks: Fuel, Fresh Water, Grey Water, Oil, Black Water, Gasoline, Diesel, LPG, LNG, Hydraulic Oil and Raw Water. It further supports up to sixteen tanks of each of these types. It is the responsibility of the person installing the NMEA 2000 system to ensure that each tank level sender is programmed with the appropriate fluid type and tank instance.

6.4 Vessel Mode

MConnect supports the following Vessel Operating Modes, which match those of N2KView:

- Disabled
- Moored
- Anchored
- Underway
- User 1
- User 2
- User 3

- User 4

The user may change the names of the four User Vessel Modes in the Vessel Data section of the Editor.

The full extent of these modes will realized in a future release of MConnect with full Alert Capability.

In this release, the mode is used to control which warnings and errors are displayed on the Screen Status buttons.

This shows that the “Engines 1” page has 1 warning and 2 errors.

In this case, we could use the Vessel Mode to only show Engine Errors on the Home Screen when the vessel is Underway. A low pressure warning is meaningless when the engine is not running.

Conditions may also be filtered to act only in selected Vessel Modes.

6.5 Parameters

The key concept of MConnect is the display of *parameters*. A parameter is a piece of information about some function of the vessel, such as engine speed, or barometric pressure. In addition, a particular instance of that data type will also need to be specified, e.g., the speed of the Port Engine and possibly a source, e.g. Port Fuel Tank Level.

A device is required to be connected to the NMEA 2000 bus and produce the relevant data for it to be displayed.

The list of parameters that MConnect can display are listed in the MConnect Parameters file (see section 9.2).

6.6 Components

Each parameter may be displayed on a User-defined Screen using a *component*. A component is a graphical display that is generally dedicated to the display of the value

of a parameter. Examples of components include the digital display, a gauge, or a bar graph. A complete listing of available component types appears in the MConnect Parameters file (see section 9.2).

If data is not available for a component, the component will display two dashes ("- -"), and the indicators for gauge type components will be at the end stop (or peg). More complex components such as the compass will show a dimmed needle to indicate data not being available. Where secondary data is not available to perform a calculation to get the required parameter, every effort is made to inform the user what secondary data is missing. (e.g., If variation is not available to convert Magnetic Heading to True Heading the digital display will show "No VAR".)

6.7 Conditions

Conditions are used to detect values passing a predefined level or entering a predefined state. When the condition is met, the condition is true; when it is not met, the condition is false. An example of a condition would be *Battery Voltage less than 11.7 V*, or *Breaker tripped*.

All conditions have a stable time. The value being measured must be in range continuously for a period greater than the stable time before the condition goes into the true state. The value must also be out of range for a period greater than the stable time before the condition goes back to the false state. This prevents multiple actions being initiated when the value hovers at the predefined condition.

Conditions may be displayed on the screen using any Indicator type component, such as Indicator Beams, Indicator Moving Lines, Indicators etc.

Conditions may also trigger one or more Actions when the condition goes from the inactive (false) state to the active (true) state. No action is executed when the condition goes from the active to the inactive state. If this is a requirement, then a second condition should be created.

While there are limited conditions defined in MConnect currently, more will be added in the future. A complete listing of available Condition Types may be found in the MConnect Parameters file (see section 9.2).

6.8 Actions

Actions may be executed when a condition becomes true. An example would be to *turn the Water Maker ON when the level of the Water Tank is below 10%*.

While there are limited actions defined in MConnect currently, more will be added in the future. A complete listing of available Action Types may be found in the MConnect Parameters file (see section 9.2).

6.9 User-defined Screens and Parameter Display

MConnect has user-defined screens. You can set up your own screens with your layout to display a group of components which generally will display related parameters, such as engine data, navigation data, tank levels, and so on.

6.10 Configurations

MConnect can store multiple configurations. A configuration is a set of screens, each containing a set of components that display different data values, plus the graphical images chosen by the designer to be displayed as backgrounds on those screens or within individual components. The layout of the screen and types of components will have been set up previously.

When first connecting to MConnect, you will be shown the first screen on one of the configurations previously designed for your boat.

If MConnect was installed as part of an OEM project, the initial screen will be correctly laid out for you, and you may be prevented from editing it.

If no configuration has been defined, you will see the default configuration.

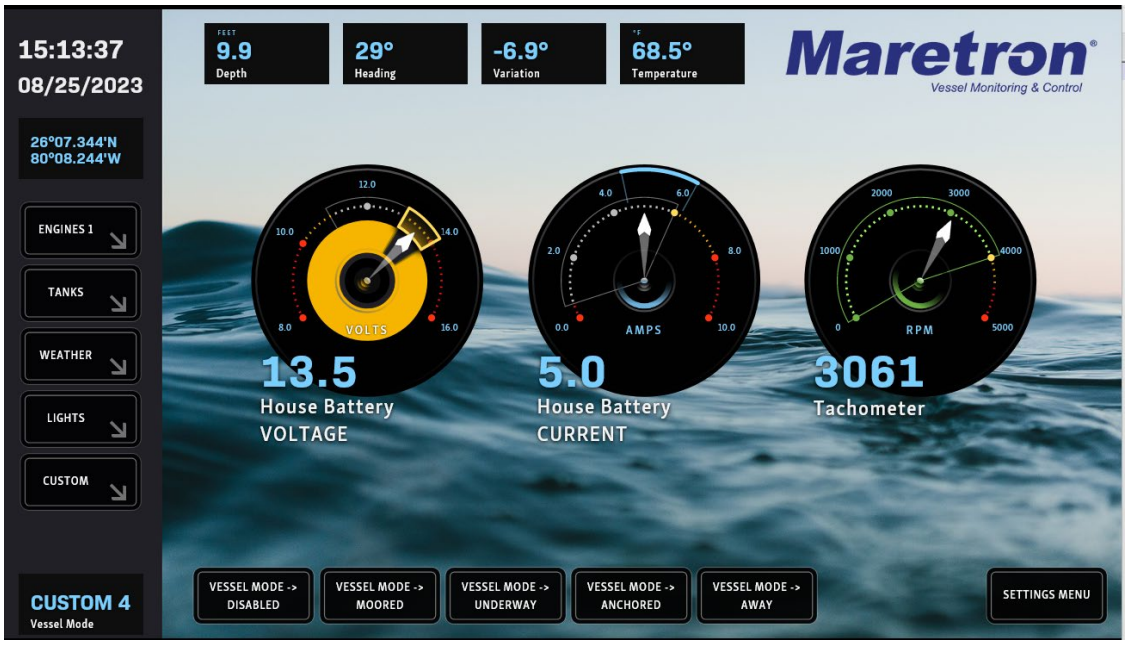


Figure 4 – MConnect Default Screen

Once the configuration is chosen, the name will be stored in user-memory on your device, and you will open that configuration when you make a connection.

6.11 Changing Screens

To display other screens, the following components have been provided:

- Screen Navigation Buttons / Screen Status Buttons

- Screen Navigation Bar

Pressing on any of these buttons will change the screen displayed, within the same configuration. A configuration may have multiple screens identified with the same name. When this is the case, the screen displayed in the browser will be the screen whose dimesions best conform to the aspect ratio of the browser window.

If you are already on that screen, the button will have a light blue border.

Other ways of changing screens are:

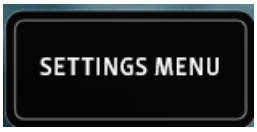
- Press the left and right arrow buttons on a keyboard
- Swipe up or down on a screen that supports those gestures. Swiping may be enabled/disabled in Main Menu -> Settings.
- Press the Home button, or the Home key on your keyboard, which will quickly take you to a screen named “Home”
- Press the Backspace button, or the backspace key on your keyboard, which will take you to the previous screen.

7 Settings

7.1 Settings Menu

The Settings menu is opened in one of two ways

- The “Settings Menu” action button



This button may be placed on any screen by the screen designer. Should the screen designer not place this button on a screen, the Settings button below will be displayed by the system.

- The Settings Button

The position of the Settings Button can be set in the Settings Dialog to avoid conflicts with buttons overlaid on MFDs by their manufacturer. If a Settings Menu action button is on the screen, then the Settings Button will be suppressed

Pressing the Settings button will display the Settings Menu. This is a set of buttons where you choose which dialog to view.

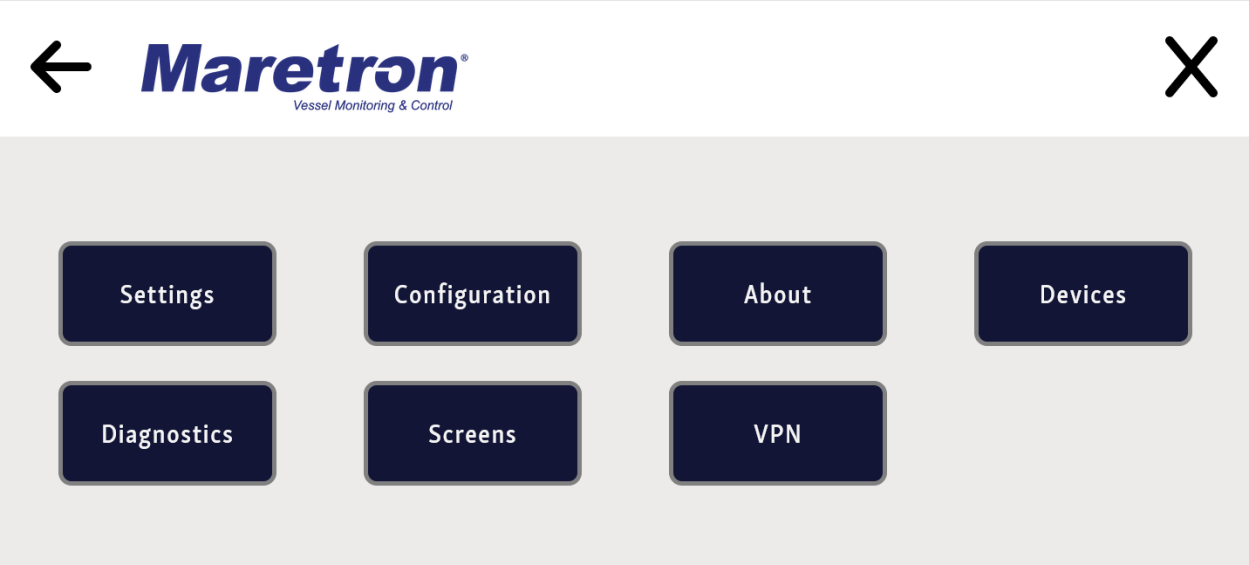


Figure 5 – MConnect Settings Menu

Pressing ← will display the previously viewed dialog; pressing X will close the dialogs and show the data screens in Display Mode.

