



Configuring CZone digital switching systems for remote control by the Siren Marine application

Introduction

This document describes how to modify an existing Czone configuration so that the Siren Marine Unit can be used to control Czone connected circuits and modes.

The intended audience for this document is persons familiar with the NMEA2000 and Czone systems in general, and configuration of Czone systems in particular. Although certain Czone configuration concepts are reviewed, this document is not an instruction manual on Czone configuration. It is expected that the reader is familiar with the Czone configuration application and how to use it to both create properly configured Czone system and update Czone device firmware.

Overview

Using a NMEA 2000 bus, the Siren Marine telematics units are able to command power circuits and modes of a properly configured Czone system. Therefore, the Siren Marine equipment must be connected to the same NMEA2000 bus that the Czone equipment is installed on. Also, the NMEA2000 bus and the Siren Marine equipment, in addition to the Czone equipment, must remain powered and operational any time control using Siren equipment is desired, including when the boat is unattended.

Some Czone hardware must be upgraded to current firmware versions and the Czone system must be configured for “third party operation.” There is a brief overview of this procedure in Appendix ‘A’.

NMEA 2000 PGNs

A “PGN,” or “Parameter Group Number, is a packet of data transmitted by NMEA 2000 devices to communicate with each other. PGNs can be a standard PGN as specified and documented by the NMEA 2000 standard, or a “proprietary” PGN. The NMEA 2000 specification provides that manufacturers may create their own PGNs for their own use, and it is not required that they document these publically. Czone uses several proprietary PGNs, some of which are documented and used by the Siren Marine Units. Also, Czone uses the two standard binary switchbank PGNs to communicate state to, and receive commands from, non-Czone equipment referred to as “third party devices.” Specifically, a Czone OI uses standard PGN 127501 to broadcast its status and standard PGN 127502 to accept commands to change its status.



A properly configured Czone system has at a minimum one OI with third party mode enabled, creating a virtual OI; third party mode enables PGN 127501 and 127502, through which the Siren Marine unit can display and control up to 28 Czone circuits. Czone hardware that is not configured for third party operation is not visible to a Siren Marine Unit.

Limitations

The Siren Marine equipment, when used to control Czone equipment, provides the ability to change, and detect changes to, Czone circuits and modes using an Android phone or iPhone, with the following limitations:

- While Czone provides the ability to dim circuits, this capability is not available via a Siren Marine Unit, which is limited to turning circuits on or off, and activating modes.
- Siren Marine Units will not detect Czone alarm conditions.
- Due to limitations in the NMEA2000 specification, the circuit / mode name list transmitted to the Siren Marine Cloud contains names of circuits which do not actually exist. Users will have to configure the phone app to hide nonexistent circuits.

Prerequisite Software and Hardware

Configuring a Czone system to interface with Siren Marine equipment requires:

- A Windows computer.
- A USB to NMEA2000 interface such as the Kvaser Leaf.
- The Czone configuration application, available from Czone.

Necessary Steps

The steps required to configure a Czone system to work with Siren Marine equipment are:

- Verify that Czone OI firmware is at least 6.17.17.0.
- Verify that you have a Windows computer with the Czone configuration application, connected through proper hardware to a Czone system.
- Select and configure one or more OIs for “Third-Party Operation.”
- Configure specific circuits on each OI.
- Start the Siren Marine equipment so it can discover the Czone equipment and transmit circuit names to the Siren Marine cloud.
- Confirm that the Siren Marine Unit is talking to the properly configured Czone system and also to the Siren Marine Cloud.
- Configure the Siren phone app to display only valid circuits.
- Configure the Siren phone app to know which circuits are actually modes.



Czone Firmware

Please verify that Czone OI firmware is at least 6.17.17.0. Although this document is not intended to instruct on the general configuration of a Czone system, there are some notes in Appendix 'A'.

OI Configuration & “Third Party Operation”

This section assumes that:

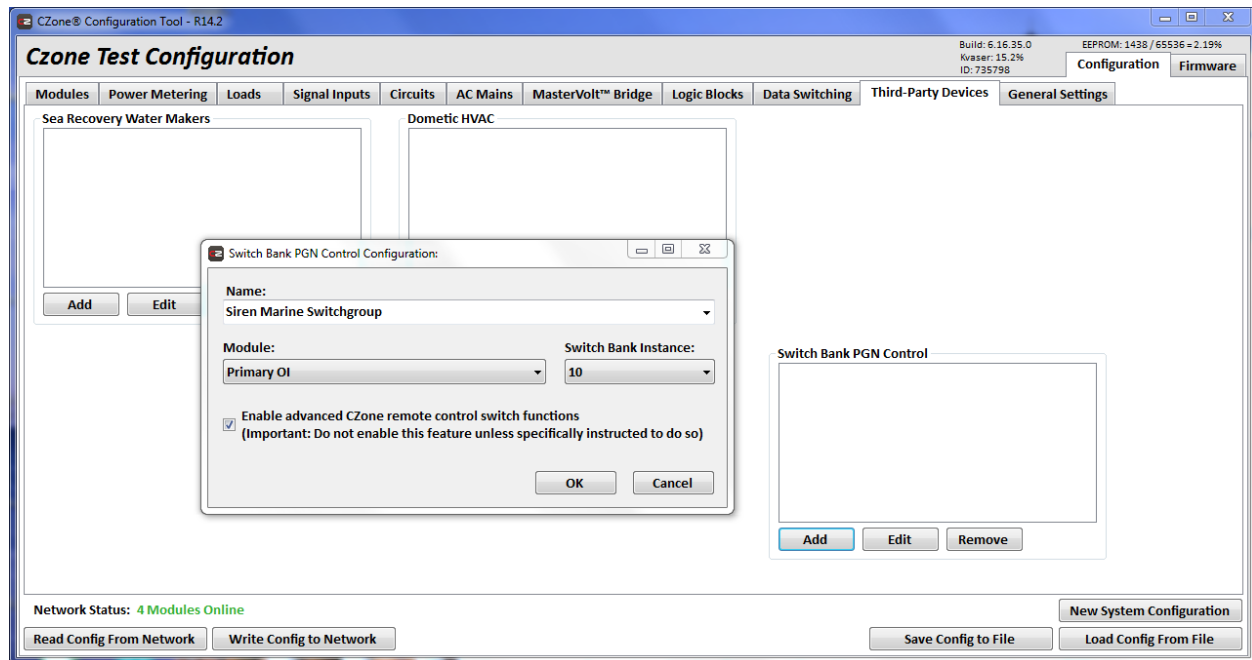
- You are working with a previously configured Czone system.
- At least one OI is present and configured.

