Training Presentation

Session 1

MPower®
Digital Switching Platform

Revision: 01/26

Session 1 Overview:

- Digital Switching Overview
- Target Customers
- MPower General Overview & Features
- Planning, Design & Troubleshooting
- N2KAnalyzer – MPower Overview
- Garmin Setup Video
- Website Resources
- ✓ Prerequisites:
  - N2KAnalyzer Overview
  - MConnect Overview
  - N2KView Overview Series

Maretron
Vessel Monitoring & Control

Session 2 Overview:

- Configuring MPower – Key Concepts
- Switching Application Videos
- Switching Concepts
- LIVE: Training Board – Overview
- LIVE: N2KAnalyzer – MPower Configuration Training
- LIVE: User Interface Configuration
- Website Resources

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DIGITAL SWITCHING OVERVIEW

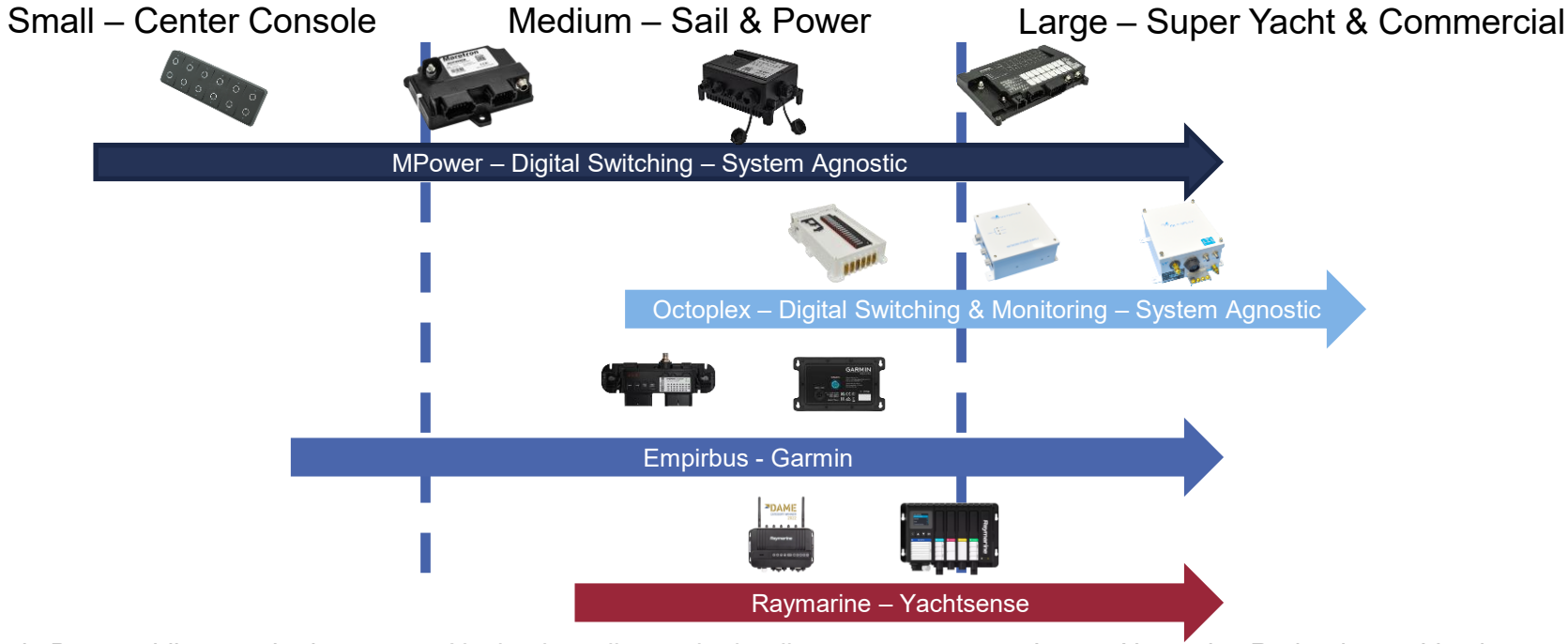
A New Alternative

- **Digital Switching Systems** can replace traditional mechanical switches and circuit breakers on board a boat with *Digitally Controlled Power Distribution Modules*

- **Power Distribution Module:** Power Distribution Modules are customised to meet the exact needs of the system being controlled and communicate using NMEA 2000® networks. An example of a Power Distribution Module is our CLMD12 or CLMD16.

- All hardware in a **Digital Switching System** is given a unique number called a **Device Instance**, which allows a **Power Distribution Module** or **Digital Switching Module** to be identifiable over an NMEA 2000® network. Using this **Device Instance**, all the devices can communicate and be used to perform user defined tasks

TARGET CUSTOMERS – DIGITAL SWITCHING



Tank, Battery, bilge monitoring as well full digital control

Navigation, climate, hydraulic, pumps, motors, AC and DC circuits

Larger Networks, Redundancy, Lloyds Certification

Maretron
Vessel Monitoring & Control

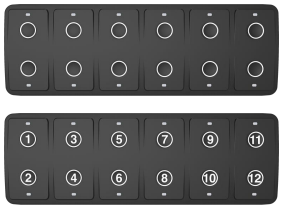
MPOWER GENERAL OVERVIEW & FEATURES

MPower - Family Overview

CLMD12
12-Channel DC Load Controller Module

CBMD12
12-Channel Manual Bypass Module

CLMD16
16-Channel DC Load Controller Module



CKM Series
12-Button Keypad

VMM Series
6 Rocker Contura Series
Digital Switch Module

RKF-001
12-Button Keypad

MPOWER GENERAL OVERVIEW & FEATURES

CLMD12 - 12-Channel DC Load Controller Module

- 12 Outputs
  - Two (2) loads at 12A max each
  - Six (6) loads at 10A max each
  - Four (4) loads at 5A max each
  - Max Current Capacity of **75A**
- 7 Hardwired Inputs (Active High, Active Low or Both)
  - Can be used to switch breaker states or as inputs for other data such as bilge alarms, hatch positions indication or Battery Voltage transmission onto the NMEA 2000 network
- Voltage Input 6.5 to 32 VDC
- Provides fast switching with:
  - Low loss solid state On/Off functions
  - Accurate current measurement (0.5A)
  - Pulse Width Modulation (PWM)
- Real-time fault monitoring for all 12 loads, including:
  - Short circuit/Over current

- IP67 rated
- Small form factor
- Ignition Protected
- Voltage back feed blocking via dual FETs topology
- Loads can be paralleled for larger applications
- A cost-effective solution for vessels of all sizes $$$

CLMD12 Datasheet

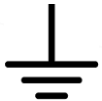
MPOWER GENERAL OVERVIEW & FEATURES

CLMD12 - Connections

- **J1** connector - Part #: A3706
  - Mating connector with flying leads (0.3m)
  - Load connections (12A)

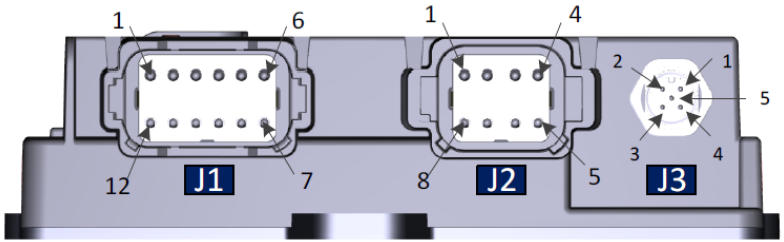
- **J2** connector - Part #: A3707
  - Mating connector with flying leads (0.3m)
  - Electromechanical input connections

  - **Reference ground is located on pin 6**



- **J3** takes a standard NMEA2000® 5-pin micro-C CAN cable

- Part # **CLMD12** – For OEM, will not include flying leads harnesses
  Part # **CLMD12-R** – For Retail, will include flying leads harnesses



Description	Max Output (A)	J1 Connector Pin No.	NMEA 2000 PGN 127501 Indicator Number	NMEA 2000 PGN 127500 Connection ID
Breaker #1	10	6	1	0
Breaker #2	10	4	2	1
Breaker #3	5	8	3	2
Breaker #4	12	2	4	3
Breaker #5	10	1	5	4
Breaker #6	5	10	6	5
Breaker #7	12	12	7	6
Breaker #8	10	3	8	7
Breaker #9	5	11	9	8
Breaker #10	10	5	10	9
Breaker #11	10	7	11	10
Breaker #12	5	9	12	11

Description	J2 Connector Pin No.	NMEA 2000 PGN 127501 Indicator Number
Discrete Input #1	2	13
Discrete Input #2	7	14
Discrete Input #3	1	15
Discrete Input #4	8	16
Discrete Input #5	4	17
Discrete Input #6	5	18
Discrete Input #7	3	19
Reference Ground	6	N/A

MPOWER GENERAL OVERVIEW & FEATURES

CBMD12 - 12-Channel Optional Bypass Module

When used in conjunction with the CLMD12, the bypass module provides manual control of the loads in case of system failures.