7.2 Settings Dialog

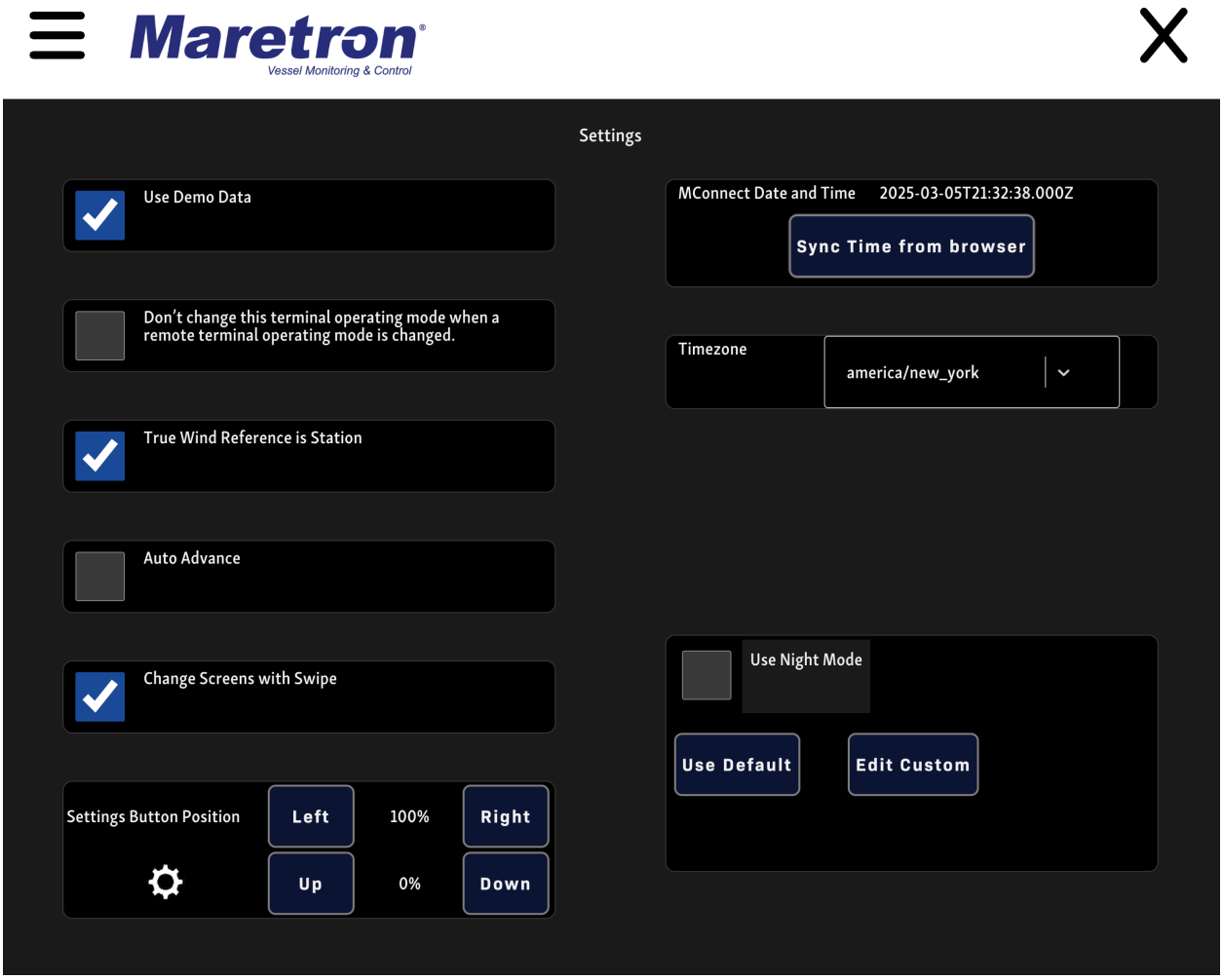


Figure 6 – Settings Dialog

The fields in this dialog control the operation of MConnect.

The hamburger menu ☰ will return to the Settings Menu.

The X will return to the data screens.

7.2.1 Use Demo Data

Normally this box will be unchecked.

If checked, MConnect will inject data into the PGN database to simulate instruments on the NMEA 2000 bus. These PGNs will all contain instance numbers of 100, 101, or 102; they will cause conflicts with any real data received on the NMEA 2000 bus with the same instance numbers. The default configuration supplied with MConnect will display this data.

7.2.2 Don't change this terminal operating mode when a remote terminal operating mode is changed.

By default, this box is unchecked.

When used on the same NMEA 2000 network as other MConnect boxes, or a computer running N2KView (PC / MBB300C / TSM810C etc.) The Vessel Mode is normally synchronized between all these devices. Checking this box will allow this instance of MConnect to have independent control of its Vessel Mode.

7.2.3 True Wind Reference is Station

By default, this box is unchecked.

If MConnect is installed on a fixed platform, not a ship, that does not have heading, then this should be checked.

7.2.4 Auto Advance

By default, this box is unchecked.

When checked, MConnect will cycle through the screens automatically.

7.2.5 Settings Button Position

By default, the horizontal position is 100% and the vertical position 0%, i.e., at the top right of the screen.

This controls the position of the Settings Button on every screen.

7.2.6 Timezone

By default, this is "UTC".

Select the Default Timezone for MConnect from the drop-down list. To help find the correct Timezone, start typing the name of the time zone, such as "New York".

The chosen Timezone will automatically adjust for daylight savings time.

7.2.7 Use Night Mode

Night Mode will place a colored filter over the screen, to allow for better nighttime viewing on a dark bridge. The default color is red, and users may choose their own color and opacity.

Checking the box will apply the filter.

7.2.8 Change Screens with Swipe

When selected, swiping up and down on a touchscreen device will select the previous or next screen. Screen order is defined by the configuration.

7.2.9 Sync Time from Browser

Normally, MConnect will synchronize its time from a GPS device. If GPS data is unavailable, users may click this button to set the time on the MConnect server to be the same as the device used to view the screen.

MConnect has a built-in Real Time Clock with battery backup that will maintain the time when the unit is powered off. If the Real Time Clock drifts away from the actual time, this button should be used to correct it.

7.3 Configuration Dialog

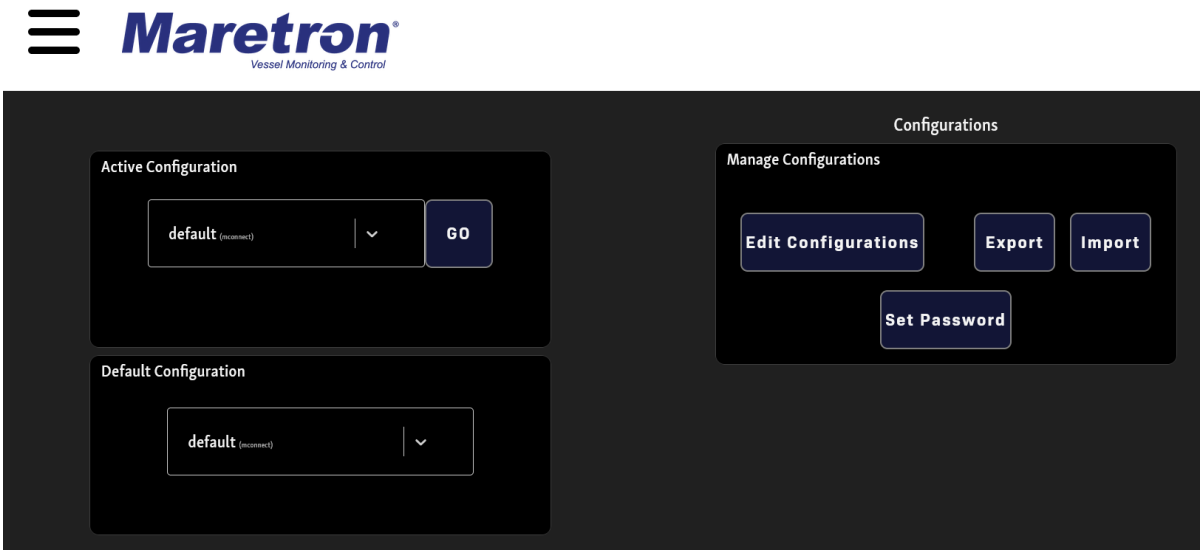


Figure 7 – Configuration Dialog

This dialog is used to select and manage the configurations stored on MConnect.

A Configuration contains the layout of the screens, the conditions and actions, and the definitions of the Switch Groups. Multiple Configurations may be active in the system at any one time.

7.3.1 Default Configuration

The Default Configuration is loaded at startup - the screens are never displayed - and any conditions / actions will always be executed.

The selection in the Configuration dialog is a drop-down list of all the configurations stored on the MConnect device. After clicking on the field to select it, you can either scroll to the configuration you want to load or type the name.

7.3.2 Active Configuration

The Active Configuration is loaded when a screen connects to the server on the MConnect box, is displayed on that screen, and is removed when the webpage is closed. Any conditions / actions in the Active Configuration are added to those in the Default Configuration while the webpage is active.

There could be as many Active Configurations loaded as there are clients.

The selection in the Configuration dialog is a drop-down list of all the configurations stored on the MConnect device. After clicking on the field to select it, you can either scroll to the configuration you want to load or type the name.

Loading a configuration for one display screen does not affect other screens connected to the same MConnect.

7.3.3 Manage Configurations

Configurations may be edited, exported, imported and password protected.

7.3.3.1 Edit Configurations

This will launch the MConnect Editor in a separate browser window. Marine MFDs do not support this functionality, so it is advised to use a PC / Mac to edit configurations.

A full description of the MConnect Editor can be found in section 9.

7.3.3.2 Export

Pressing Export will display the Export dialog within the Configuration Dialog.

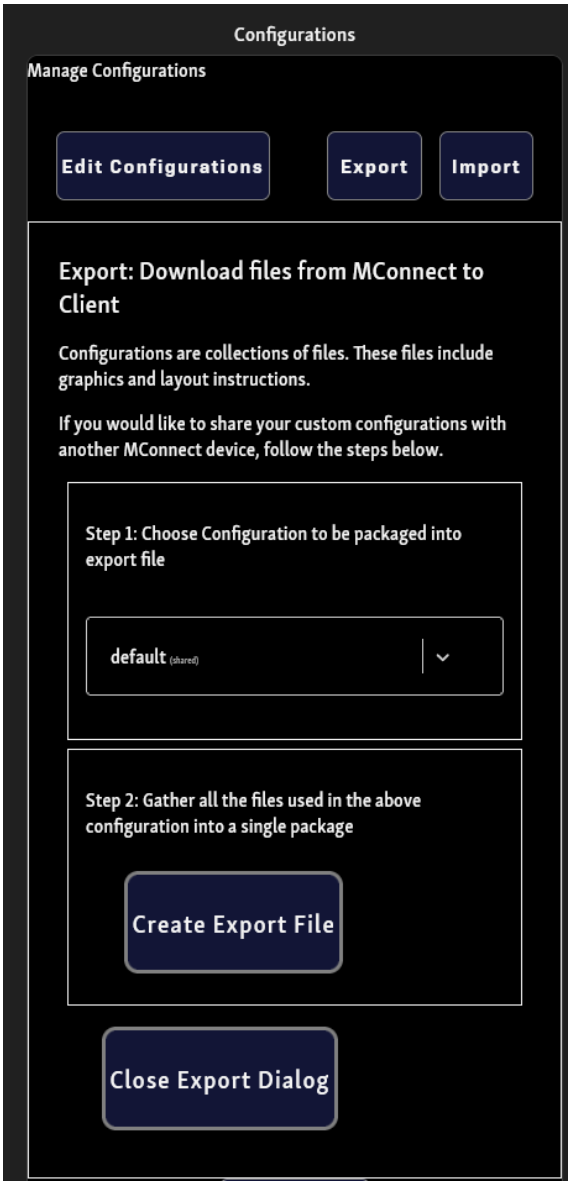


Figure 8 – Export Configuration Dialog

The files are exported to the same computer on which this dialog is being displayed – it is not saved to the USB port on the MConnect hardware.

1. Choose the configuration you wish to export from the drop-down list.
2. Press the **Create Export File** button to create a file on the MConnect box. This file will contain the screen layouts and all the graphic images used by the configuration.
3. Press the **Download** button to download the file to the downloads directory on your PC.

7.3.3.3 Import

Pressing Import will display the Import dialog within the Configuration Dialog.