The next step is to select and configure one or more Czone switchbank (OI) to communicate with non-Czone hardware. Each OI configured for Third Party Operation can be used to display and control up to 28 Czone circuits or modes on the Siren Marine App. In the upper right hand corner of the Czone configuration tool, be sure the “Configuration” tab is selected. Next, select the tab labeled “Third-Party Devices.”

Here you will see a field labeled “Switch Bank PGN Control” with three buttons below it. If this is the first time configuring for third-party control, the field above the buttons will be empty. This is where you will add a virtual switch group which will serve as a bridge between the Czone system and the Siren Marine Unit. To do so:

Click the “Add” button to add a new virtual switch group (alternatively, select an existing one to edit)

- Click the “Add” button to add a new virtual switch group, or, if there is already one listed, select it and click “Edit.”
- Use the “Name” field and enter the name of the virtual switch group, such as Siren Marine Switch Group.”
- Select a module to associate Siren Marine Switch Group with.
- Select a “Switch Bank Instance” number between 0 and 252.
- Check the checkbox labeled “Enable advanced CZone remote switch functions.”
- Finally, click “OK.”



A virtual switch group does not exist as hardware, but rather an imaginary group of 28 switches that is mapped in this configuration to one or more circuits or modes *anywhere within the Czone system*. The “Module” dropdown is used to select which OI you are associating the virtual switch group with, but you can still use any of the 28 switches in the virtual switch group to control any circuit or mode, not just those on the selected OI. Therefore, if you have 28 or fewer circuits and modes you want controlled by the Siren Marine Unit, you only need to create one virtual switch group; *you do not need one for each OI*.

The “Switch Bank Instance” selects a NMEA 2000 instance ID for the virtual switch group you are configuring. This is a number from 0 to 252. The instance number, in combination with other data, is used by NMEA 2000 devices to identify other NMEA 2000 devices. It does not matter which number you select, as long as each virtual switch group you configure has a unique instance number.

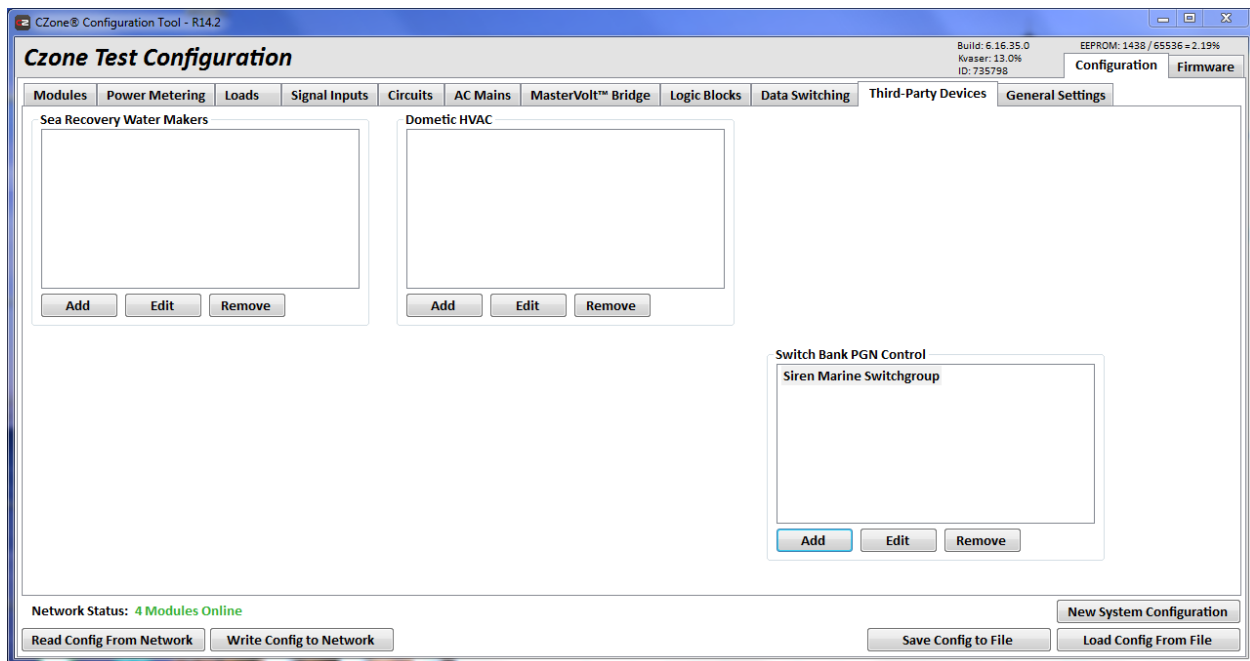
In summary:

- Select the “Third-Party Devices” tab.
- Under “switchbank PGN Control” click “Add”
- Enter a virtual switch group name in the NAME field.
- Select the OI this virtual switch group associates with.
- Select a unique instance number for the virtual switch group.
- Save by clicking “OK.”