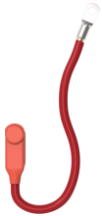
- 75 Amps maximum current capacity
- Two (2) outputs capable of carrying up to 12A
  Six (6) outputs capable of carrying up to 10A
  Four (4) outputs capable of carrying up to 5A
- 12V and 24V DC power systems
- Carling Technologies Curvette® Rocker Switches
- Overcurrent protection via ATC standard fuses

CBMD12 Datasheet

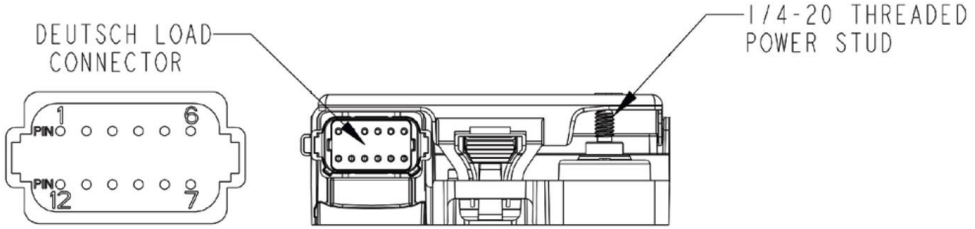
MPOWER GENERAL OVERVIEW & FEATURES

CBMD12 - Accessories

- **J1** connector - Part #: A3706
  - Mating connector with flying leads (0.3m)
  - Load connections (12A)



- Jumper Wire with Lugs - Part #: A3720
  - 6AWG, Red



- Fuse Pack - Part #: A3721
  - ATC Standard
  - 2 qty 15A, 6 qty 10A, and 4 qty 5A

- Part # **CBMD12** – For OEM, will not include jumper wire and fuse pack
  Part # **CBMD12-R** – For Retail, will include jumper wire and fuse pack

PIN#	1	2	3	4	5	6	7	8	9	10	11	12
SWITCH#	1	2	3	4	5	6	12	11	10	9	8	7
CIRCUIT#	5	4	8	2	10	1	11	3	12	6	9	7
FUSE MAX RATING	10 AMP	12 AMP	10 AMP	10 AMP	10 AMP	10 AMP	10 AMP	5 AMP	5 AMP	5 AMP	5 AMP	12 AMP

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MPOWER GENERAL OVERVIEW & FEATURES

CLMD16 - 16-Channel DC Load Controller Module

- 16 Outputs + 1 x 300mA Output
  - Four (**4**) loads at **25A** max each
  - Twelve (**12**) loads at **12A** max each
  - Max Current Capacity of **125A**
- 11 Hardwired Inputs (Active High, Active Low or Both)
  - Eight voltage sensing inputs (Can be used for general electromechanical switch integration or for logic applications such as position sensing)
  - Two resistive inputs (Can be used for tank monitoring)
  - One 4-20mA input (Can be used for tank monitoring or industrial control type sensors)
- Voltage Input 6.5 to 32 VDC
- Provides fast switching with:
  - Low loss solid state On/Off functions
  - Accurate current measurement (0.5A)
  - Real Time Fault Monitoring
  - Pulse Width Modulation (PWM)
- Real-time fault monitoring for all 16 loads, including:
  - Short circuit, Over current, thermal, load shed
- Voltage back feed blocking via dual FETs topology
- Supports reversing currents such as engine hatches, pass rails, trim tabs, etc.
- Loads can be paralleled for larger applications
  - Maximum current rating when multiple breakers are paralleled is typically 180% of the single channel rating. (Example: 45A maximum for two 25A breakers in parallel).
- Local override capacitive touch switches for manual control
- Built-in NMEA 2000® redundancy
- Ignition Protection

CLMD16 Datasheet

MPOWER GENERAL OVERVIEW & FEATURES

CLMD16 - Wiring

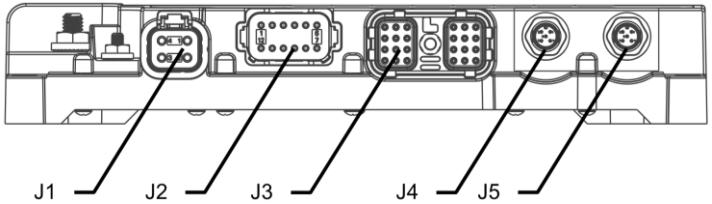
- **J1** connector - Part #: A3709
  - Mating connector with flying leads (1.0m)
  - Load connections (25A)

- **J2** connector - Part #: A3708
  - Mating connector with flying leads (1.0m)
  - Load connections (12A)

- **J3** connector - Part #: A3710
  - Mating harness kit (components provided)
  - Electromechanical input connections

- **J4 & J5** takes a standard NMEA2000® 5-pin micro-C CAN cable

- Part # **CLMD16** – For OEM, will not include flying leads harnesses
  Part # **CLMD16-R** – For Retail, will include flying leads harnesses



Description	Max Output (A)	J2 Connector Pin No.	Paralleling Breakers Support	Half/Full Bridge Support
Breaker # 1	12	1	YES (1+2)	YES (1+2)
Breaker # 2	12	2	YES (1+2)	YES (1+2)
Breaker # 3	12	3	YES (3+4)	-
Breaker # 4	12	4	YES (3+4)	-
Breaker # 5	12	5	-	-
Breaker # 6	12	6	-	-
Breaker # 7	12	7	YES (7+8)	-
Breaker # 8	12	8	YES (7+8)	-
Breaker # 9	12	9	-	-
Breaker # 10	12	10	-	-
Breaker # 11	12	11	-	YES (11+12)
Breaker # 12	12	12	-	YES (11+12)
Description	**Max Output (A)**	**J1 Connector Pin No.**	**Paralleling Breakers Support**	**Half/Full Bridge Support**
Breaker # 13	25	1	YES (13+14)	-
Breaker # 14	25	2	YES (13+14)	-
Breaker # 15	25	3	-	-
Breaker # 16	25	4	-	-

CLMD COMPARISON

Product Comparison

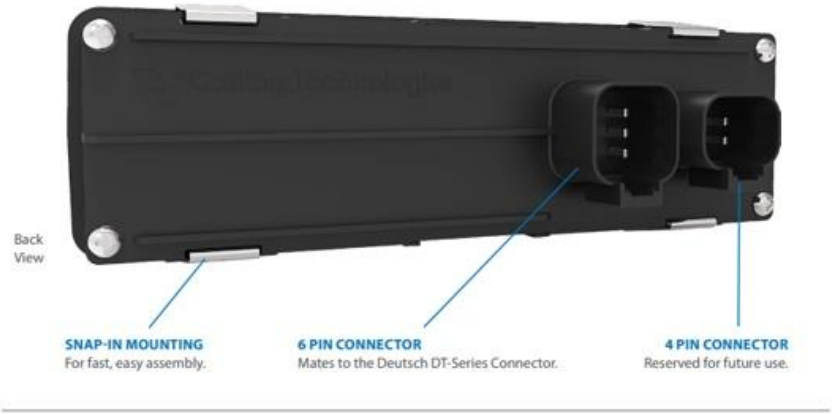
FEATURE	CLMD12	CLMD16
Output Channels	12 (2@12A, 6@10A, 4@5A)	16 (4@25A, 12@12A)
Input Channels	7	11 (8 Mechanical, 3 Tanks)
Total Max Current	75A	125A
Manual Override	CBMD12	LOCAL
NMEA2000 Connectors	1	2 - Isolated
I/O Connector Type	DEUTSCH	DEUTSCH
Parallel Channels	YES, ALIKE CHANNELS	YES, SELECT CHANNELS
H-Bridge Circuits	N/A	YES, SELECT CHANNELS
Load Shedding	N/A	YES
IP Rating	IP67	IP67
Ignition Protection	YES	YES
Certification and Compliance	NMEA 2000®, CE	NMEA2000®, CE
Dimensions W,H,D	144.8mm x 127mm x 40.6mm	279.4mm x 190.0mm x 47.5mm

MPOWER GENERAL OVERVIEW & FEATURES

VMM6 Series - 6 Rocker Multiplexed Switch Module

- The VMM-Series is a sealed, multiplexed switch module featuring the Carling V-Series Contura® rocker switch style (IP68 Sealing Protection)
- Operating voltage same as an NMEA 2000® network
  - Min: 9.5VDC
  - Max: 15.4VDC
- Max Current Operation: 300mA (LEN: 6)
- Programmed via Maretron gateway paired with PC running N2KAnalyzer® V3
- Electrical Endurance Minimum 250,000 Operations
- Illumination uses Single-Color Blue LED
- Connector: Deutsch DT-Series 6 pin connector to NMEA 2000®

  (Maretron Part #: A3702, provided)



VMM6 Series Datasheet

ROCKERS FOR DISTRIBUTORS

Standard Options

Prices vary depending on rocker type

- A3801-1 Contura II (ALL Position Momentary ON)
- A3801-2 Contura II (Position #6 is 3 Position (NAV/ANC)
- A3801-3 Contura V (All Positions Momentary ON)
- A3801-4 Contura V (Position #6 is 3 Position (NAV/ANC))
- A3801-5 No Actuators (ALL 6 Positions Momentary ON)
- A3801-6 No Actuators (Position #6 is 3 Position (NAV/ANC))
- VMM-00000007 No Actuators
  - (Accessories NOT included ALL Positions Momentary ON)
- VMM-00000008 No Actuators
  - (Accessories NOT included ALL Positions are 3 Position)