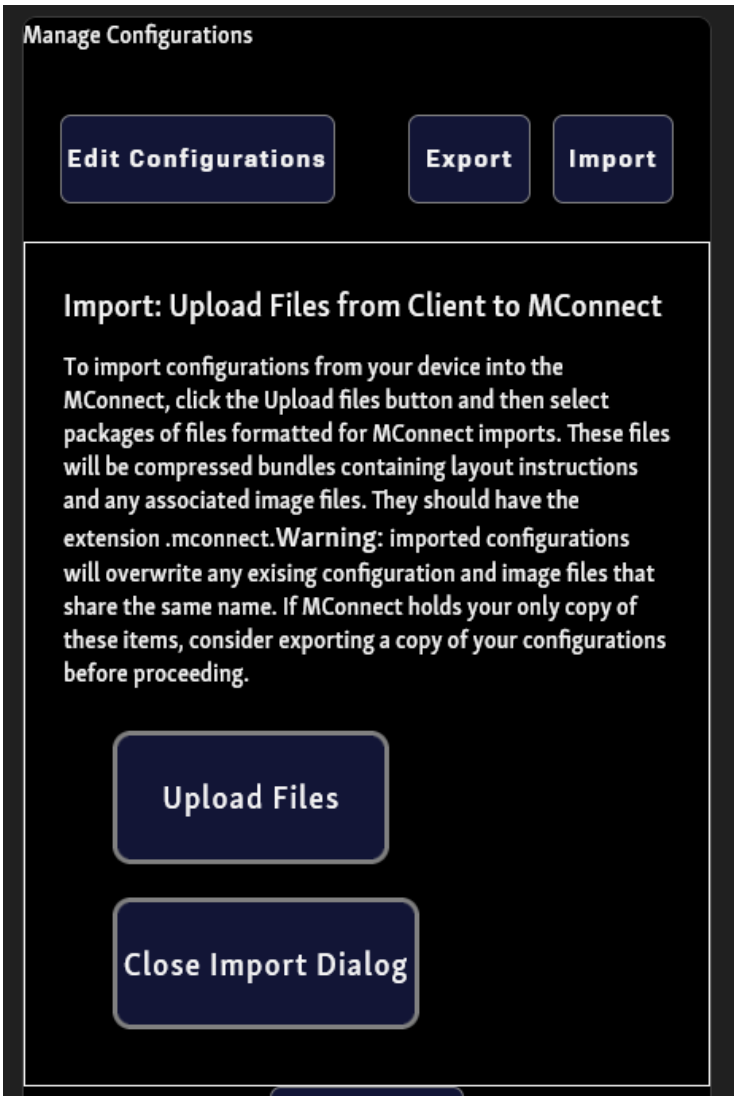


Figure 9 – Import Configuration Dialog

The files are imported from the same computer on which this dialog is being displayed – they are not read from the USB port on the MConnect hardware.

1. Press the **Upload Files** button and select an MConnect configuration file on your computer. The filename must have an extension of *.mconnect*.

2. When the import is complete, the dialog will close.

7.3.3.4 Set Password

This opens the Service Mode Settings dialog, which allows you to set, delete, or change the password and enter installation notes.

If a password is set in the system, the ability to edit, import, and export configurations will require you to know the password.

Setting an empty password allows the password to be deleted.

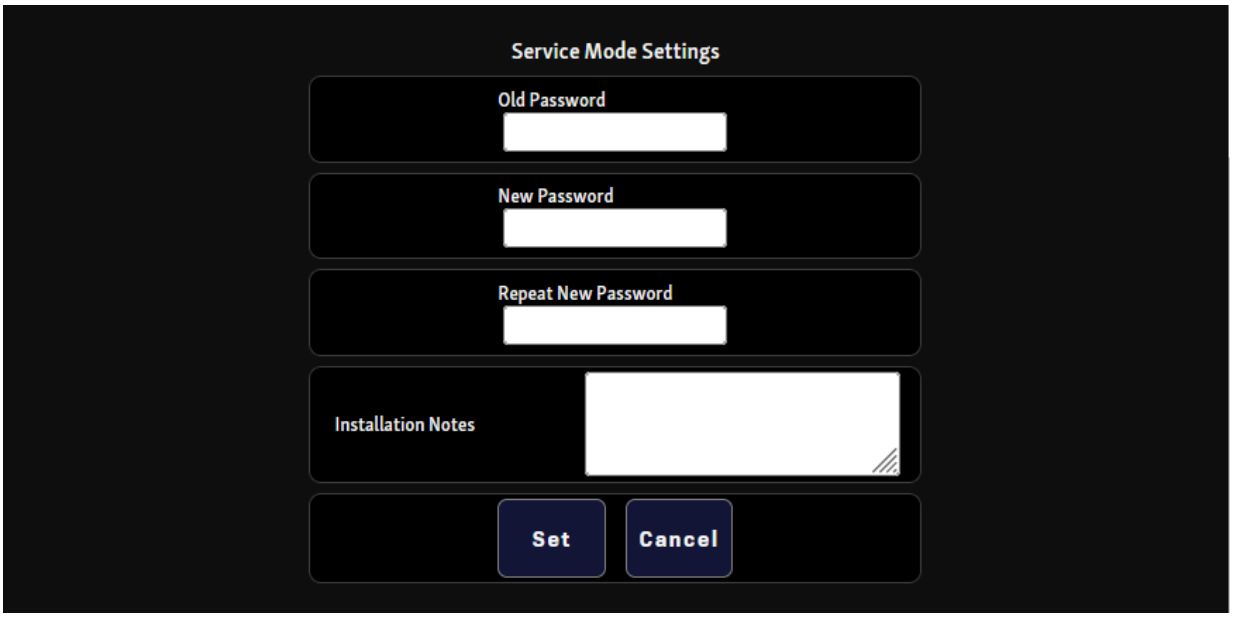


Figure 10 – Password Dialog

7.4 About Dialog

The About Dialog shows information about the program, including the IP Address of the MConnect box, the software version, and the serial number. This information will be required by Maretron when contacting Technical Support.

Figure 11 – About Dialog

7.5 Devices Dialog

This is a useful dialog when debugging data received on the NMEA 2000 bus. It contains all the information received on the bus, organized by the devices that transmit the data.

To create a copy of the information, click the **Generate Report** button. After the **Download** button appears, you may save it to your device.

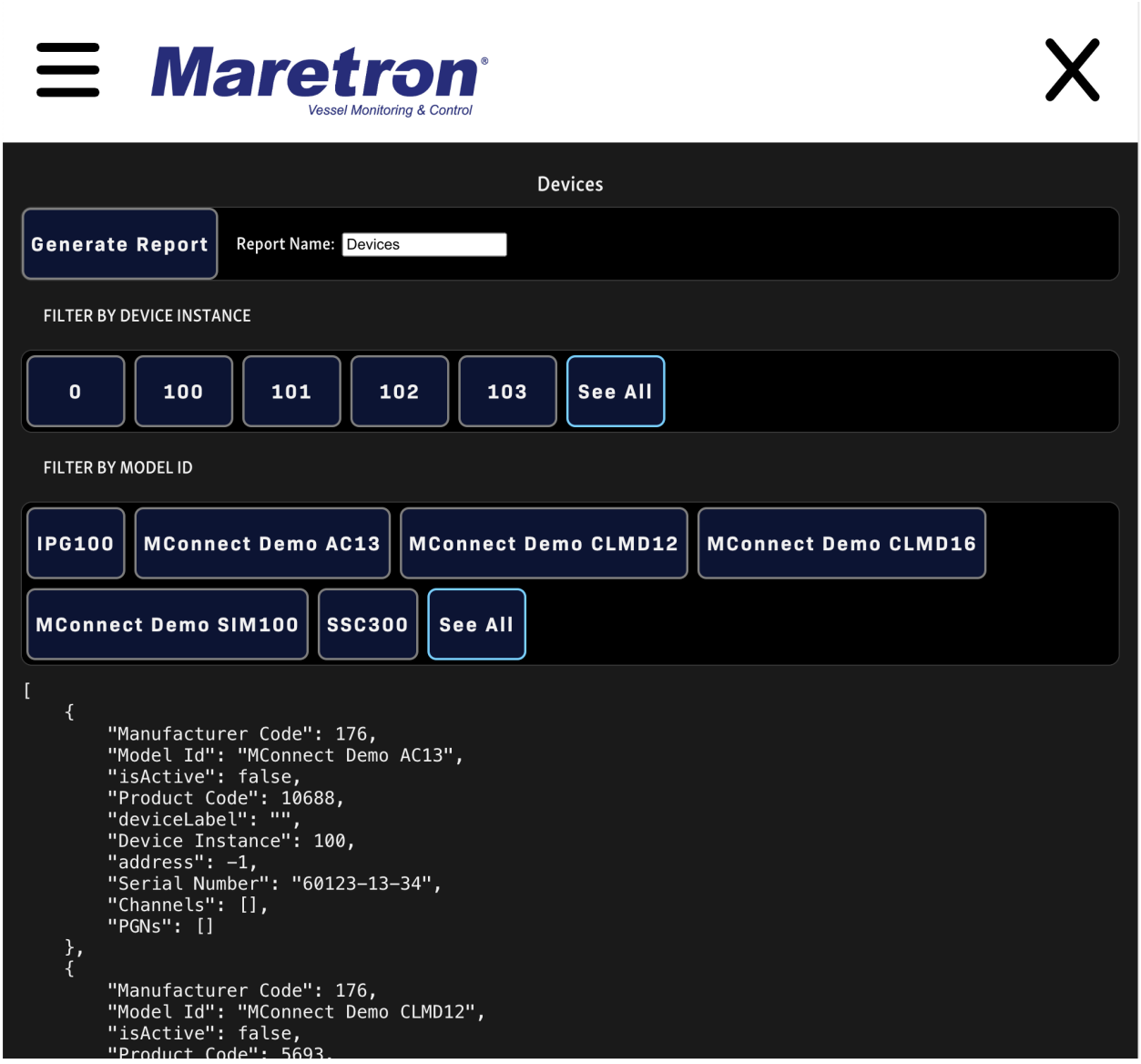
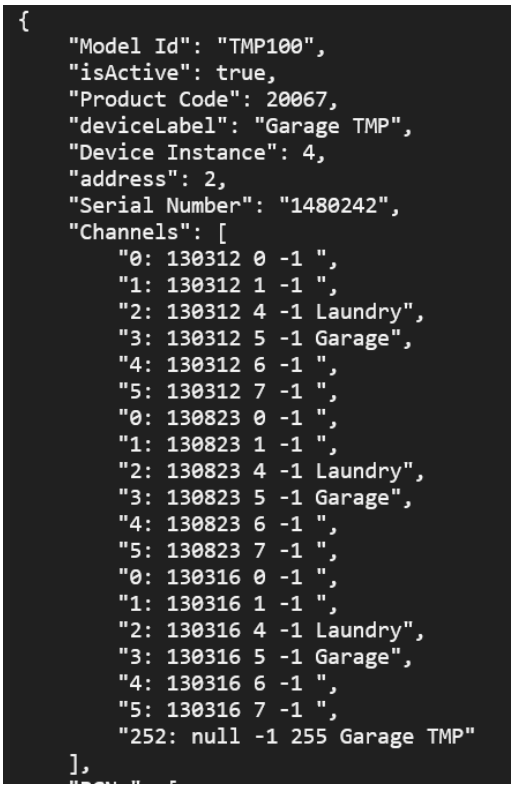


Figure 12 – Devices Dialog

The devices shown may be filtered by Device Instance Number, or model Id, or both.

Within each device, there is a section containing details of the device



```
{
    "Model Id": "TMP100",
    "isActive": true,
    "Product Code": 20067,
    "deviceLabel": "Garage TMP",
    "Device Instance": 4,
    "address": 2,
    "Serial Number": "1480242",
    "Channels": [
        "0: 130312 0 -1 ",
        "1: 130312 1 -1 ",
        "2: 130312 4 -1 Laundry",
        "3: 130312 5 -1 Garage",
        "4: 130312 6 -1 ",
        "5: 130312 7 -1 ",
        "0: 130823 0 -1 ",
        "1: 130823 1 -1 ",
        "2: 130823 4 -1 Laundry",
        "3: 130823 5 -1 Garage",
        "4: 130823 6 -1 ",
        "5: 130823 7 -1 ",
        "0: 130316 0 -1 ",
        "1: 130316 1 -1 ",
        "2: 130316 4 -1 Laundry",
        "3: 130316 5 -1 Garage",
        "4: 130316 6 -1 ",
        "5: 130316 7 -1 ",
        "252: null -1 255 Garage TMP"
    ],
```


Figure 13 – Devices Dialog – Device Data

and a list of PGNs received from that device, as interpreted by MConnect.


```
{
    "PGN Number": "126996 (Product Information)",
    "last received": "from CAN 1 at Fri Aug 25 2023 13:43:23 GMT-0400 (Eastern Daylight Time)",
    "Raw Data": "[ 2, 126996, 2, 255, 6, 0, 2000, 20067, TMP100, 1.1.2.7, 1.0, 1480242, 0, 1 ]",
    "Parameters": [
        "NMEA 2000 Database Version : 2000",
        "NMEA Manufacturers Product Code : 20067",
        "Manufacturers Model Id : TMP100",
        "Manufacturers Software Version Code : 1.1.2.7",
        "Manufacturers Model Version : 1.0",
        "Manufacturers Model Serial Code : 1480242",
        "NMEA 2000 Certification Level : 0",
        "Load Equivalency : 1"
    ]
},
```


Figure 14 – Devices Dialog – PGN Data

To save the contents of this dialog, enter a name for the report and press the **Generate Report** button. The file will be created for all the devices on the network; the filters will not be applied. Once the file has been created, the **Download** button will be displayed. Pressing that will save the file to the Downloads directory on the device displaying the dialog. It may not be possible to download the file to an MFD. The files will also be displayed in the Diagnostic dialog, where they may be downloaded later, or deleted.