You have now created a linkage between the NMEA 2000 bus (and therefore the Siren Marine Unit) and the Czone system.



When done, the dialog will have an entry in the “Switch Bank PGN Control” list, like this:



In Depth Review of Czone Loads, Circuits and Modes

Czone has “loads,” “circuits” and “modes” and a good understanding how Siren Marine equipment interfaces with Czone equipment interface requires a good understanding of the differences.

Load

A “load,” also sometimes referred to as a “circuit load,” is a specific hardware switch on a particular output interface (OI). It is one physical switch which can be configured for AC or DC, dimmed, and so on. There is a direct, one to one, mapping from a “load” in the Czone configuration to a specific hardware switch on an OI.

Circuit

A “circuit,” is a single virtual switch, created in the Czone configuration tool, to one or more specific “loads.” A circuit can be created to control one, two or more loads. For example, a circuit called “forward navigation lights” could be created to control two different physical switches (loads), one each for the port and starboard bow light.

The loads controlled by a circuit may have different combinations of on and off, and even dim levels. For example, a circuit called “owner cabin lights” could control the table lamps and the overhead lighting, with the lamps being set to full on and the overhead lighting being set to 50%. Circuits may be switched on or off.



Modes

“Modes” are combinations of circuits, each of which maybe on or off. A mode itself may only be switched on, or “activated.” They can not be switched off, however another mode may be activated, in which case all the circuits in that newly activated mode assume their preconfigured states.

While a mode is activated, circuits can be switched on and off, changing the state of all the circuit loads, but the most recent mode activated is still activated. If the same mode is activated again, then all the circuits (and associated circuit loads) will then assume their preconfigured states.

NMEA 2000 Standard PGNs as Used by Czone

As mentioned earlier, Czone and Siren Marine equipment use two standard PGNs to monitor and command Czone equipment. These PGNs provide for up to 28 switches to be monitored and controlled. These standard PGNs provide very limited information about circuits; all that is provided is the status of a particular circuit. Therefore the Siren Marine Unit knows only which switches are on or off. Since each virtual switch group always reports 28 switch states, the Siren Marine Unit can not know whether there are actually circuits or modes mapped to any particular switch in the group.

While the standard PGNs are designed to report the status of, and accept commands to, a particular switch bank, Czone implemented this a bit differently. In Czone, a particular switch in a standard PGN does not map directly to a physical load on a switchbank. Instead, each virtual switch represented in a PGN maps to a particular Czone *circuit (as opposed to load)*. Further, Czone modes are also mapped to Czone circuits.

Because of this, all 28 potential circuits represented in a standard PGN, whether they actually exist or not, are transmitted to the Czone cloud. Also, there is no way for a Siren Marine Unit to know if a particular Czone circuit is actually configured as a “circuit” or a “mode.” This is why the user must tell the Czone phone app which circuits are in use and also which are actually modes (discussed later).