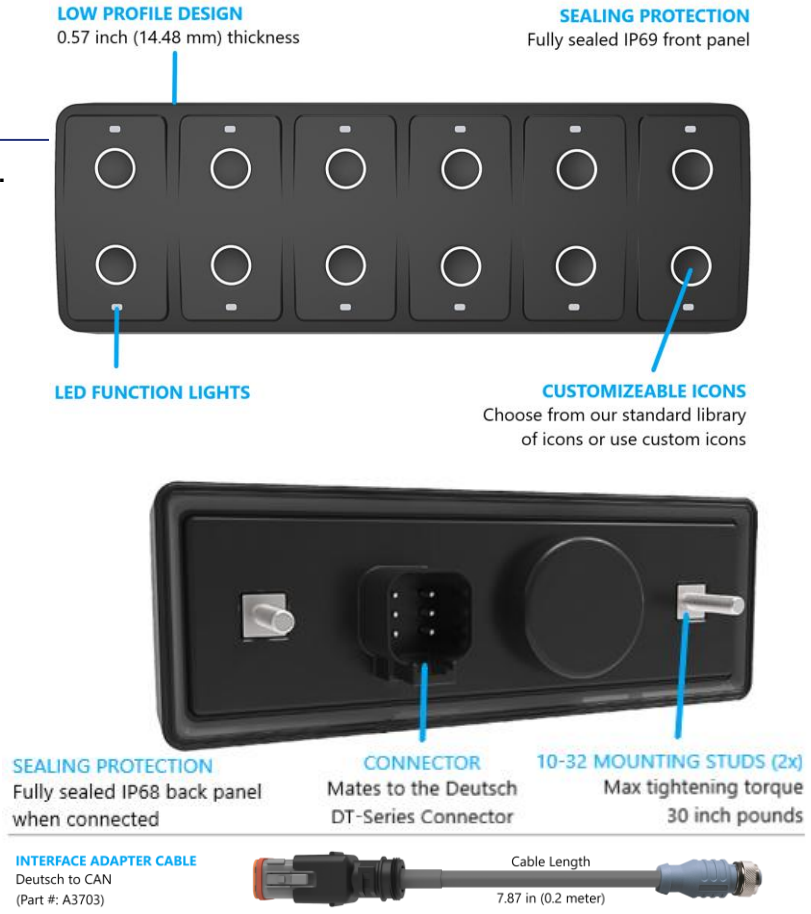
Special Icon (Not Standard)

- Prices vary based off configuration
- New laser etched symbol setup charge will apply
- Minimum order quantity (MOQ): 100 pieces

MPOWER GENERAL OVERVIEW & FEATURES

CKM12 - 12 Button Keypad

- The CKM-Series is a keypad featuring laser etched legends. Function LEDs provide diagnostics when fault conditions are detected
- IP6K9K Front Panel, IP68 Back Panel Sealing Protection
- Operating voltage same as an NMEA 2000® network
  - Min: 9.5VDC
  - Max: 15.4VDC
- Sleep mode draws less than 1.5mA throughout the supply voltage range and wakes on keypress or CAN message
- Programmed via Maretron gateway paired with PC running N2KAnalyzer® V3
- Electrical Endurance: Each button functions for at least **1,000,000 actuations**
- Connector: Deutsch DT-Series 6 pin connector to NMEA 2000® (Maretron Part #: A3703, provided)



CKM12 Series Datasheet

KEYPADS FOR DISTRIBUTORS

Standard Options

A3802-1 Ring on each Button

A3802-2 Number in center of Ring on each Button
(Horizontal installation)

Special Icon (Not Standard)

- Prices vary based off configuration
- New laser etched symbol setup charge will apply
- Minimum order quantity (MOQ): 100 pieces

MPOWER GENERAL OVERVIEW & FEATURES

RKF-001 - Remote Key Fob

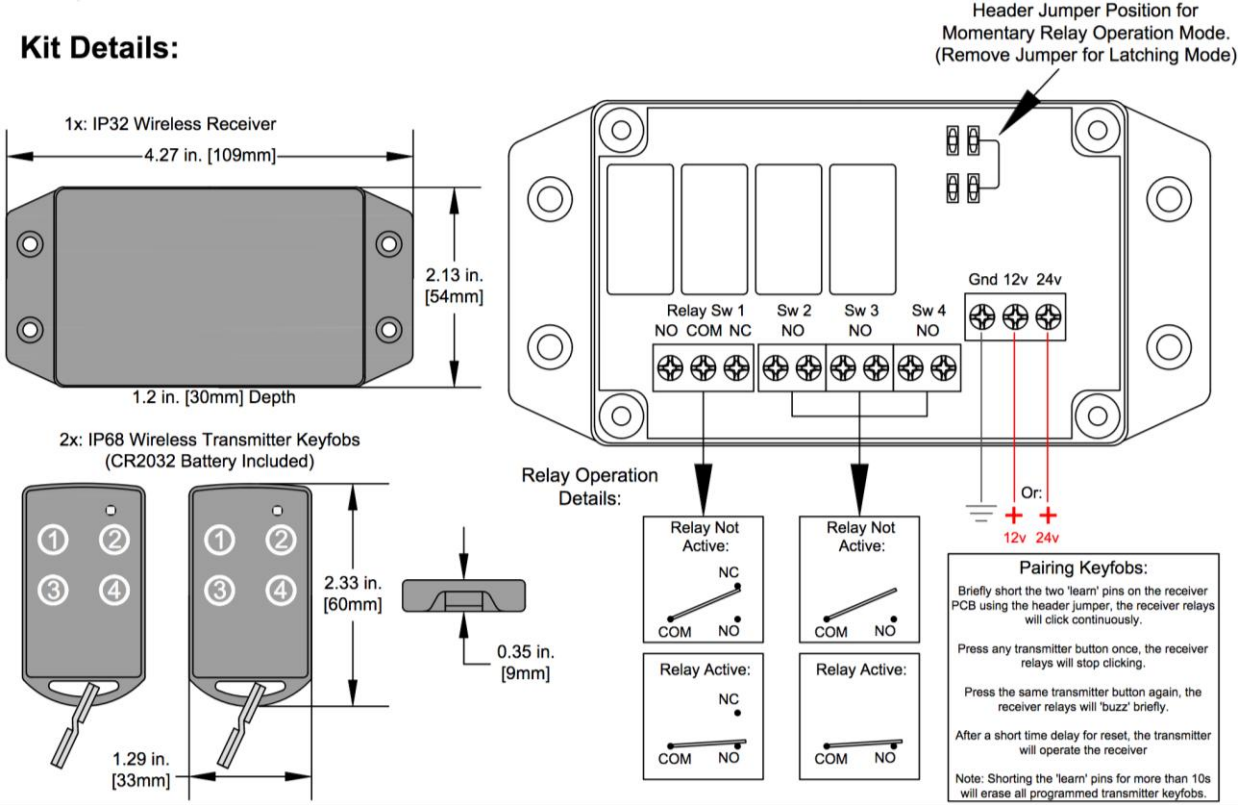
The RKF-001 *Remote Key Fob* offers a reliable and secure solution for a wide range of general-purpose analog input applications. Designed with robust RF communication and user-friendly operation.

- 4 Button - FM Remote Control System for reliable operation.
- Keeloq™ - High Security protocol for enhanced protection.
- Range: Up to 60 meters
- Waterproof transmitter with an IP68 rating for durability.
- Receiver operates on: 12 or 24V DC Supply.
- Relay Changeover Outputs with a capacity of 5A @ 230V AC.
- Convenient installation through screw terminals.
- Choose between Momentary or Latching Outputs for customized control
- Easy integration into the NMEA 2000® network via:
  - Maretron RIM100, SIM100
  - MPower CLMD12, CLMD16
  - OctoPlex SIU