7.6 Diagnostics Dialog

This dialog contains information that may be requested by Maretron Support.

7.7 Screens Dialog

This contains a drop-down list of all the screens in the active configuration. You may select a screen and press the GO button to display that screen. This need only be used if the screen designer did not add a screen navigation button to a screen.

7.8 Tailscale VPN Dialog

This should be used when the user wishes to access the MConnect Web Server over the Internet when away from the boat. Using a VPN is a very secure way of accessing the boat's network

7.8.1 Initial Setup

Any device used to remotely access the MConnect will also need to run the Tailscale application. To learn more about installing Tailscale on your phone or computer, visit ***https://tailscale.com/***. The MConnect will also provide a custom link during the setup process. Tailscale will provide you with an app for your phone to set up the VPN on your phone.

MConnect must have access to the Internet for both the installation of Tailscale and when you want to access the data.

The MConnect may have Tailscale already installed with a common key. If you wish to monitor more than one MConnect on your Tailnet, please use the “Remove Tailscale VPN” button to uninstall Tailscale. After the uninstall is completed, clicking the “Install Tailscale VPN” button will restore the Tailscale software with a unique key.

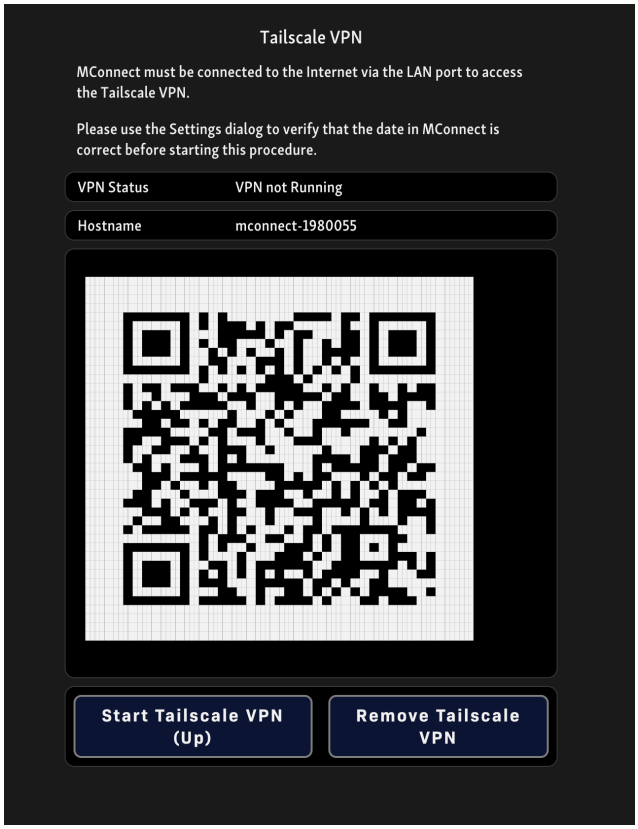


Figure 15 - Tailscale installed, Not Member of any Tailnet

If the VPN status is “Not Running” point your phone’s camera at the QR image. The link will ask you to login to Tailscale and will associate the MConnect with your Tailnet.

If the authentication link is expired, press the Start Tailscale Button to generate a new link.

If Tailscale is not installed there will not be a QR Code and the following dialog will be displayed.

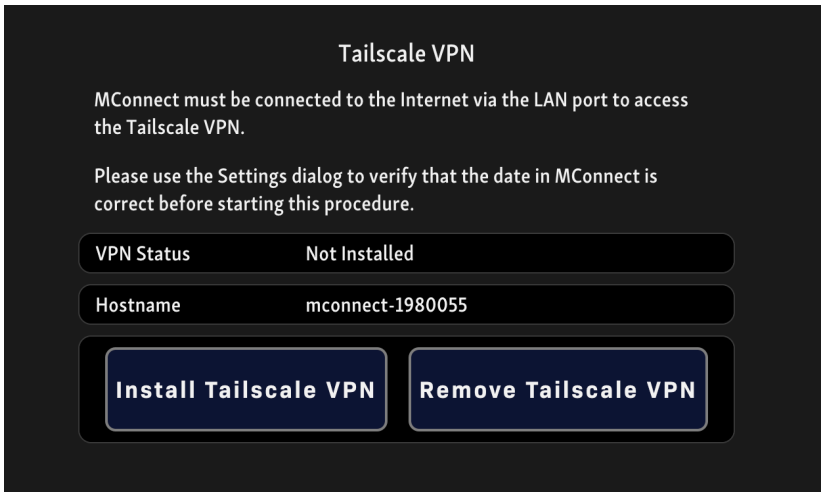


Figure 16 - Tailscale Not Installed

Press the install Tailscale button to get started. The “Remove Tailscale” button is always available and can be used to remove all Tailscale data and settings.

7.8.2 Post Setup Usage

The VPN status will show “VPN not Running” or VPN is up.

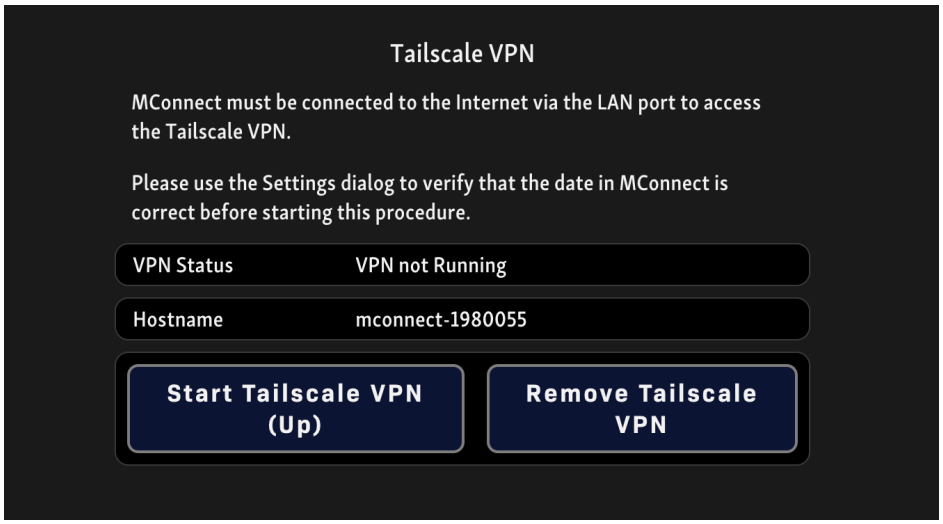


Figure 17 - Existing Installation (Down)

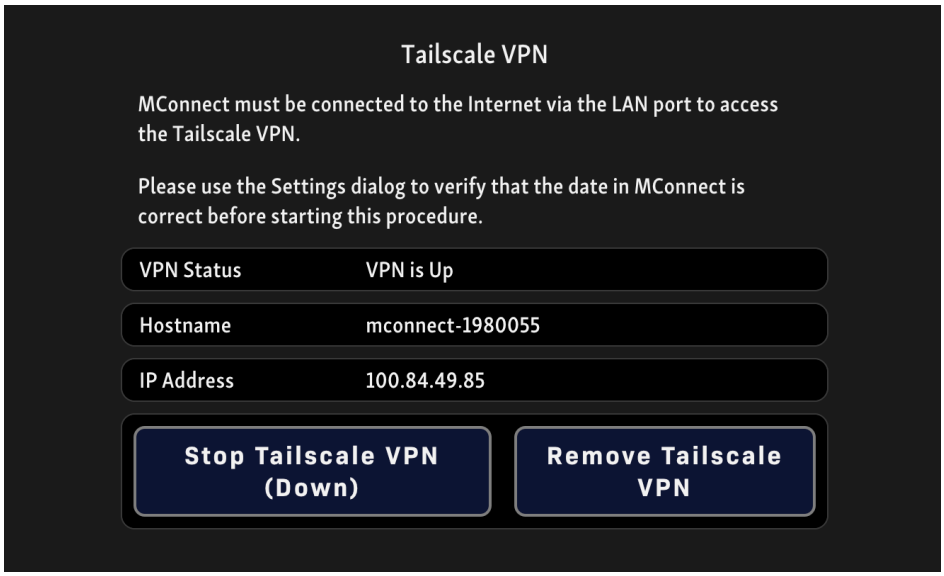


Figure 18 - Existing Installation (Up)

Tailscale requires accurate timestamps. In most cases, the MConnect clock will be accurate as it uses the vessel’s GPS data. If no GPS is available and the clock is not accurate, use the option in **Main Menu -> Settings** to set the MConnect time to your computers time.

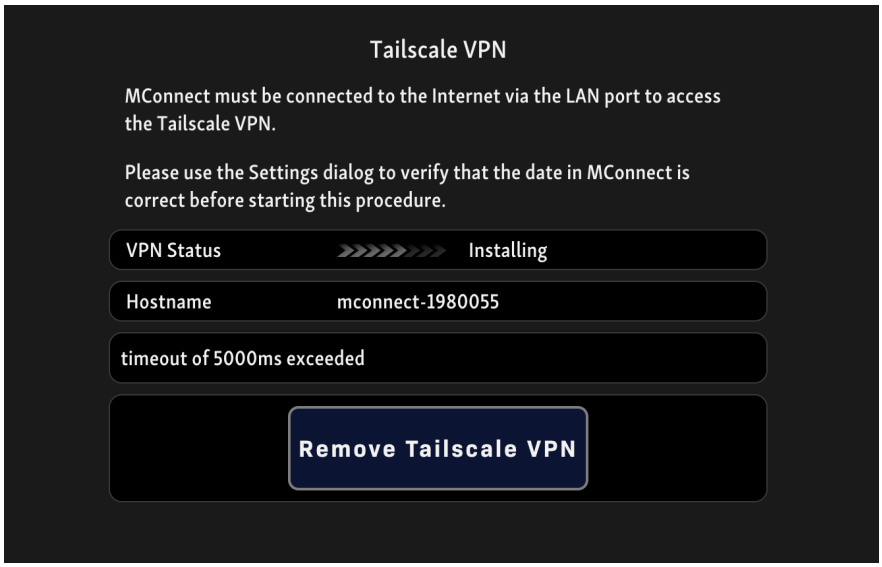


Figure 19 - Install Failing Because Clock is Out of Sync

8 Upgrading MConnect

As MConnect is released with new features on a regular basis, you will want to keep it upgraded to the latest version.

Updates will be posted on the Maretron website on the MConnect page. Please download the update file, and follow the instructions given with the update.

9 MConnect Editor

When the Edit Configurations button in the Configurations Dialog is pressed, MConnect will change into Edit Mode. Pressing Control + E (Windows) or Command + E (Mac) will also navigate to Editor Mode. While the Edit Mode is supported by all browsers and MFDs, it is strongly recommended that a large screen be used with a mouse and keyboard.

Figure 20 - MConnect Editor

9.1 Top Menu Bar

Figure 21 - Top Menu Bar

The Top Menu Bar contains the following buttons:

- **Display Mode** – exit the edit mode and return to the main display
- **Image Manager** – enter the dialog to manage the images saved within MConnect. These images are used for screen backgrounds, gauge faces, masks and needles, and button and indicator icons. The images are shared between the configurations.