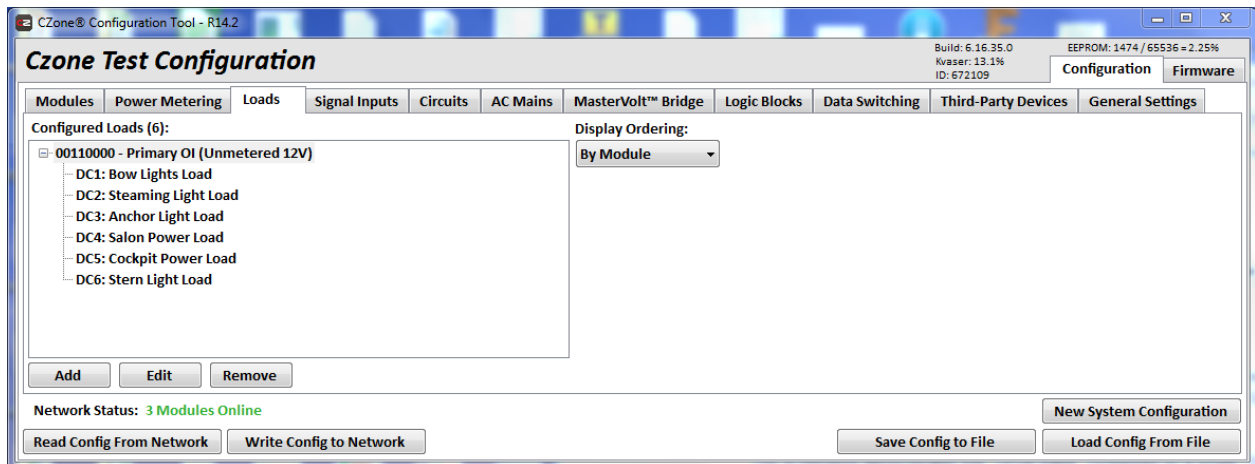
Configure Czone Circuits and Modes

Generic Czone Configuration Baseline Example

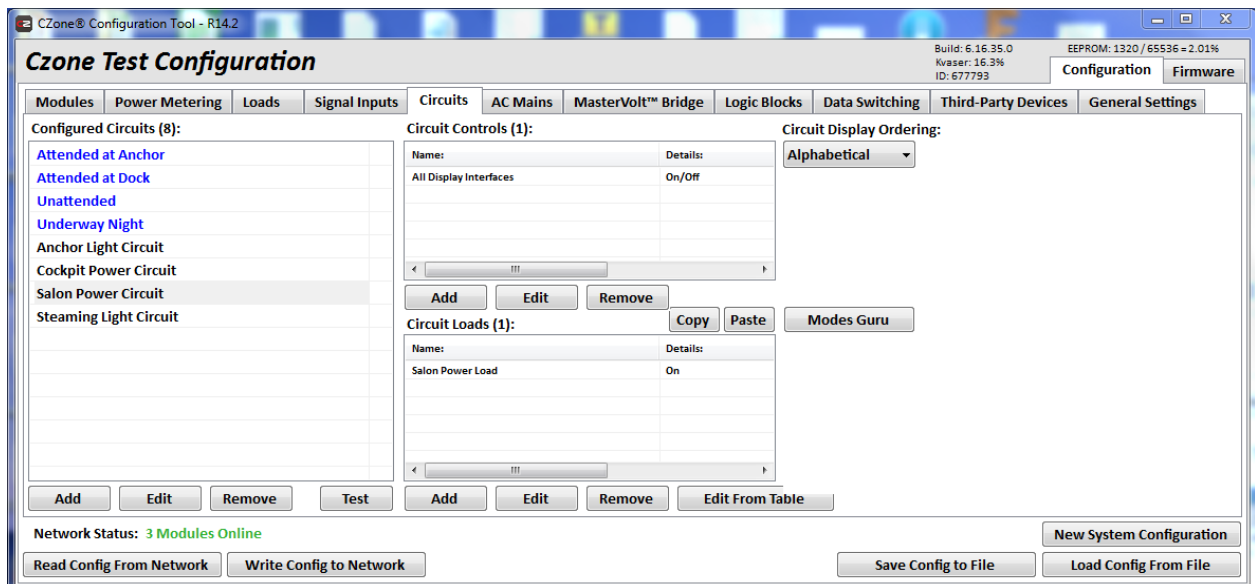
Next, and you may already have this done, configure Czone circuits and modes as you normally would for local control through, for example, a Czone switch interface, a Czone Touch Display or a Garmin plotter. Nothing about this configuration is Siren Marine specific and this instruction is intended not as documentation for generic Czone configuration, but rather to create a known example which will be used to demonstrate Siren Marine specific configuration.



This screenshot demonstrates six “loads” configured on a single OI called “Primary OI.” Note that these are set up on the “Loads” tab under the “Configuration” tab.



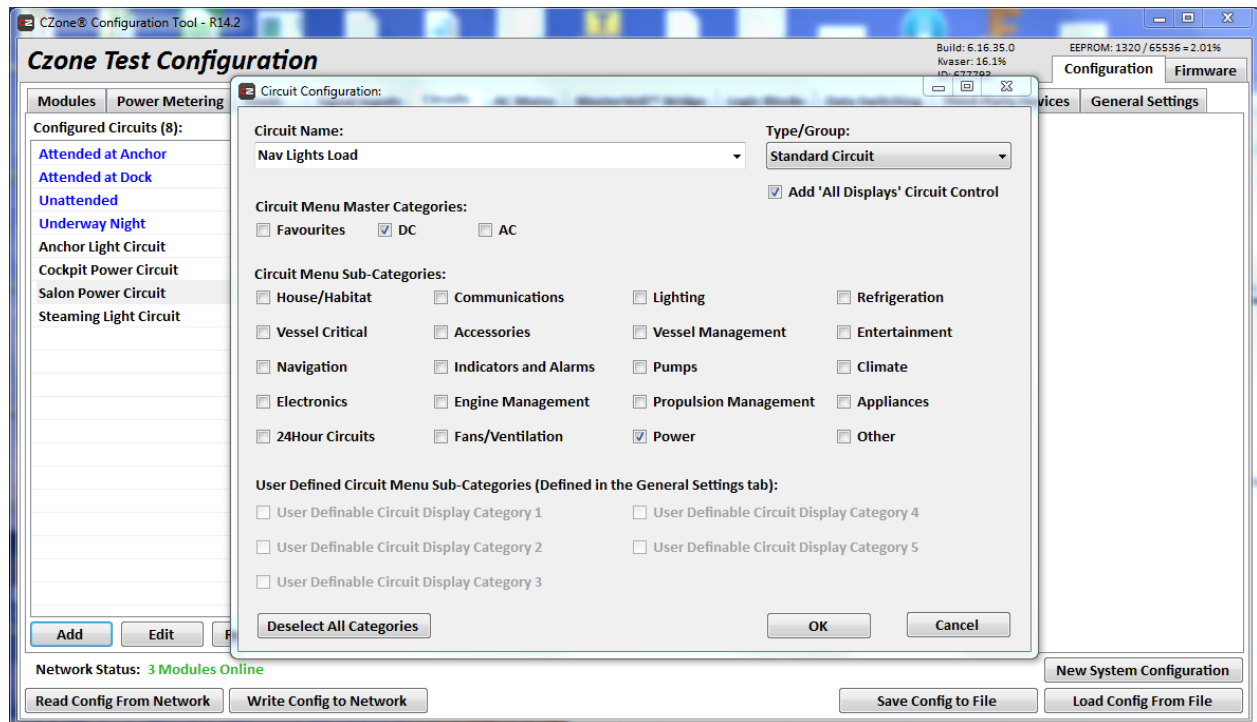
Once the “loads” are configured, the “circuits” can be configured. This screenshot shows eight circuits, four of which are set as “modes” and appear in blue.



In this configuration, each circuit, as demonstrated by the highlighted “Salon Power Circuit” circuit, controls one circuit load, in this case the “Salon power Load.” Additionally, note that in the dialog labeled “Circuit Controls” each circuit is controlled by “All Display Interfaces” which means that this circuit can be controlled by any display type interface, such as a Czone Touch 5 display and also a Garmin plotter. The “Circuit Controls” dialog will be important later.