RKF-001 Datasheet
Installation Instructions

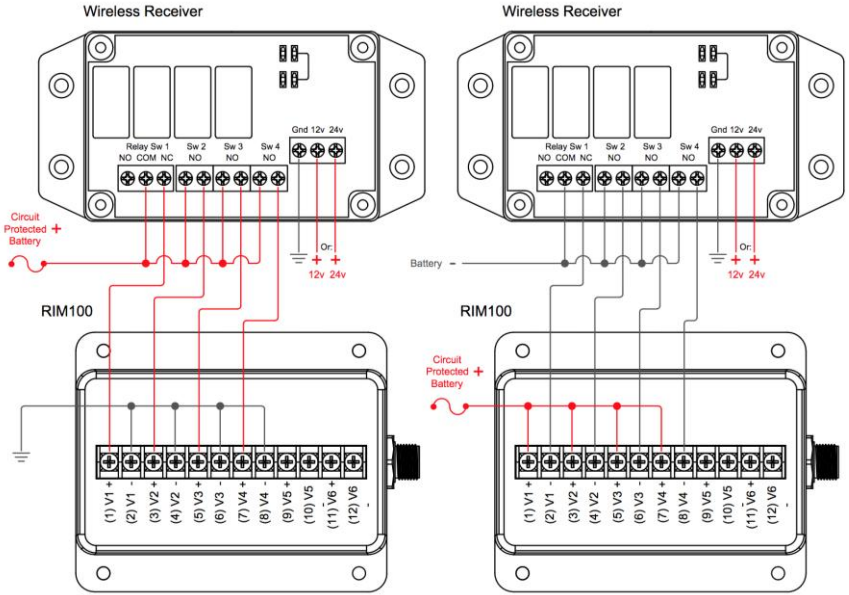
MPOWER GENERAL OVERVIEW & FEATURES

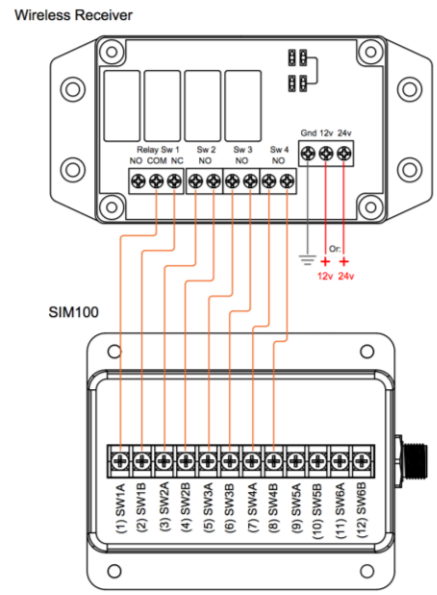
RKF-001 - Kit Details

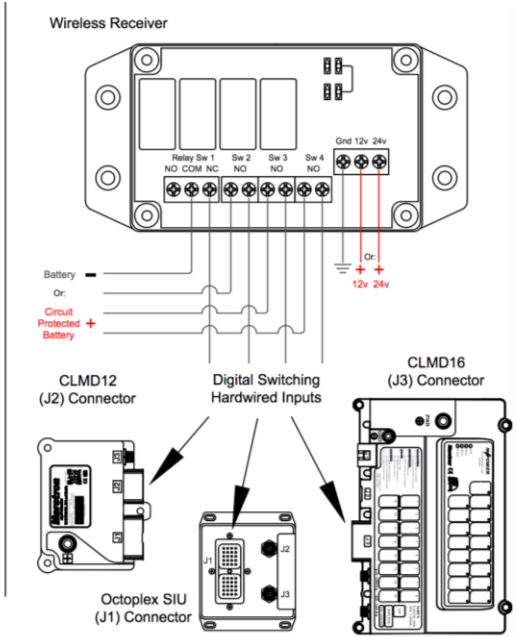


MPOWER GENERAL OVERVIEW & FEATURES

RKF-001 - Wiring Schemes



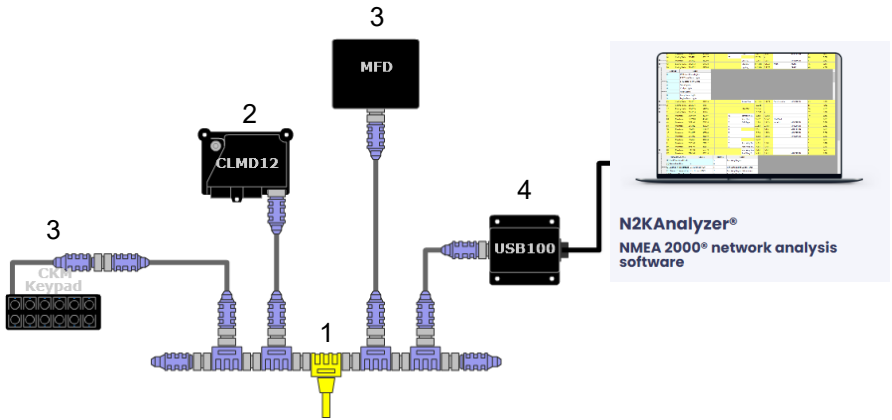




Note: When wiring RKF100 to RIM100, the channels can receive DC (+) on all channels, DC (-) on all channels, or any combination of both DC (+) and DC (-) signals.

PLANNING, DESIGN & TROUBLESHOOTING

Basic Network



Digital Switching Basic Network Requirements

1. NMEA 2000® Network

   Power Tee (12Vdc), Tee Connectors (1 / per device), Drop cables (1 / per device), 2 x Terminators (Cap each end).

2. NMEA 2000® Device – Load Controller (e.g., CLMD12)

3. NMEA 2000® Switching Interface Controller –

   Either a Multi-Function Display or a Human Machine Interface controller that supports Standard NMEA Switching PGNs.

   (N2KView, MConnect, CKM Series, VMM Series, Garmin MFDs, etc.)

4. **Maretron Gateway – USB100, IPG100, WSV100**

   *Required for configuration and calibration of MPower products

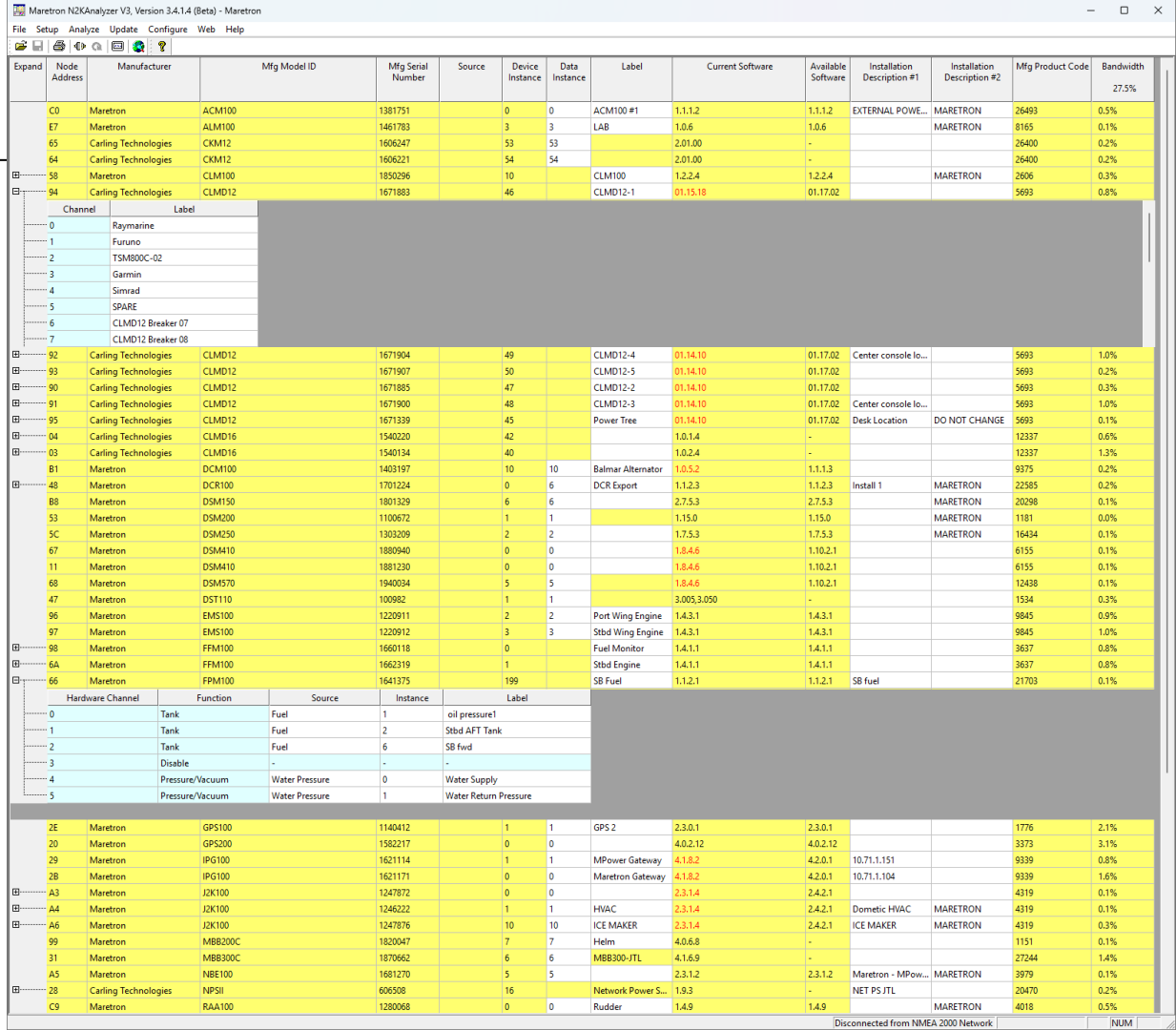
Maretron
Vessel Monitoring & Control

N2KANALYZER® V3

- N2KAnalyzer is required for configuring all Maretron, MPower & Octoplex devices
- Pair a PC with a Maretron gateway (USB100, IPG100, WSV100)
- Displays all active devices on the NMEA 2000® network
  - ➢ Also 3rd Party devices
- Information about each device is also displayed in the respective columns
- For most Maretron devices, to view all configurable properties of a device on the network, select the component until it is highlighted blue, right click, then select ‘Configure Device’.
- For most Maretron devices, provides a source for updating equipment to their latest software version.