- **Documentation** – This page can be used to get help on parameters and components.
- **Configuration** – This shows the Configuration Editor.
- **Telemetry** – Shows Telemetry Editor and status.
- **Light / Dark Theme Control** – This changes the screen colors for editing from light to dark.

9.2 Image Manager

Screens may contain background images and custom components will contain images and masks. This section of the Editor is used to upload these images to the MConnect Server and manage them.

Images are divided into the following sections:

- Background-images – images used for Screen backgrounds.
- Compass-roses – images used for backgrounds in Custom Compass Rose components.
- Gauges – images used for backgrounds and masks in Custom Gauge components.
- Needles - images used for needles in Custom components.
- Digital-backgrounds - images used for backgrounds in Custom Digital components.
- Icons - images used in Push Button and Indicator components.

9.2.1 Image Types

The best images to use are png files. These allow transparent areas, or semi-transparent areas.

Supported image types:

- JPEG (or JPG) - Joint Photographic Experts Group
- PNG - Portable Network Graphics

- GIF - Graphics Interchange Format
- MP4 – Video files

9.2.2 Image Manager Dialog

Images are managed in the Image Manager Dialog, which is opened by clicking on the Image Manager button at the top of the screen.

Looking at background-images as an example

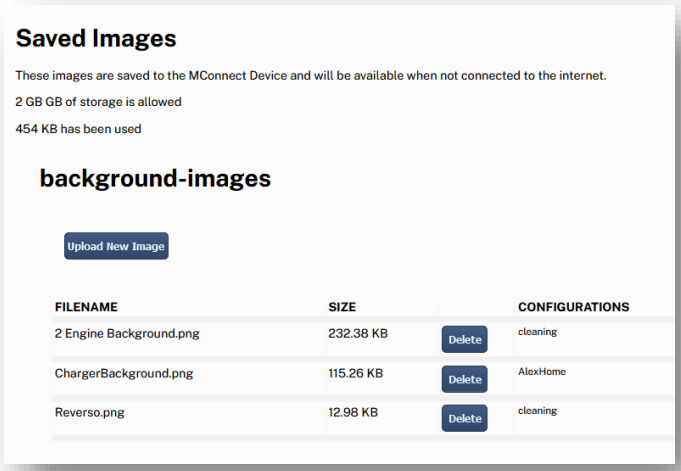


Figure 22 - Editor Image Manager

This shows that 3 customer-defined images have been uploaded.

To upload images from your laptop, press the **Upload New Image** button. A window will open in your browser where you can select the images.

Once uploaded, the file is listed, with its size and the names of the configurations that use the file.

9.3 Documentation

Pressing the Documentation button in the header area will open the Documentation display.

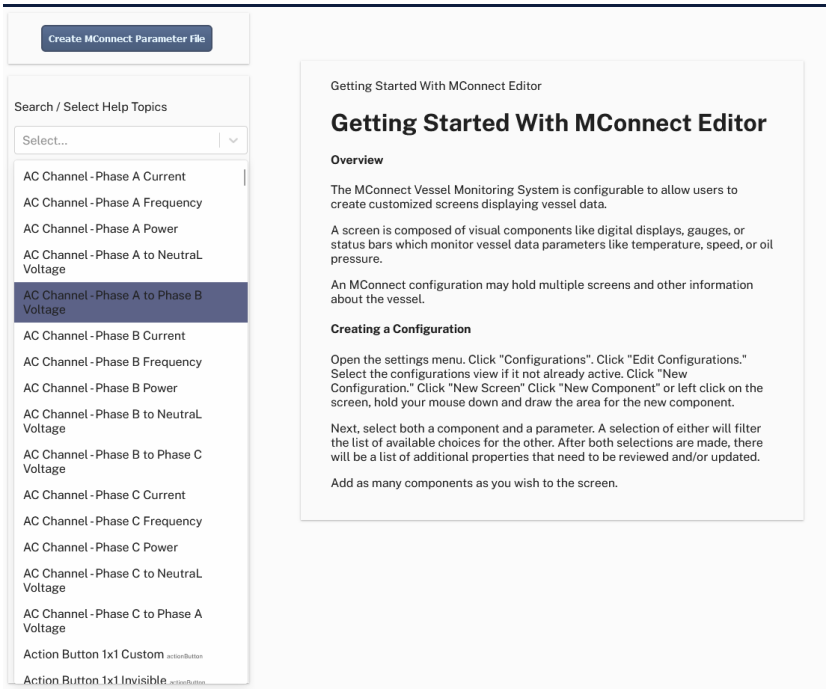


Figure 23 - Editor Documentation

The left column is a searchable list of all the parameters.

As a reference, you can download the list of supported parameters, components, conditions, and actions by pressing the **Create MConnect Parameters File** button. The file will be stored in your Downloads directory. Where possible, the description of the parameters will contain the PGN from which the data will be extracted. Searching for PGN is an easy way to discover which parameters are in which PGN.

9.4 Configuration Editor

The Configuration Editor has three columns, each of which may be resized by clicking and dragging the vertical bar between the columns. To open more than one panel at a time, click the + and – buttons. Clicking the title of a panel will close other panels.

On the left is the **Selection Panel**, which is used to select the configuration, the screen within the configuration, and the component within the screen.

In the center is the **Display Screen** which shows the graphical view of the screen being edited. Components may be selected, sized, and positioned using a mouse or touch screen. At the top of the Screen Display

On the right is the **Edit Panel**, where an attribute of a selected object may be edited.

The Selection Panel has the following panes, which may be expanded using the + button, or minimized using the – button. They may be re-sized by clicking and dragging the horizontal line between the panes.

9.4.1 Configuration Selection Pane

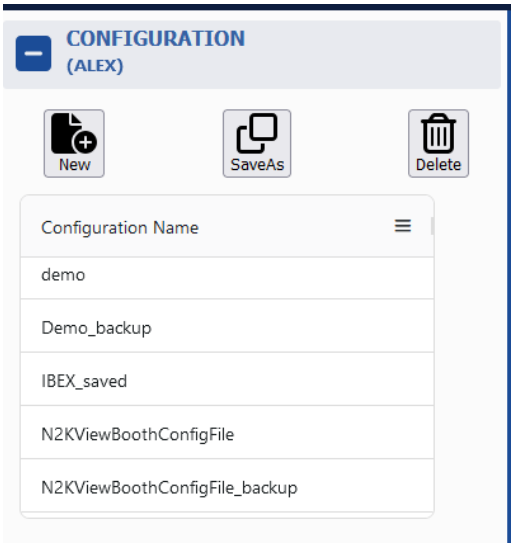


Figure 24- Editor Configuration Selection Pane

This pane is used to manage the configurations stored in the MConnect device. Selecting a configuration from the list will load the configuration into the editor.

The blue +/- button at the top left of the pane will open and close the pane, and pressing on the CONFIGURATION title when the pane is closed will open the pane and simultaneously close any open panes in the left column.

Hovering a mouse to the right of the title and then clicking the ☰ icon will open the search dialog.

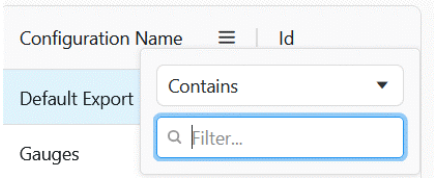


Figure 25 - Configuration Search Dialog

9.4.1.1 Creating a New Configuration

A new configuration may be created by pressing the New button, and the selected configuration may be deleted by pressing the delete button. Any configuration may be saved with a new name (effectively copying a configuration) by pressing the Save As button. All changes made to the configuration will also be saved under the new name and will not be saved under the old name.

9.4.1.2 Copying a Configuration

Configurations may be saved with a different name, to create a copy of the Configuration.

The exception to this is the default configuration. To make a copy of the default configuration, exit the Editor and, from the Configuration dialog, export the default configuration to your computer, and then Import it again as a user configuration. (see 7.3.3.2)

9.4.1.3 Deleting a Configuration

Select the configuration in the Configuration pane. When the center Screen Display panel displays a screen from that configuration, press the Delete button.

After deleting the configuration, use the Image Manager to remove images that are no longer required.

9.4.2 Screen Selection Pane

Once a configuration is chosen and loaded, all the screens of the configuration are displayed in a list.

The blue +/- button at the top left of the pane will expand and close the pane. Pressing on the SCREEN title when the pane is closed will open the pane and simultaneously close any open panes in the left column.

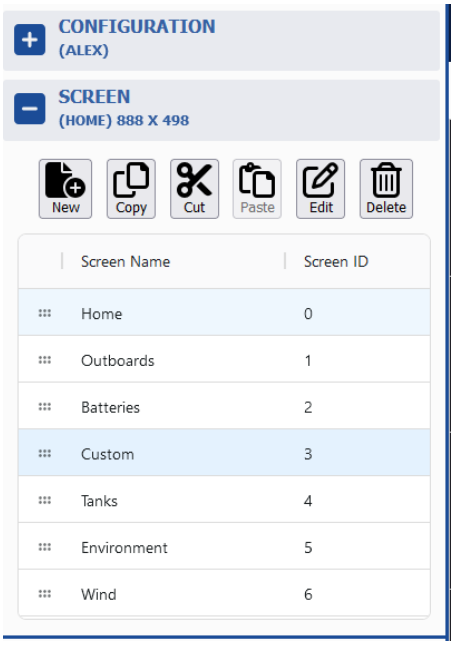


Figure 26 - Editor Screen Selection Pane

Here the Configuration **Alex** has been loaded; the list of screens in the configuration is shown with the **Home** screen selected (light blue background). The pixel dimensions (width x height) are shown at the top of the Screen Selection Pane after the name of the selected screen.

The contents of the selected screen with be shown in the Screen Display panel.

The order of the screens may be changed by grabbing the handle in the left column and dragging it up and down the list.

New screens may be created by pressing the New button and the highlighted screen may be deleted by pressing the Delete button.

Screens may also be cut, copied, and pasted (either as a copy in the same configuration or into another configuration).

9.4.2.1 Editing Screen Attributes

Pressing the Edit button will display the screen attributes for editing.

This includes:

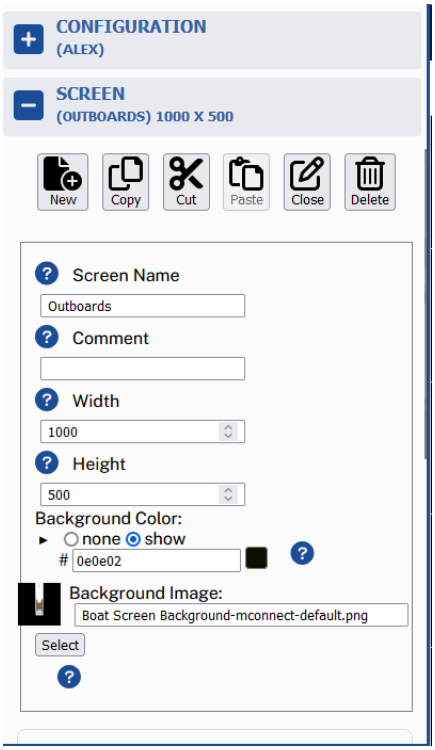


Figure 27 - Editor Screen Attributes

- The Screen Name – this will be displayed to allow you to identify the screen during editing and normal operation.

- Comment – this will not be displayed to the end user and is a place where the screen designer can make notes.

- Width and Height – in pixels.

- Background Color – this gives a color to background. The rrggbb color value may by typed in the field, or pressing the ▶ will open a color picker. The color will be displayed on the right.

- Background Image – This field selects an image (gif, jpg, png, or svg) that fills the screen behind the components. The file must already exist on MConnect; use the Image Manager to transfer images to the MConnect Device. The background image is displayed on top of the background color. If the image is a png file with any transparency, the background color will show through. Pressing the Select button shows a list of background images already stored on MConnect and an **Upload New Image** button that can be used to transfer a background image directly from the computer that is hosting the web browser.