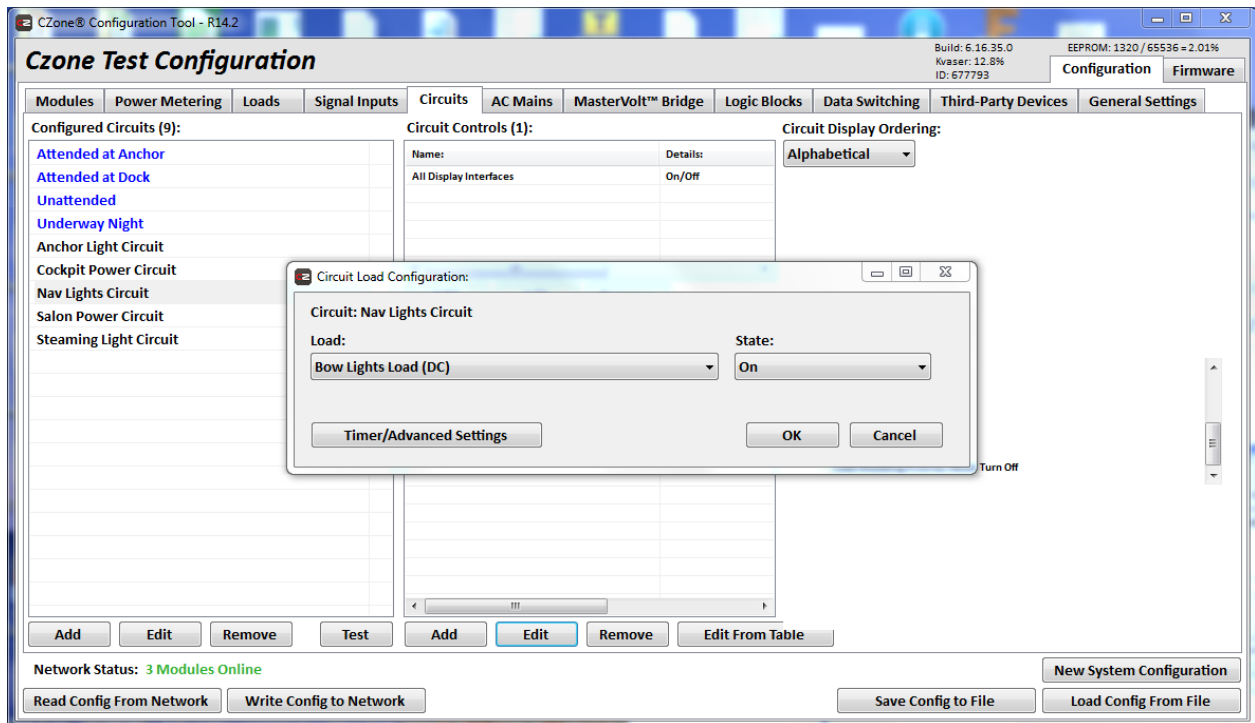
In the next screenshot, a circuit called “Navigation Lights Circuit” will be added. This circuit will map to two loads, the “Bow Lights Load” and the “Stern Light Load.” Turning this one

circuit on will turn both loads on. To open this dialog, click the “Add” button below the “Configured Circuits” list.



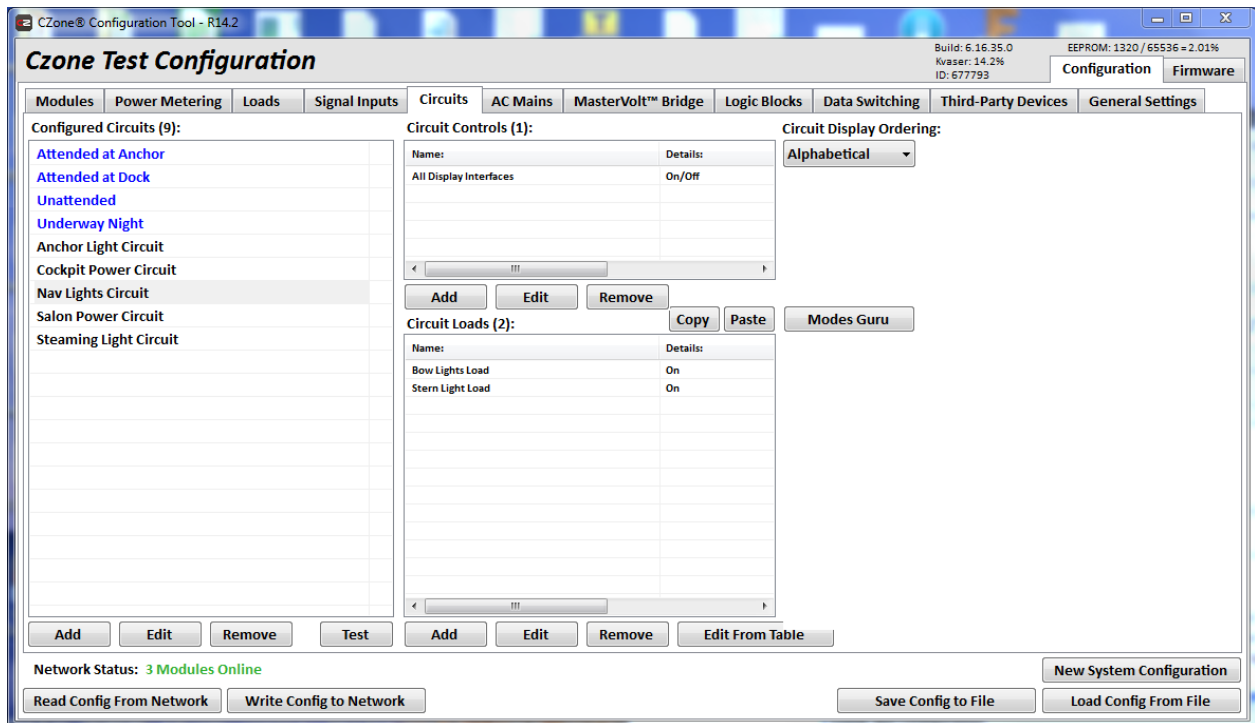
Enter the circuit name. In this case, it's correct that the “DC” and “Power” checkboxes are selected. Click “OK.”