[N2KAnalyzer Home Page]

Maretron
Vessel Monitoring & Control

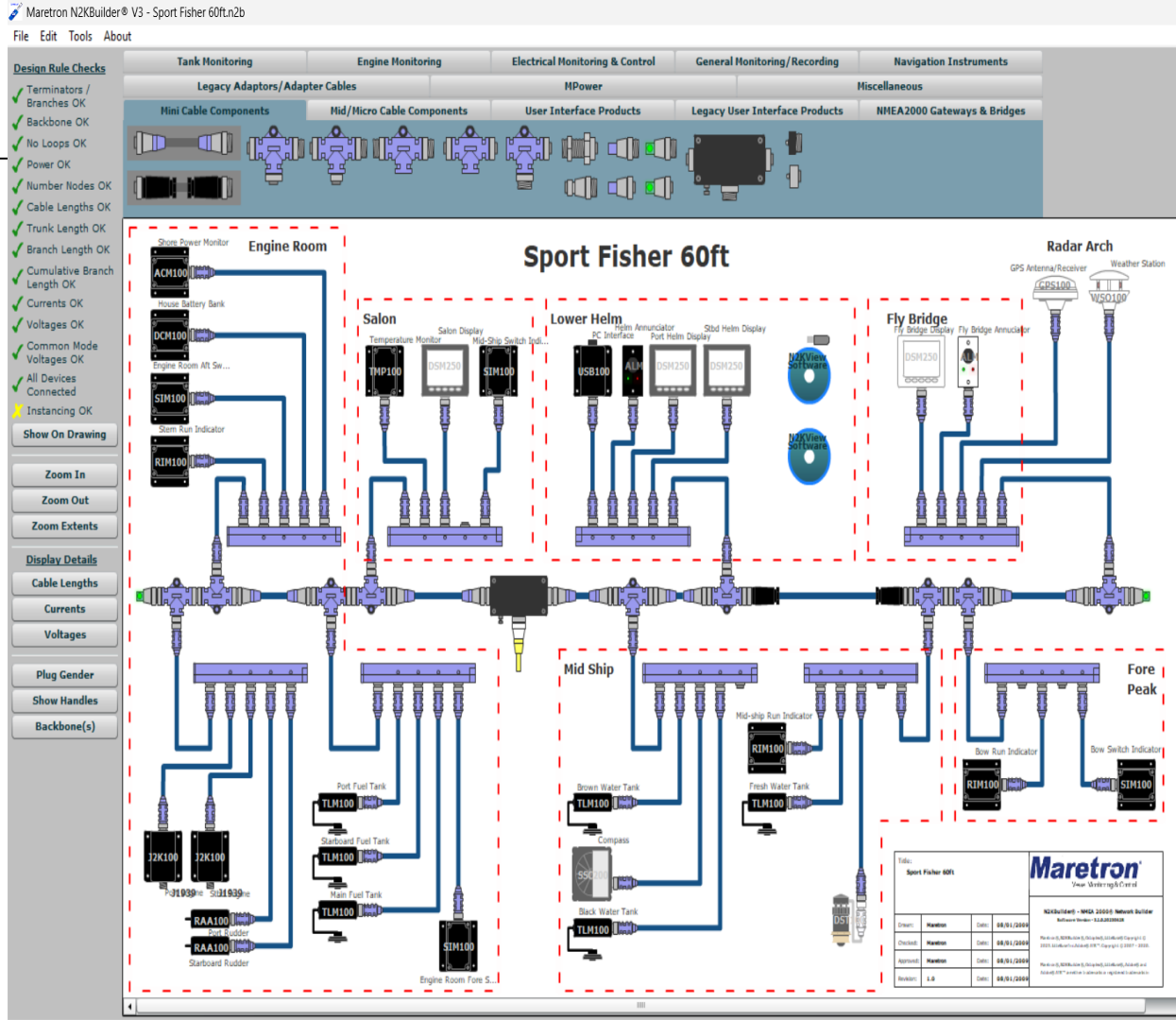


N2KBUILDER® V3

- Free PC software tool for designing and verifying the integrity of NMEA 2000® networks
- Primarily used to layout, document, and validate the design of complex NMEA 2000® networks
- Eliminates guesswork and transcription errors
- Will directly produce a Bill of Materials (BOM) for Maretron products
- Can print schematics and reports for boat builders, owners and any other involved parties

N2KBuilder Download

Maretron
Vessel Monitoring & Control



PLANNING, DESIGN & TROUBLESHOOTING

Electromechanical vs Digital Switching

- Simplified wiring = quicker installation
  - Less wiring distance by distributing load controllers
  - Space Saving
  - Reduced Cost
- Less weight = Better Fuel Economy $$
- Can be remotely controlled/monitored
  - Service provided via Real Time Cloud Service
- More flexible in programmable applications
  - Timers
  - Paralleled Channels
- Easier maintenance & Simpler diagnostics
- Easier to duplicate helms
- Simpler 3rd Party Integration
- Control multiple loads at once without changing wires
- Modify loads without replacing breakers or panel configurations
- Combining all of your vessel's content between controls and monitoring into a single user interface platform

PLANNING, DESIGN & TROUBLESHOOTING

Before You Start Your Design

Things to think about:

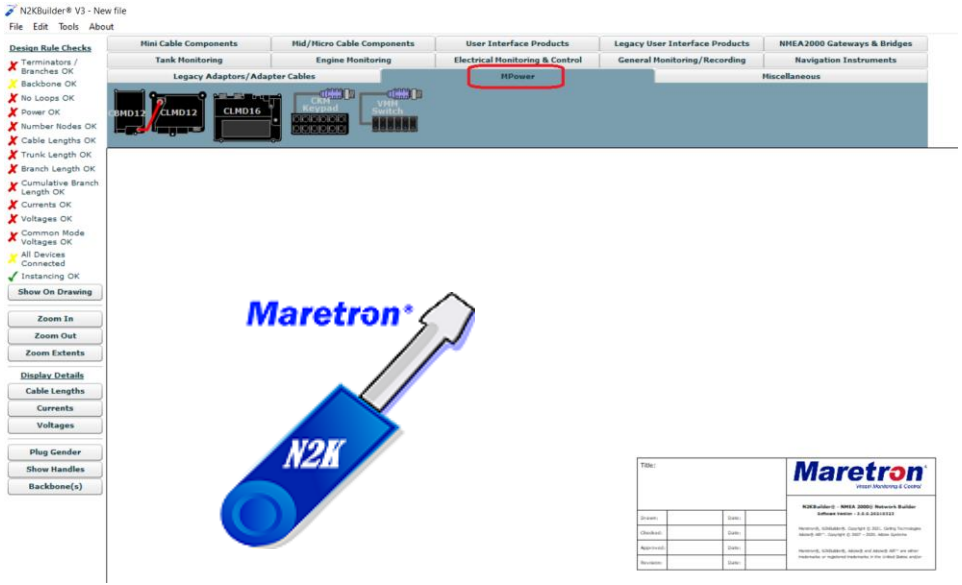
- Is this a 12/24V system?
- New Build or Refit?
- What will be controlled through the CLMD12/CLMD16? (Loads)
- How much current will these loads be drawing? Maximum 75A (CLMD12) or 125A (CLMD16)
- Do any of these loads have a high inrush current?
- Do any loads require monitoring, lockout or timer functionality, (CLMD12 & CLMD16) advanced logic or timer Sequencing (CLMD16)?
- Is there any Third Party Integration?
- How will you be controlling these loads? (Inputs, Digital or Electromechanical?)
- Can any loads be controlled by PGN rather than physical wiring?
- Do your design ideas meet regulatory standards?

  (Our devices are NMEA certified, ISO built, and pass multiple IEC testing requirements)

PLANNING, DESIGN & TROUBLESHOOTING

N2KBuilder® V3 - Mapping an NMEA 2000® Network

- Free PC software tool for designing and verifying the integrity of NMEA 2000® networks
- Can be used to layout, document, and validate the design of complex NMEA 2000® networks
- Will directly produce a Bill of Materials (BOM) for Maretron® products
- Eliminates guesswork and transcription errors
- Recently added an MPower tab containing VMM, CKM, CLMD12, CBMD12 and CLMD16 (circled)
- Available at the below link:

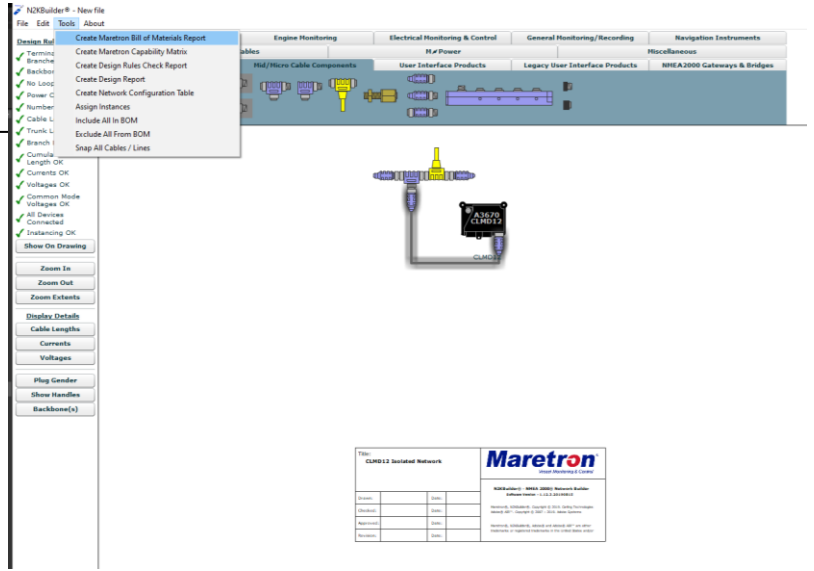


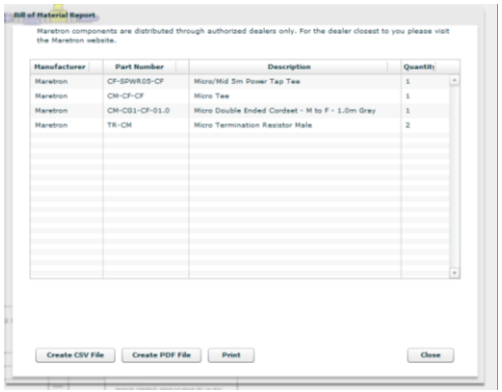
N2KBuilder® V3 https://www.maretron.com/products/N2KBuilder.php