9.4.2.2 Screen Sizes (Width and Height)

The selection of screen sizes is important. All the MConnect screen components are drawn using vector graphics, so they will scale to large sizes without distortion or pixelation. Any user-defined screen component using graphic images (including the background images) will pixelate or blur if they are displayed at a greater size than that when they were loaded to MConnect. While that makes a good argument to use large images, the larger images and larger screen sizes make more demands on the display processor and memory, which can slow the client down considerably.

The starting point to think about sizes is to look at the size of your monitor (or MFD). If your display is 800 x 600 pixels, selecting a screen size of 8000 x 6000 pixels is a waste, as the graphics processor must move and process images 100 x the size of what is needed, and then throw away 99% of the data.

The aspect ratio is an important factor to consider as well. The aspect ratio is calculated by dividing the width by the height. If the aspect ratio of the MConnect screen does not match the physical screen, MConnect will add black bars to either the top and bottom, or the left and right of the Screen Display to prevent the screen components from being distorted. E.g., screens with resolutions of 800x600, 1440,1080, and 1920x1440 all have an aspect ratio of 1.33:1. Any MConnect screen designed for one of these sizes will display without any black borders.

9.4.2.3 Supporting Multiple Aspect Ratios

MConnect does support multiple screen aspect ratios without black borders, provided that the screen layouts are all predefined. MConnect will never re-layout your screen away from your design or distort the screen to force the display to fit.

If you create more than one MConnect Screen with the same Screen Name, MConnect will display the screen with the closest aspect ratio to the area in which it will be displayed. E.g., if designing for an iPad, you can create an engine screen that is 2420x1668 pixels (landscape; suitable for an MFD). When complete, copy and paste the screen using the same name, and then change the height and width to 1688x2420 (portrait; suitable for an iPad). Re-arrange the components to fit. You now have a screen that is optimized for both portrait and landscape. And you are in complete control of the resultant user experience.

9.4.2.4 Home Screens

Screens named “Home” have a special place. On startup, if the last screen viewed cannot be found, the display will look for a screen named “Home” and display this screen.

Pressing the Home button on a keyboard will display the screen named “Home”.

Action buttons that will take you to a screen named “Home” will show an icon of a house rather than the arrow.

For these reasons, it is recommended that all configurations have a screen named “Home” that is the top level of your screen hierarchy.

9.4.3 Component Selection Pane

When a screen is selected in the Screen Selection pane, the Component Selection pane is populated with the list of components shown on the screen, and one component selected. The Screen Display will show the screen, and the selected component will be

shown with a yellow border as well as having its attributes displayed in the Edit Panel. Clicking on a component in the Component Selection pane or on the Screen Display will make it the selected component.

The blue + - button at the top left of the pane will expand and close the pane, and pressing on the COMPONENTS title when the pane is closed will open the pane and simultaneously close any open panes in the left column.

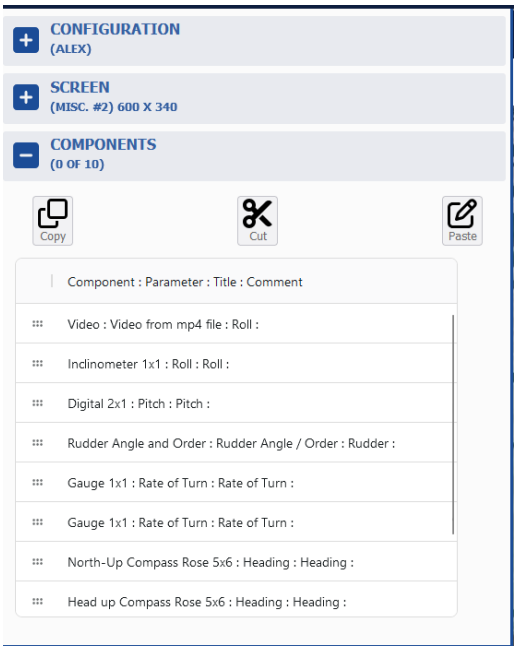


Figure 28 - Editor Component Selection Pane

Components may be copied, cut, and pasted from here. Use control/command + click in either the table or in the preview to select multiple non sequential components or shift + click in the table to select a sequential group.

To add a new component, use the Add button on the right column; to delete a component, use the Delete button on the right column.

Clicking on a component will select it. The component will be highlighted with a yellow border and translucent overlay on the Display Screen.

The attributes of the selected component will be shown in the right column where they can also be edited (see 9.4)

If multiple components are selected, all will have a yellow or gold border, but only the first component selected will have editable properties in the Component Edit Panel.

9.4.4 Display Screen

The display screen is in the center and provides a WYSIWYG display of the screen that is being edited.

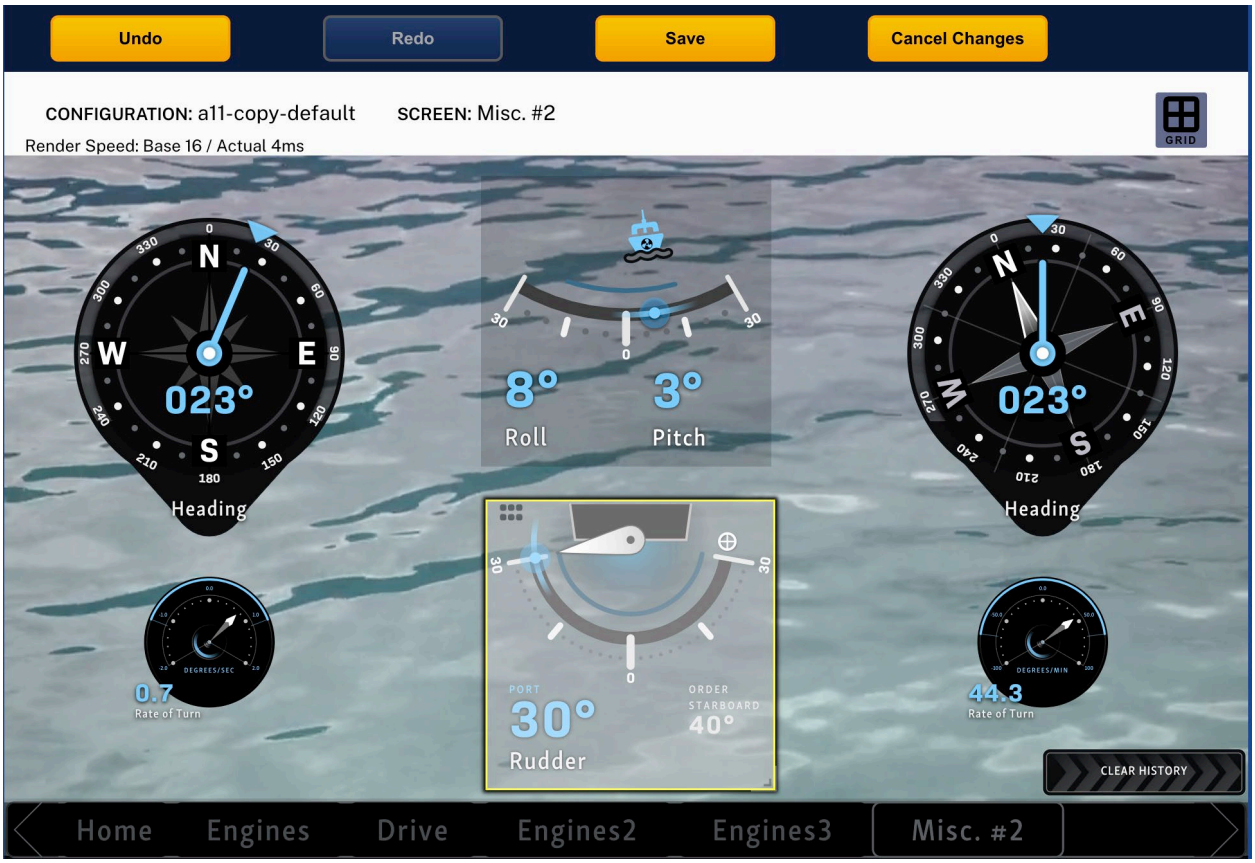


Figure 29 - Edit Display Screen

Above the screen are Undo, Redo, Save, and Cancel Changes buttons. The configuration being edited is never saved to MConnect without being explicitly commanded by the designer by pressing the Save button. If any changes have been made and are not saved, the button will be yellow. If changes were made due to required updates to the configuration schema, the Cancel Changes button will not work. The user should save the changes made by the system.

9.4.4.1 Grid and Snapping

The grid is only visible in editor mode. Each page of each configuration will remember the grid preferences selected for that grid.

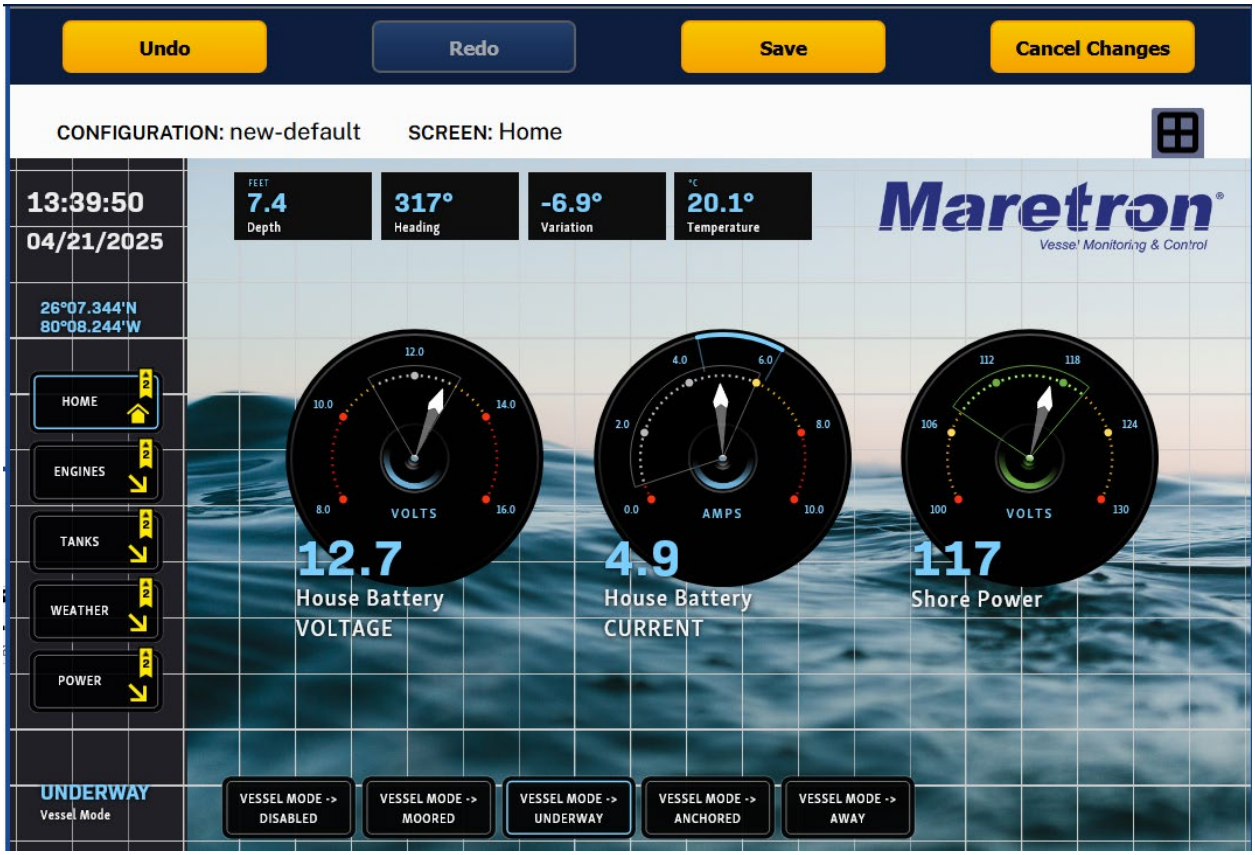


Figure 30 - Editor Grid View

Clicking the Grid Button  will toggle visibility of the grid layout dialog.