Next, the “Loads” will be added. Click the “Add” button which appears below the “Circuit Loads” dialog and select a circuit load to add.



Click “OK” to save it, and then repeat this procedure to add any additional loads you want controlled by this circuit. The screenshot below demonstrates a newly added circuit called “Nav Lights Circuit” which controls both the bow lights and the stern light.

This “Circuits” tab also allows us to specify what interfaces control each circuit. As seen again in the above screenshot, in the “Circuit Controls” dialog, the “Nav Lights Circuit” can be controlled by “All Display Interfaces” as explained earlier.



At this point, there is a generic Czone configuration that allows control of some circuits and loads. Specific configuration required for communication between the properly configured Czone system and the Siren Marine Unit is described next.

Enabling NMEA 2000 / Siren Marine Communication

It is in the “Circuit Controls” dialog that settings are configured to enable circuit control from the Siren Marine Unit. This is accomplished by adding the “Siren Marine Switchgroup” created earlier to the list of “Circuit Controls” for each circuit we want to allow the Siren Marine Unit to control. Like a switch interface or a Czone display, the Siren Marine Unit acts as a circuit control device.

This example will enable the “Nav Lights Circuit” to be controlled by the Siren Marine Unit.

Here are the steps:

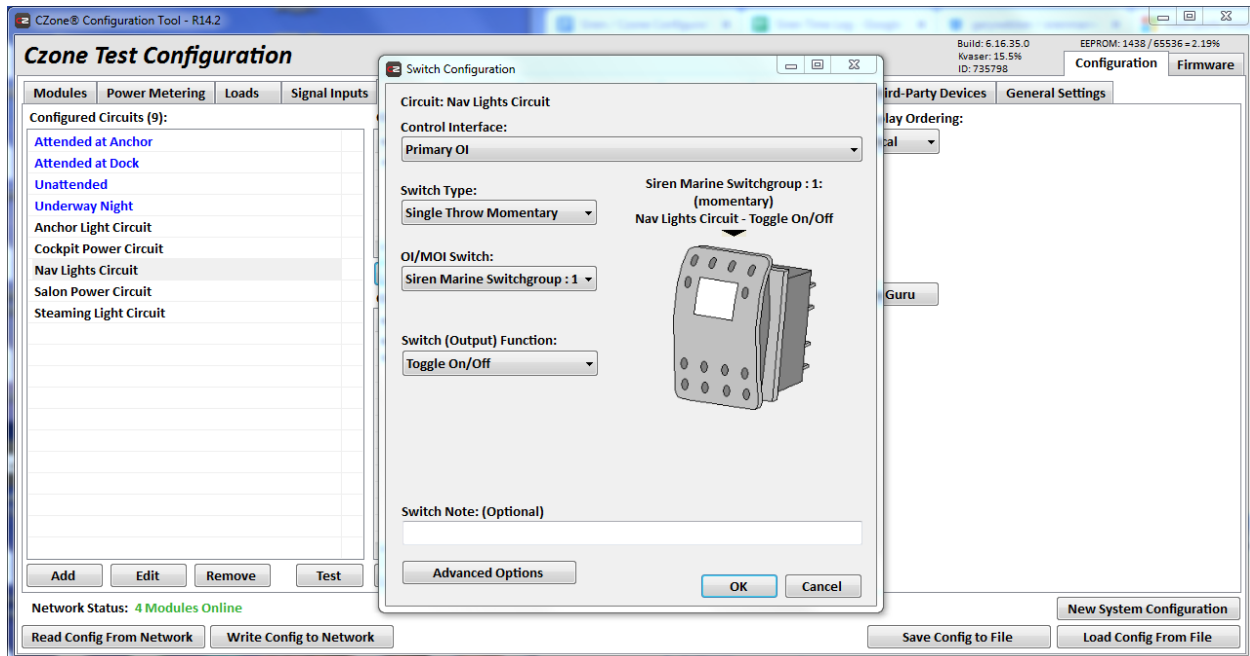
- Select the “Nav Lights Circuit,” so it is highlighted, in the “Configured Circuits” dialog.
- Below the “Circuit Controls” dialog is an “Add” button. Click it.

A new “Switch Configuration” dialog will appear (refer to the screenshot below).

Now:

- Select the “Control Interface” for the loads, in our case “Primary OI.”