N2KBUILDER® V3

Creating a BOM

- Click ‘Tools’
- Select ‘Create Maretron Bill of Materials Report’
- Report includes info on Manufacturer, Part Numbers, Description and Quantity of components in network
- Includes options to create the report as a CSV or PDF File
- Does not include price as this will be quoted by your local distributor





PLANNING, DESIGN & TROUBLESHOOTING

NMEA 2000® Network Constraints & Limitations

- The maximum length of an NMEA 2000® cable that is used to connect any device or accessory to the backbone is 6m (20ft)
- Cumulative Cable Drop length from all tees on the backbone cannot exceed 78m (256ft)
- The distance between any two devices on an NMEA 2000® network must not exceed 100m (328ft) for mid and micro backbones and 200m (656ft) for mini backbones
- Each device on a network should have *individual* Device Instance Numbers to avoid instancing conflicts

Maretron
Vessel Monitoring & Control

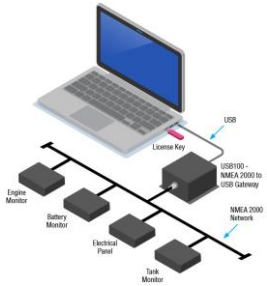
N2KANALYZER GENERAL OVERVIEW & MPOWER DEVICES

N2KAnalyzer® V3 – NMEA 2000® Gateways

USB100

Connect N2K port to an active NMEA 2000® network.

Connect opposite port via USB cable into your Windows PC.



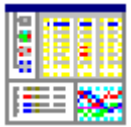
IPG100 & MConnect (WSV100)

Connect N2K port to an active NMEA 2000® network.

Connect ethernet port (RJ45) to your Vessel's network.

N2KANALYZER GENERAL OVERVIEW & MPOWER DEVICES

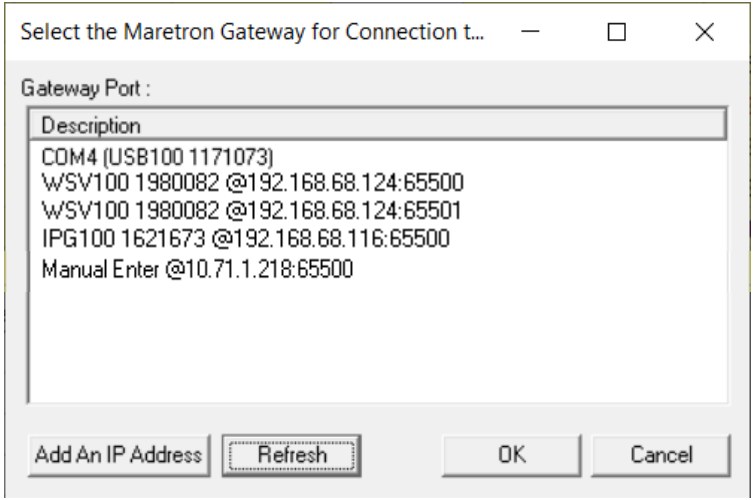
N2KAnalyzer® V3 – NMEA 2000® Gateway Ports



N2KAnalyzer

When launching N2KAnalyzer, you will be prompted to select your gateway solution.

Select your connection and press **OK**.



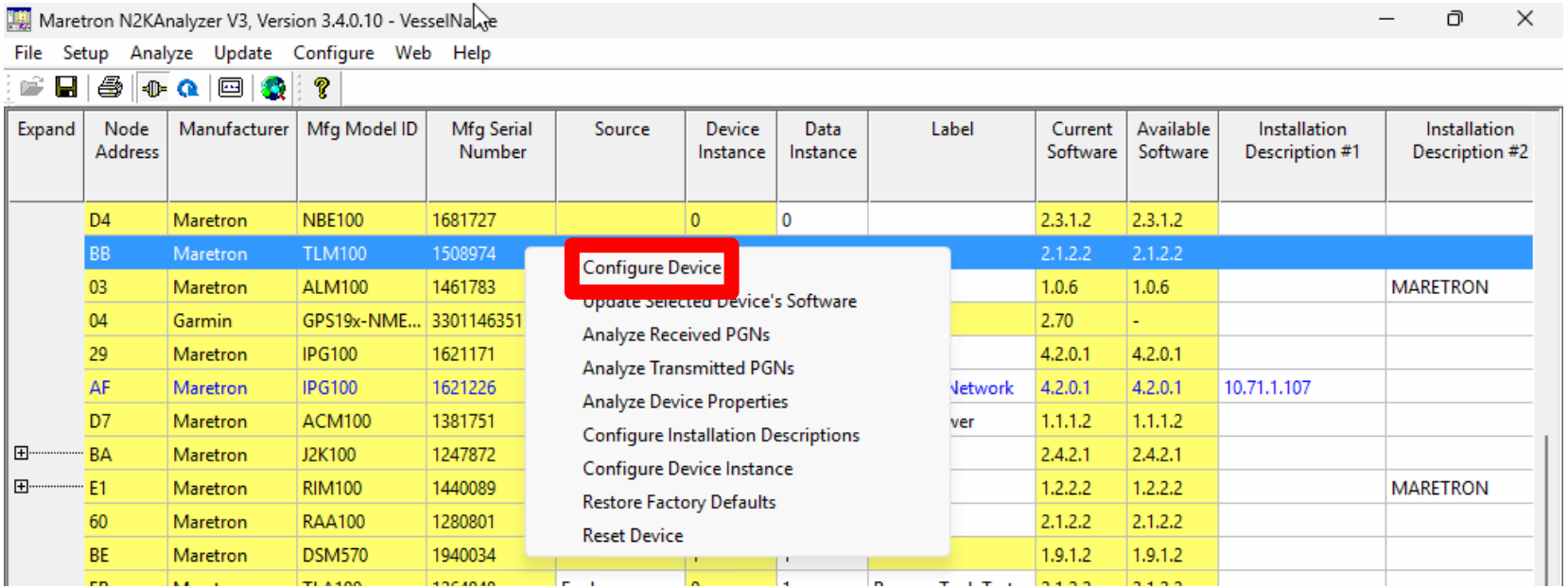
N2KANALYZER GENERAL OVERVIEW & MPOWER DEVICES

N2KAnalyzer® V3 – Locate Device

Select Target Device for Setup

A list of all your connected NMEA 2000® devices will populate, locate your appropriate device.

Select the target device by left-clicking once, then right-click and select **Configure Device.**



N2KANALYZER GENERAL OVERVIEW & MPOWER DEVICES

CLMD12 – Overview

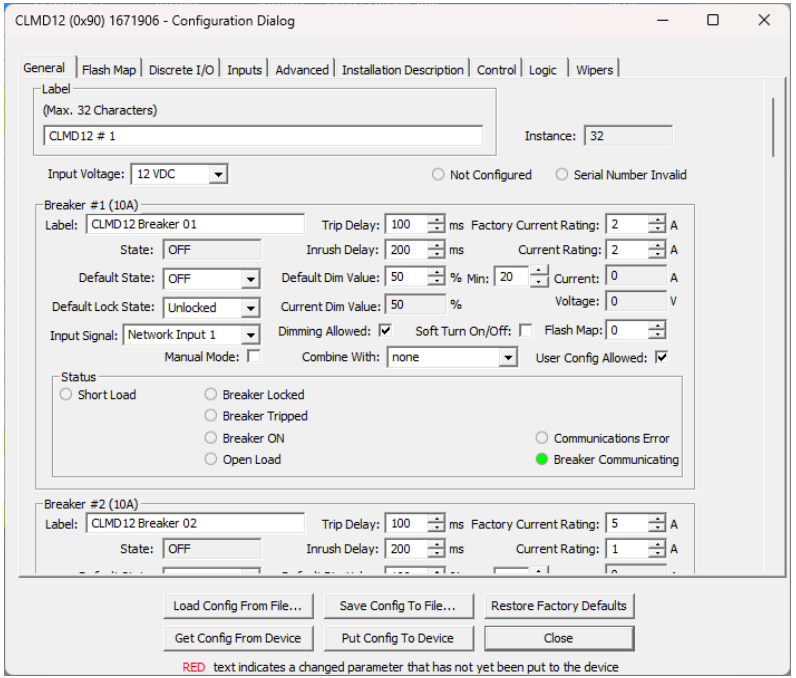
This manual corresponds to CLMD12 firmware revision (**01.16.01**)

NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD12

General Tab

In the event we are starting with a new out of the box setup, lets navigate through the tabs of what will be introduced to you.