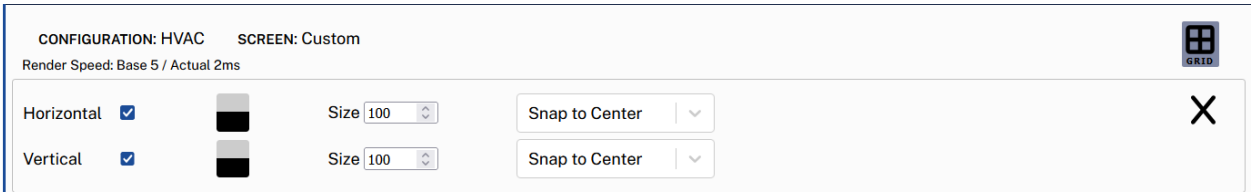


Figure 31 - Grid Layout Dialog

The checkboxes on the left control if the horizontal and vertical grid lines are displayed.

The next column controls the color of the color of the gridlines – use the light color for dark screens and the dark color for screens with light backgrounds.

The size column controls the spacing between the grid lines. One line is always drawn at the center of the screen, and the other lines are spaced out from that at the given spacing.

When components are dragged on the screen to position them, they may be snapped to the closet grid line by selecting one of the snapped options. (E.g. Snap to Center means that the center of the component will be snapped to the nearest grid line.)

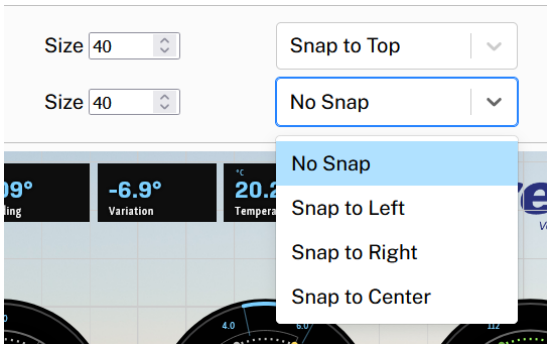


Figure 32 - Component Snap Options

The snap options have no effect on components already placed on the screen, only on the component being dragged.

9.4.4.2 Adding a Component to a Screen

The first step in adding a component to a screen is to determine the parameter for the data that is to be displayed. The list of the components, parameters, conditions, and actions that MConnect supports can be found by pressing the **Create MConnect Parameter File** button within the Editor. (see 9.2) Where possible the description of the parameter includes the PGN Number of the NMEA 2000 message that contains that parameter. The HTML file of the parameters may be searched to find which parameters are extracted from that PGN.

Once the parameter has been selected, determine the type of component that will be used to display the parameter's data. Descriptions of the components are contained in the above file. Where the name of the component is followed by (2x1) this gives the aspect ratio of the component as width x height. e.g., Active Button (4x1) is four times wider than it is high. When there is no aspect ratio, the control can be assumed to be square (1x1).

The following sections provide more detail on using the Editor.

9.4.4.3 Selecting Components

Components may be selected by clicking on them with a mouse or touch. Only one component may be selected at a time. Once selected, it may be dragged around the screen. Dragging the bottom right corner will re-size the component. Experience has taught us that placing and sizing components in this is only approximate, and hand editing the Left, Top, and Width attributes in the component editor, or snapping to a grid line are the best ways to line components up for a professional finish.

Components may also be selected from the Component Selection Panel on the left.

9.4.5 Component Editor

To edit a component, select the screen in the Screen Selection panel (see 9.4.2) and then select the component by clicking its entry in the Component Selection panel (see 9.4.3) or by clicking it on the Display Screen. This will open the Component Editor in the right column.

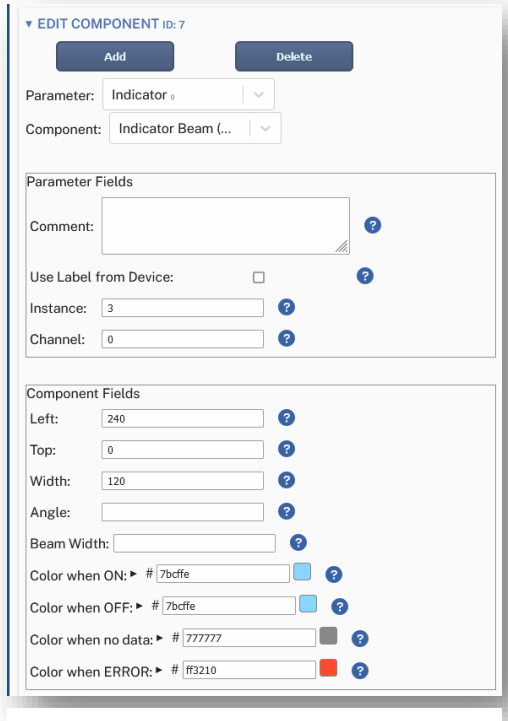


Figure 33 - Component Editor

For details on the attributes on each parameter or component, generate the MConnect Parameter file from the Documentation page (9.2) or press the ? symbol next to the attribute.

The Parameter and Component fields are used to select the parameter type and the component type. These are filtered, so that you only see the components for the parameter that has been chosen, or vice versa. This can lead to your choice of parameter not being available. If this happens, change the selection of Component to None before selecting the parameter. Typing in the field will narrow the selection.

A component contains two main sets of attributes, the Parameter Attributes, and the Component Attributes.

9.4.5.1 Parameter Attributes

Selecting a Parameter will populate the list of Components that may be used to display the Parameter and show the attributes for that Parameter.

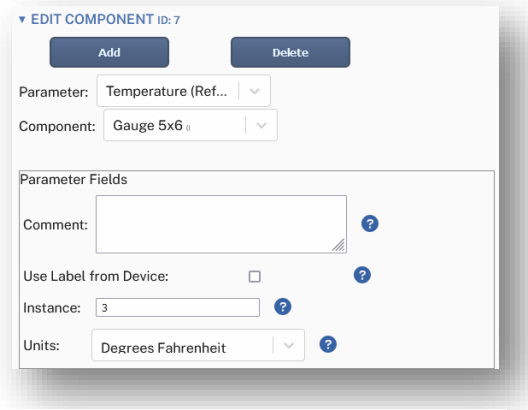


Figure 34 - Editor Parameter Attributes

The Parameter Attributes describe how the data is obtained from the source (normally the NMEA 2000 bus) and typically include the instance number and units.

The comment field is never displayed and may be used by the screen designer for their notes.

9.4.5.2 Component Attributes

Selecting a Component will show the attributes for that Component.

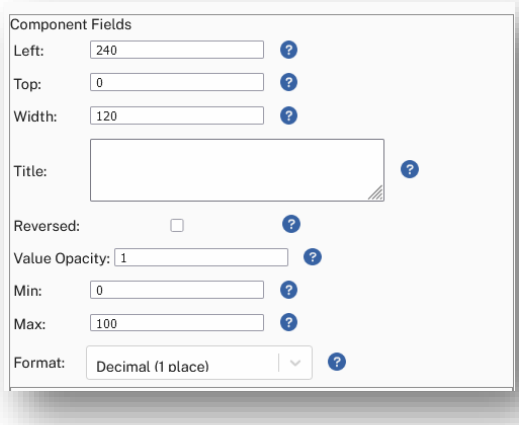


Figure 35 - Editor Component Fields

The Component Fields describe how the data is displayed on the Screen, and typically include the Top, Left, and Width attributes, and details on how to color the component.

9.4.6 Switch Groups

Breakers may be controlled in a group. These groups are called Switch Groups and are defined in this section. To create a new group, press the **Insert Switch Group** button near the top of the editor. This button is only visible when there are no Switch Groups in the Configuration, or an existing Switch Group line has been selected.

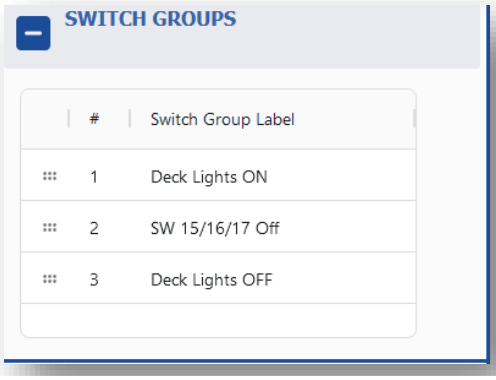


Figure 36 - Switch Group Selection Panel

It is possible to re-arrange the order of the Switch Groups by grabbing the handle in the left column and dragging it up and down.

If the Switch Group line is highlighted, the center panel displays the contents of the switch group.

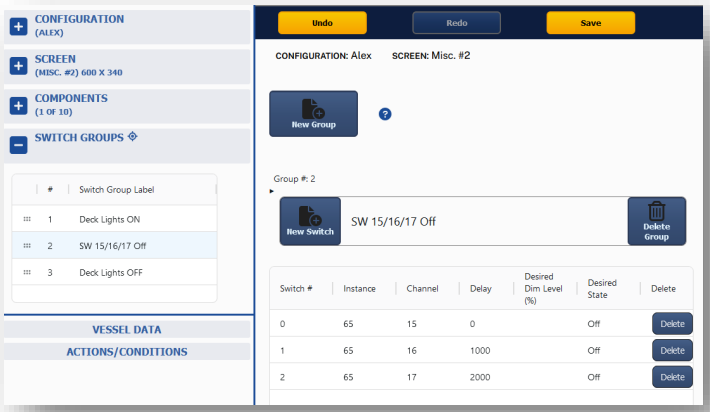


Figure 37 - Edit Switch Groups

.

Expanding the Switch Group by pressing the little triangle just under the group number or the name, shows that each group has a Label, Comment field, a number, and a set of Switches. This set is initially set to just one switch.

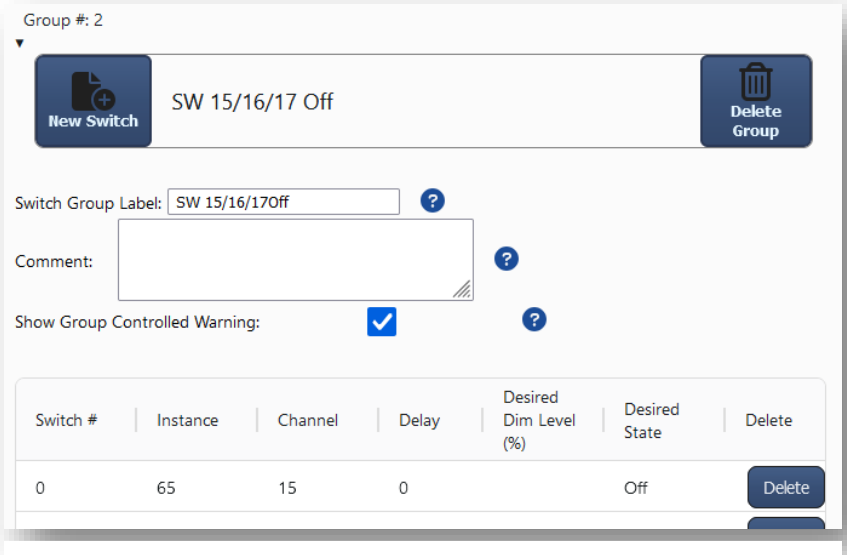


Figure 38 - Edit Switch Group Members

When a Switch Group is assigned to a Push Button and the button is pressed, all the switches in the group will be commanded into their desired state after the specified delay. If a Switch Group is created to turn a set of lights on, then a separate Switch Group must be created to turn them off.

9.4.7 Vessel Data

This section contains the names of the user-defined Vessel Operating modes.

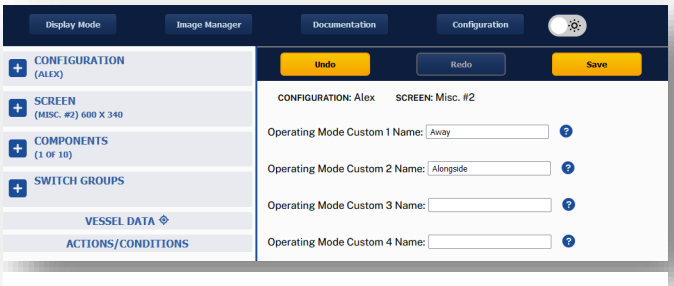


Figure 39 - Editor Context Sensitive Help

Note the . Throughout the edit, you can get context sensitive help by pressing this button.