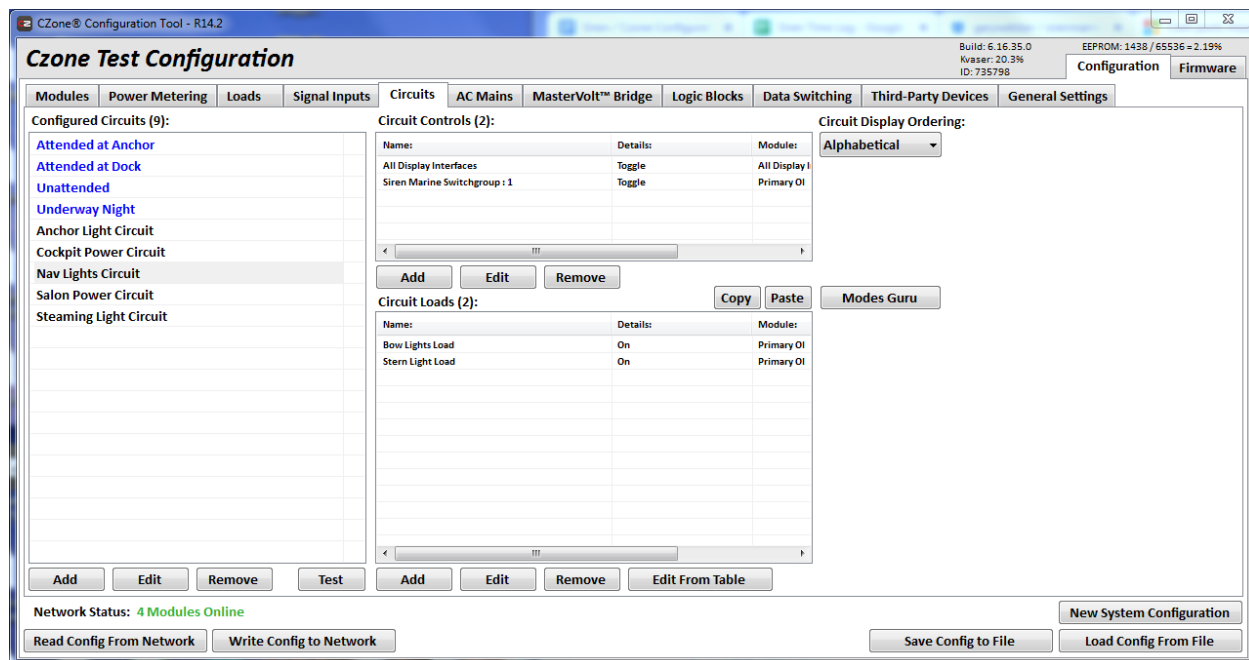
- For “Switch Type” select “Single Throw Momentary.”
- For “Switch (Output) Function” select “Toggle On/Off.”
- For “OI/MOI Switch” select the switch number on the virtual switch group. The example uses switch 1.
- Click “OK.”



That will allow the circuit to be controlled by both “All Display Interfaces” and “Siren Marine Switchgroup:1.” Siren Marine Switchgroup is controlled by the Siren Marine Unit and the Nav lights Circuit is now mapped to switch 1 on that interface.

One thing to note about the above screenshot is the picture of a switch. The picture which actually appears is dependent upon what hardware the Czone configuration application detects. Sometimes, the picture will be of a switch, other times a display and other images are possible as well.

The final configuration for this circuit looks like this:



Note the new entry in the list of circuit controls.

Repeat this procedure for each circuit and mode you wish to control using the Siren Marine Unit. In this case, each circuit or mode must map to a unique switch on the virtual Siren Marine Switchgroup.

Overall, changes specific to the Siren Marine Unit were:

- In “Third-Party Devices” configured an OI for “Third-Party” operation.
- In “Third-Party Devices” assigned a virtual switch group to the physical OI.
- In “Circuit Controls” mapped each circuit (or mode) to a switch number on the virtual switch group.

Writing Configuration

Once your configuration is complete, remember to save the Czone configuration changes to the Czone system using the Czone configuration tool. Also remember to save the configuration to a file, if desired.

Once the configuration is saved, configuration is complete and the configuration software and hardware can be put away

Circuit Discovery by the Siren Marine Unit

Once we have a properly configured Czone system and the Siren Marine Unit is installed and connected to the boat’s NMEA 2000 bus, the Siren Marine Unit can be switched on. When it



starts, the Siren Marine Unit will detect the Czone equipment, record the Czone configuration in its local flash memory and transmit a list of circuits to the Siren Cloud. Only circuits and modes mapped to a virtual switch group can be controlled by the Siren Marine Unit, so any circuits not configured like this will be invisible to the Siren Cloud.

Whenever a new Czone virtual switch group is added, it will be detected by the Siren Marine Unit and the circuit and mode names will be transmitted to the Siren Marine cloud. At this time, however, the Siren Marine Unit will not notice if a switch group is deconfigured or removed from service.

Also, the Siren Marine Unit will notice changes of circuit names and transmit those changes to the Siren Marine cloud, and then to the Siren Marine App.

Phone App Configuration

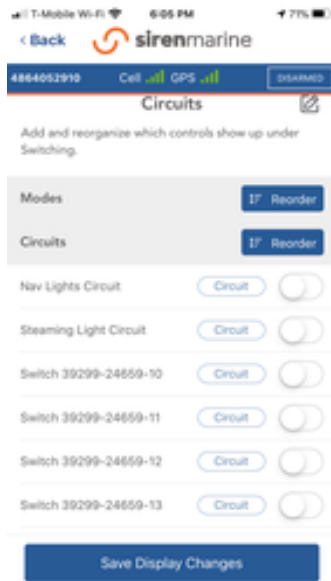
The user's phone app can now be configured. This is the last step.

Start the Siren Marine App. Along the bottom are four icons, "HOME", "SWITCHING", "EVENTS" and "SETTINGS". Click on the switching icon to be brought to the switching page. The top portion of the page displays standard Siren Marine outputs for devices connected directly to a Siren Marine Unit.

Below that is a Czone logo, where the Czone modes and switches are displayed.

If this is the first time the Siren Marine Unit has connected to a properly configured Czone system, no switch or modes will appear. The Czone switches and modes must be configured.

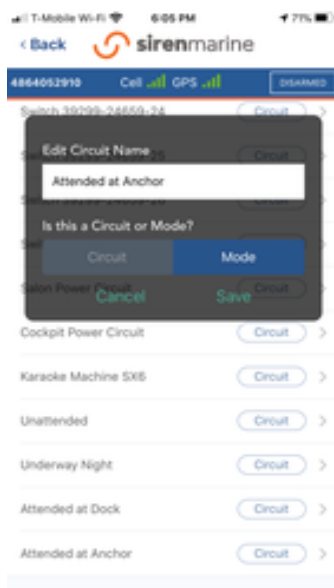
Tap the "settings" icon at the bottom of the page. Scroll down, to the heading "Switching Settings" and tap "Digital Switches." This brings the app to the "Circuits" page, where a list of Czone switches which are visible to the Siren Marine Unit is displayed.



Each circuit will have either the name assigned when configuring the Czone system, or a default name assigned by the Siren Marine Unit. Default names take this form: “Switch 39299-24659-11.” Each circuit has a switch next to it, and by default each one is off.

The next step is to tell the app which of these switches are modes. Near the upper right hand corner of the app, immediately to the right of the heading “Circuits” is a small edit icon. Tapping this icon brings the app to the “Edit Circuits” page.

Here is a similar list of circuits. To designate one as a mode, tap on it:

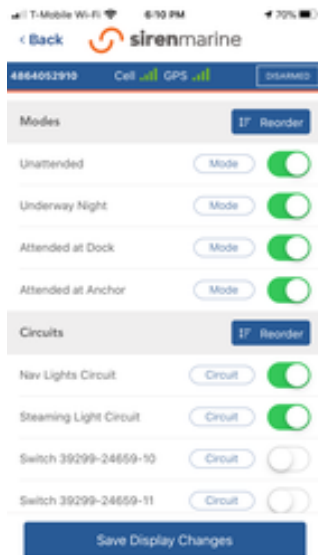


Tap “mode” and, if desired, change the name of the mode. Tap save.



Repeat as needed, then click the small edit icon (from the upper right hand corner of the app) to return to the “Circuits” page.

To make a circuit or mode available on the “Switching” page, turn on the switch that appears to the right of each mode or switch you want to be available.



Tap “Save Display Changes” and wait while the configuration changes are sent to the Siren Marine cloud. Finally, click the “< Back” icon, which is near the upper left hand corner of the page to return to the main setting page.

You can now tap the “SWITCHING” icon at the bottom of the app and you will see the selected modes and switches displayed.

Phone app configuration is now complete.

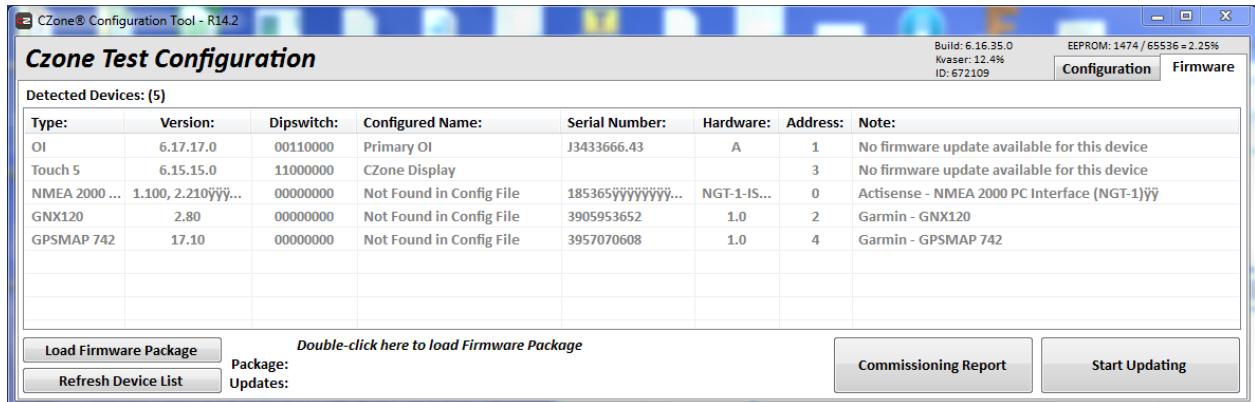
Support

If you have any questions about this procedure or need assistance, please contact Siren Marine support.

Appendix A - Firmware Upgrade

The specific Czone hardware requiring firmware update are the output interfaces (OIs). The minimum OI firmware version is 6.17.17.0. This version may not yet be available from Czone’s website, but it is available upon request from Czone or from Siren Marine.

To check the firmware version, launch the Czone configuration application and click the “firmware” tab near the upper right hand corner of the application. You will see:



If necessary, update the OI firmware. Please note that if you update your OI firmware, even if you reload the same version as already exists, the OI name will change, making the OI appear as a new device to the Siren Marine Unit. This will require changing the configuration on the Siren Marine phone app (discussed later in this document).

Firmware upgrade is straightforward:

- Launch the Czone configuration application.
- In the upper right hand corner of the application, there is a tab labeled “Firmware.” Click this tab, and you will see a list of installed Czone hardware and the current FW versions.
- Click “Load Firmware Package” and select the firmware distribution files.
- Click “Start Updating.”

The configuration tool will distribute the updates via the NMEA 2000 bus and report when updating is complete.

Some Czone equipment, including Touch Displays, are not updated using the configuration tool but by placing the update on an SD card and inserting it into the display. Updating displays is not necessary to enable Siren Marine hardware for controlling Czone.