9.4.8 Conditions and Actions

Conditions and Actions are part of the automation capabilities of MConnect.

When a condition is met the action is performed. No action is performed when the condition goes false. This would require the creation of a second condition. E.g., to control an Engine Room fan would require 2 conditions and 2 actions:

- Temperature > 90 degrees condition triggering a Breaker On action.
- Temperature < 80 degrees condition triggering a Breaker Off action.

More than one action may be associated with a condition.

Conditions may also be displayed on the screen using any of the indicator components.

The automation module will be extended as more features are added to MConnect.

Pressing Conditions and Actions in the left column displays the Conditions and Actions editor.

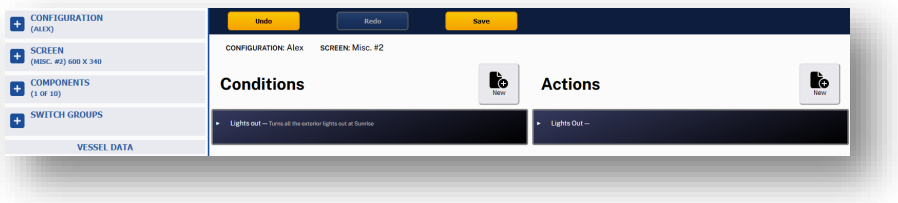


Figure 40 - Conditions and Actions

To create a new condition, press the **New** button at the top of the Conditions column.

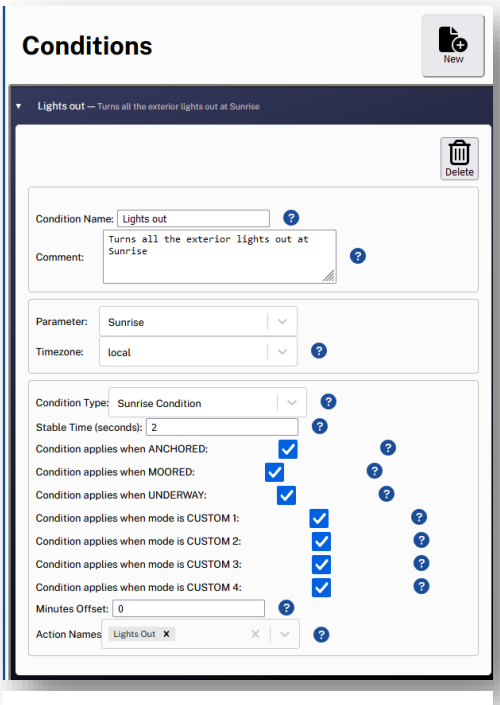
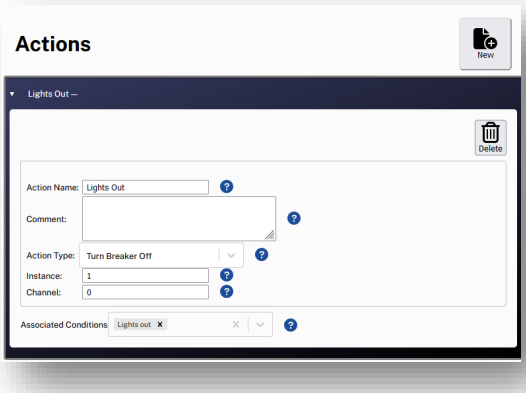


Figure 41 - Edit Conditions

For details on the attributes on each condition, generate the MConnect Parameter file from the Documentation page (9.2) or press the ? symbol next to the attribute.



To create a new action, press the **New** button at the top of the Actions column.

9.5 Telemetric Cloud Service

For off vessel monitoring, MConnect may be paired with a Maretron Telemetric Cloud Service account. See (***https://www.maretron.com/products/maretron-telemetric-cloud-service*** for details.)

Choose Telemetric Data from the top-level navigation buttons. The controls and table on this section allow specification of data to be sent to cloud storage.

To Add a new parameter, click the Add button and then edit the top row. Change “aaa New Title” and any other necessary fields to match your requirements.

Notice some parameters require additional selections. When these are required, selection menus will be available in the table.

The MConnect must be connected to the internet and the “Enabled” box must be checked if data is to be uploaded to the cloud service.

Changes will not take effect until the Save button has been pressed.

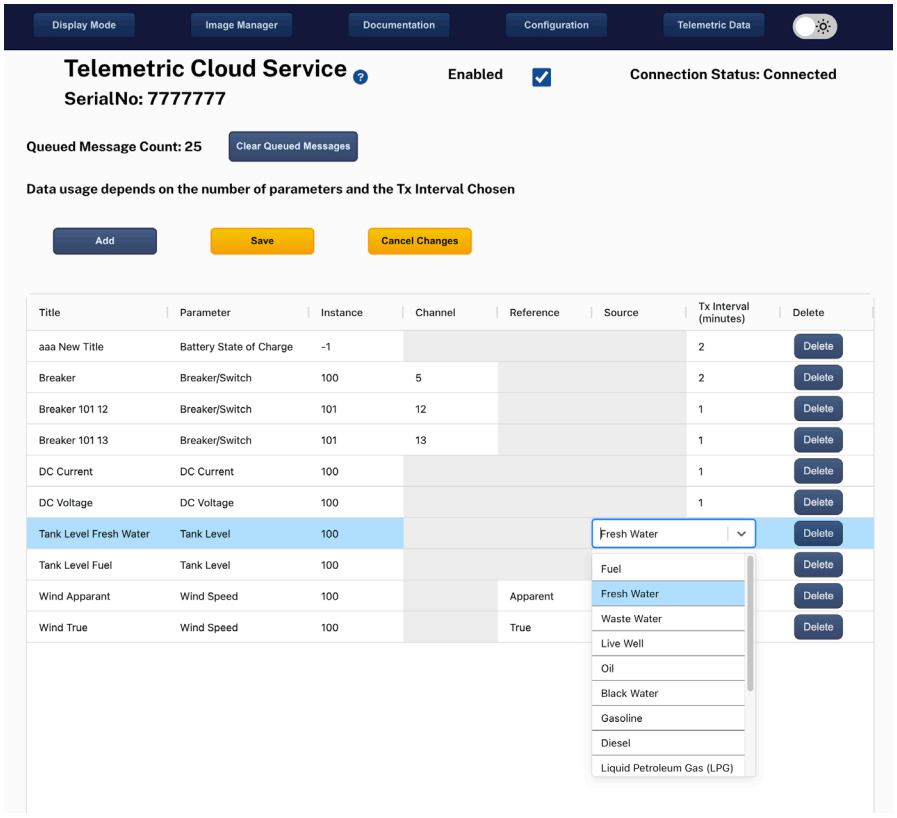


Figure 42 - Telemetric Cloud Service

10 Troubleshooting

If you notice an unexpected operation of Maretron MConnect, follow the troubleshooting procedures in this section to remedy simple problems.

Symptom	Troubleshooting Procedure
No data on the MConnect screen (all components display dashes for the data value and gauge indicators are at the end stop.	Tighten the NMEA 2000 CAN connectors.
Only certain digital components display dashes for data or certain gauge indicators are at the end stop.	Make sure that you have the proper transducers on the NMEA 2000 network and that the transducers are properly programmed with the right source type and instance number (if applicable)

If these steps do not solve your problem, please contact Maretron Technical Support (refer to Section ***Technical Support*** for contact information).

11 Browser Support

MConnect is designed to work with a wide range of devices, but it is important that screen designs respect the limitations of the device intended to view the screen. For example, a high-end computer will be able to display hundreds of components on a single screen, but a device with limited resources will not support this same design.

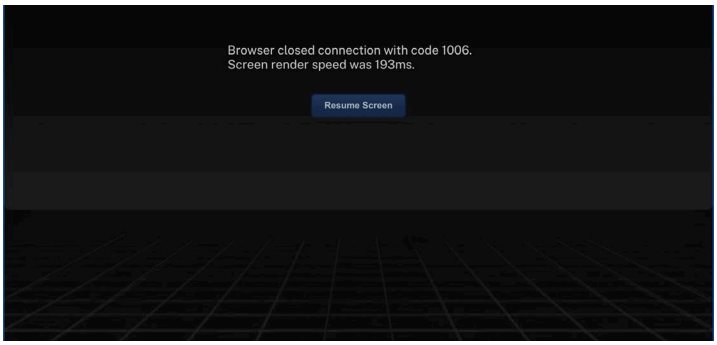


Figure 43 - Resume Screen Button

If a device is overwhelmed, it will close the connection to the MConnect Server. If this is detected in combination with an unusually slow screen render speed, the display will exit to provide access to all other controls on the page. The user may then edit the screen, change to another screen, or use the Resume Screen button to try again. When designing screens, it is possible to measure the performance of the device used to view the screens. Add a digital component with a parameter Screen Render Time. As components are added to the screen, the render time increases. If the render time approaches 80 milliseconds, performance will be degraded. Notice that this render time will change with the device used to view the screen, so be sure to test in the browser intended for everyday use.

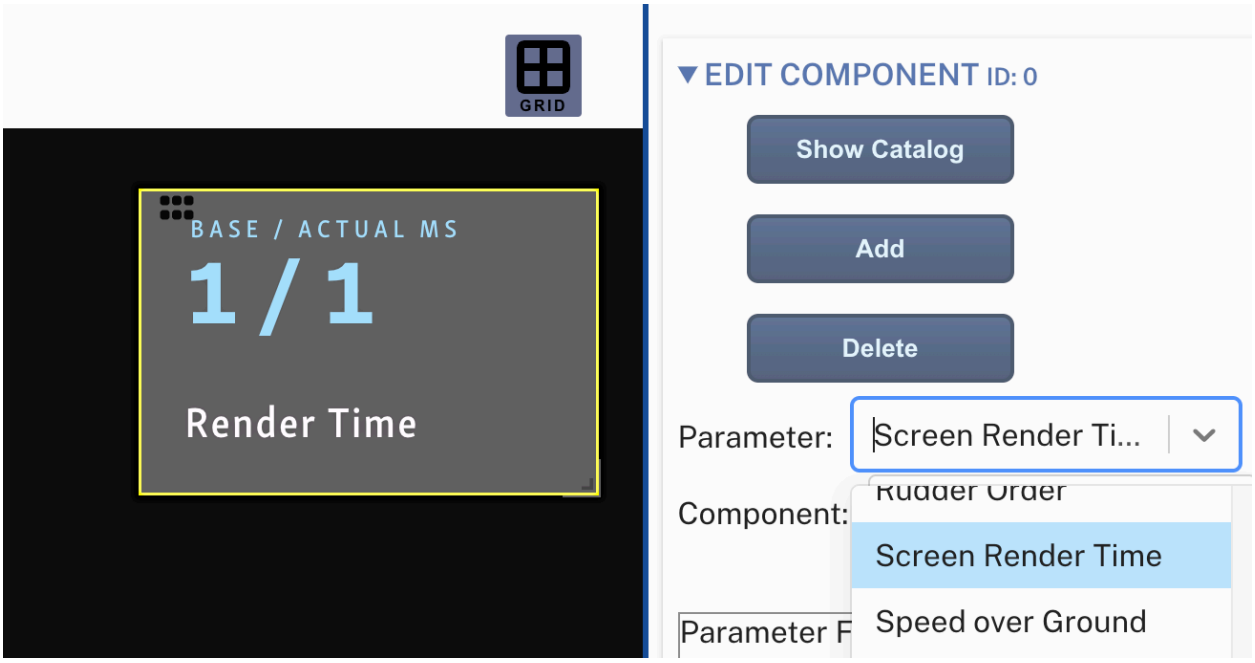


Figure 44 - Measure Screen Render Time

12 Technical Support

If you require technical support for Maretron products, you can reach us in any of the following ways:

Phone: +1-602-861-1707

Telephone: +1-866-550-9100

Fax: +1-602-861-1777

Sales email: sales@maretron.com

Support email: ***support@maretron.com***

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120 Intracoastal Pointe Drive
Jupiter FL, 33477
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