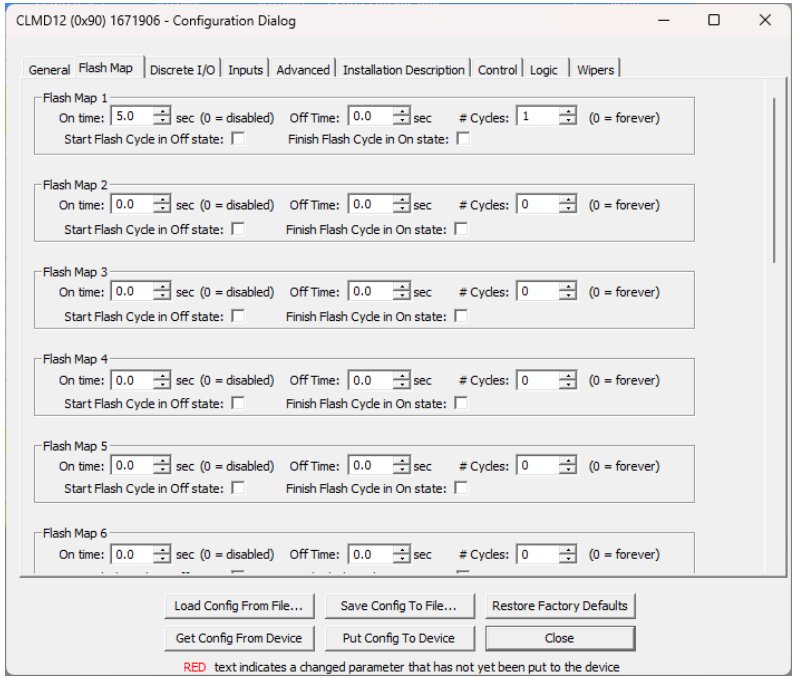
- Use the **General** tab to alter the names of the loads connected to the CLMD12 as well as breaker configurations
- Some fields are permanently greyed out as they show live data



NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD12

Flash Map Timer Elements

- The Flash Map tab implements a timer element
- You can apply a timer element to a designated load that can be on for a certain duration, then off for a certain duration and can continue this cycle as long as desired
- We have recently implanted two additional features where you can designate to
  - Start the Flash Cycle in the Off state and/or
  - Finish the Flash Cycle in the On state



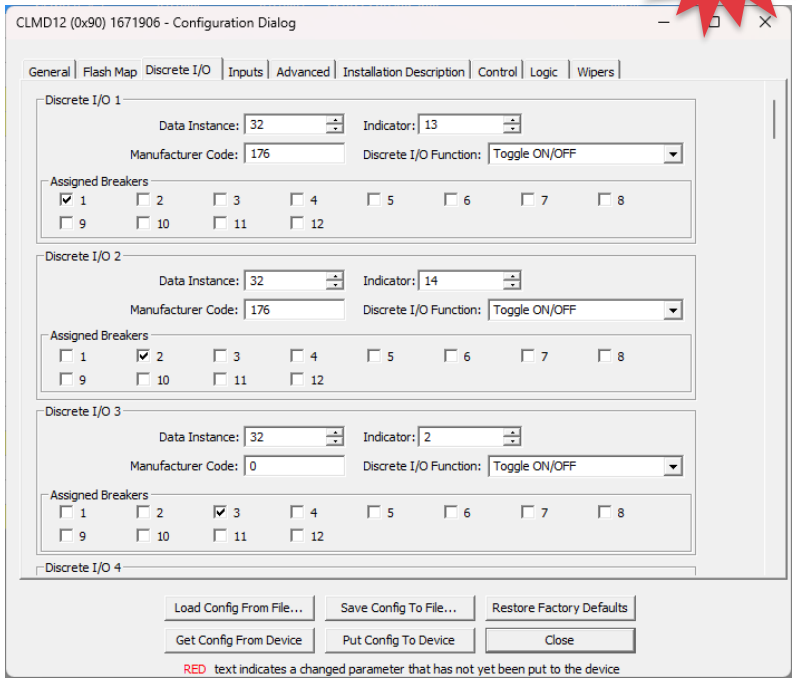
NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD12

Discrete I/Os

The Discrete I/O tab allows you to define the relationship between the input and outputs

- Data Instance – The Instance of an input device, could be local or a remote device
- Indicator – The indicator on the device being used to produce a signal that can control a load or a selection of loads (outputs)
- Manufacturer Code – A unique code assigned to each manufacturer by the NMEA Committee. All products produced by a given company will use the same manufacturer code. This can be used to filter the devices that control the Digital Switching of the CLMD module
- Discrete I/O Function – What the function of the load will be when it is activated. Is it momentary, maintained etc
- Assigned Breaker – Checkbox for the breakers being controlled through the signal coming from the above data already provided

Carling/Maretron Manufacturer Code: 176



NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD12

Inputs

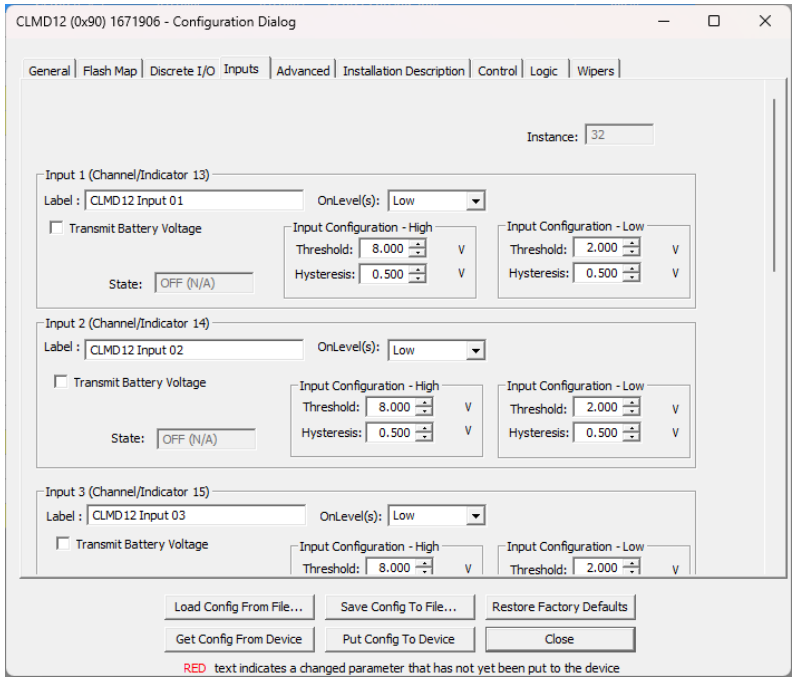
The Inputs tab allows us to define the mechanical/hardwired inputs (J2 Connector) of the CLMD12

- Populates individual entries for Inputs 1-7
  ** Take note of the Indicator # as this will correspond to setting up any Discrete I/O functions

- On Level(s) refers to when do I define this input to be classified as On/Active
  - High — When voltage is applies to the circuit
  - Low — When a ground connection is applied
  - Both — When in either the above states

- Shows the active status of the hardwired inputs

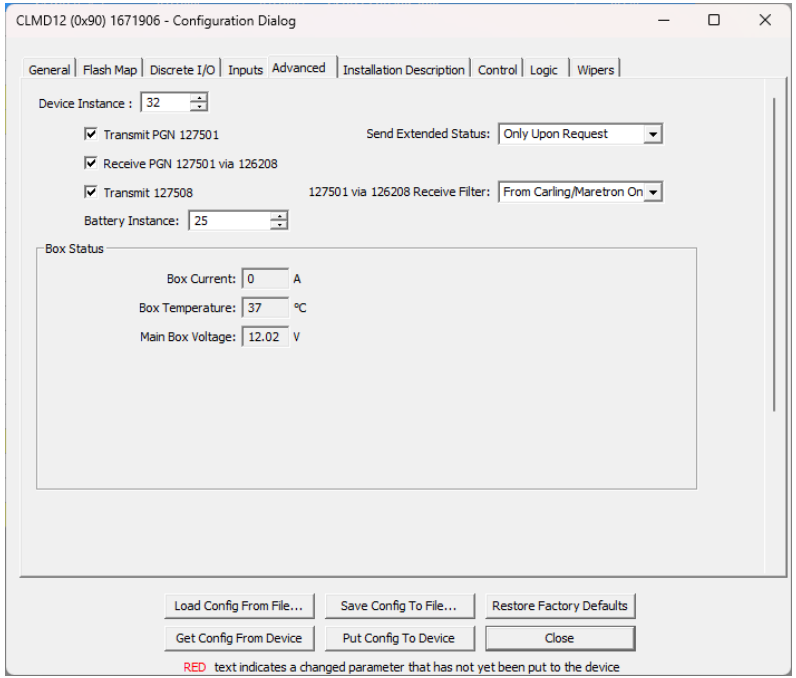
- If Transmit Battery Voltage is Enabled, this will populate the adjacent field to define the Battery Instance value, PGN 127508.



NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD12

Advanced Settings

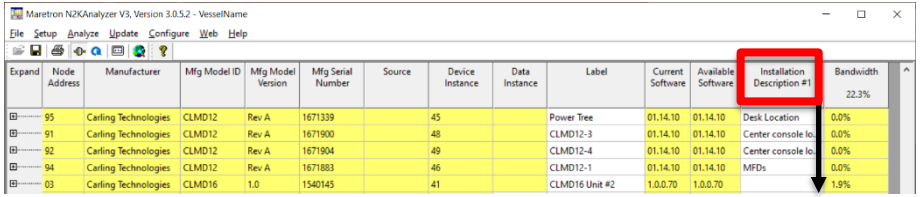
- Can change Device Instance of module and transmitted PGNs
- Provides real time status of the module's
  - Current
  - Temperature
  - Main Supply Voltage
- Provides adjustable settings of the Manufacturer Code receive filter
  - Only Carling/Maretron
  - Any Manufacture

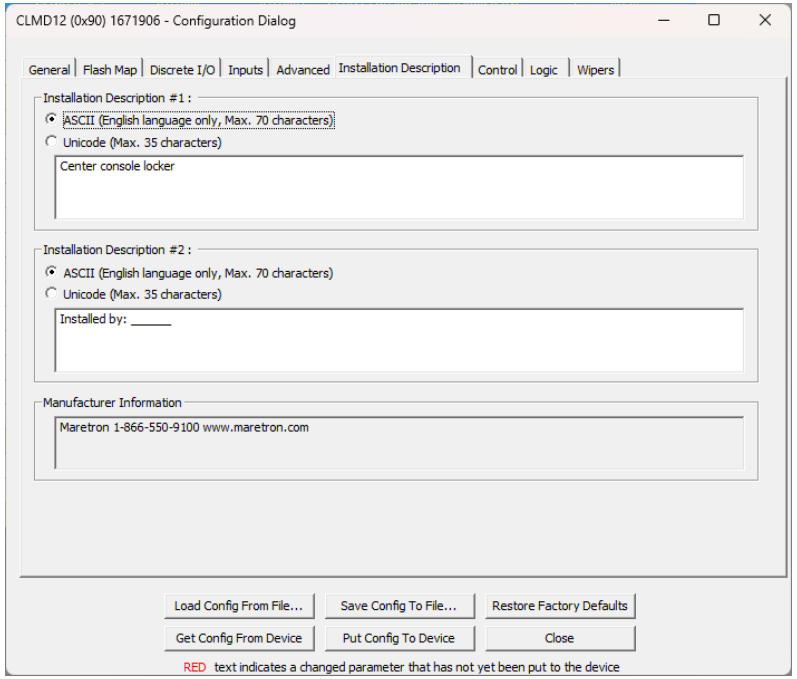


NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD12

Installation Description

- Provides a 70 character text field
- If filled in, will appear on N2KAnalyzer V3® in the below highlighted column for the CLMD12
- 2 Installation Description fields, treat these fields as if you were the next technician on the vessel and needed to troubleshoot
  - Device Location, Purpose, Installed by, When…..

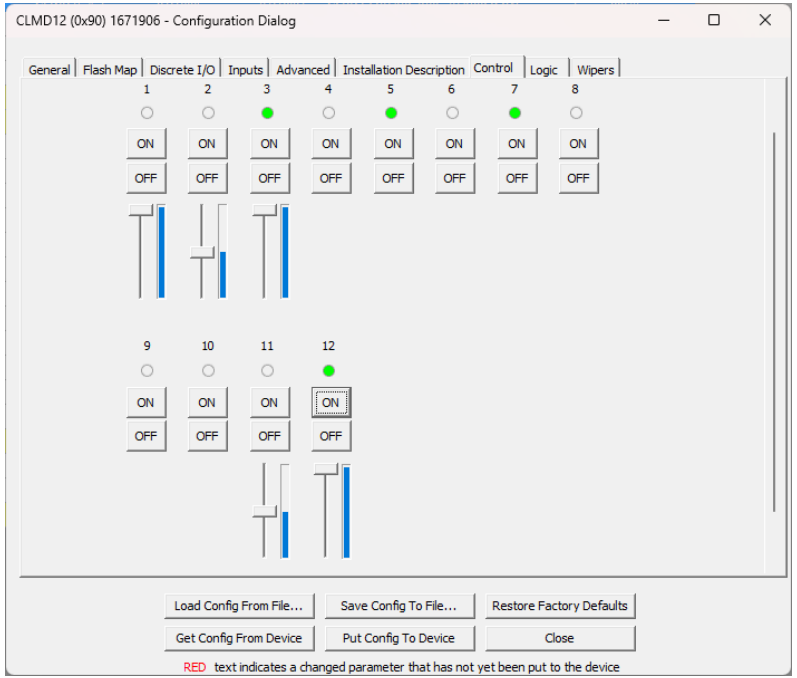




NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD12

Control Tab

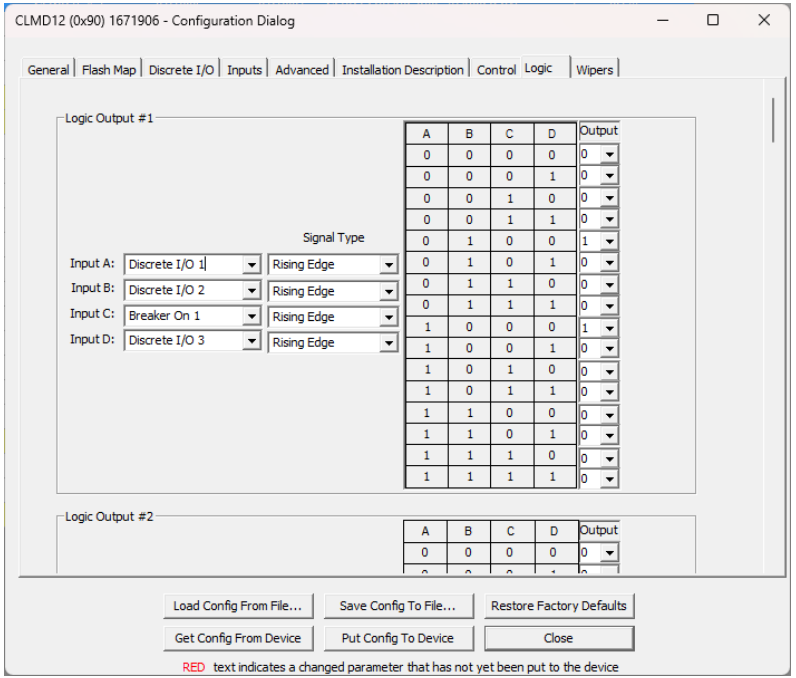
- Can be used to manually test the functionality of the breakers on your CLMD12
- Blue sliders control PWM when dimming has been enabled on a breaker
- Provides real time feedback indication



NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD12

Logic Tab

- Primarily used in applications where an output is being controlled from 2 – 4 different places on a vessel. Additionally, logic can be applied for more complex functions such things as generating rulesets for slide out controls or lockouts
- Where “1” is On and “0” is Off, the top row indicates the status of “Input A”, “Input B”, “Input C” and “Input D”’s combination of On or Off state
- Filling the row for each Logic Output #, place a 1 when the combination is to turn the Logic Output On and a “0” when the combination is to turn the Logic Output Off
- Up to 12 Logic elements



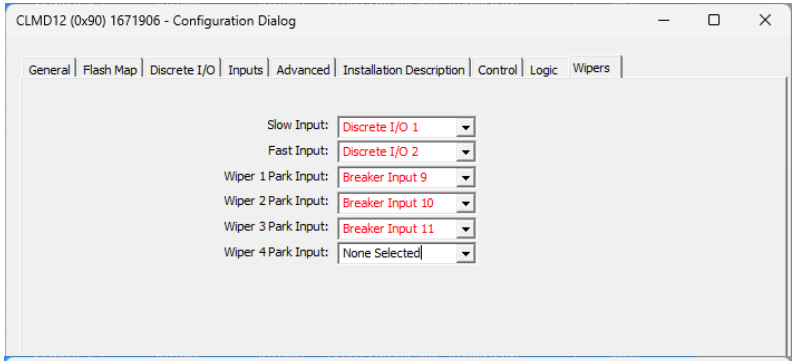
NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD12

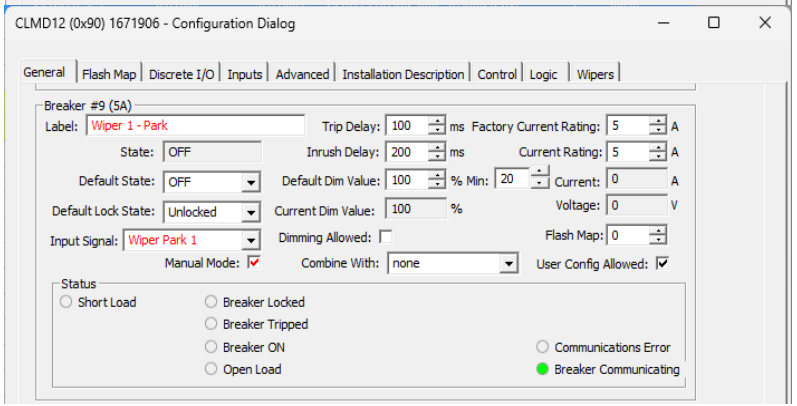
Wipers Tab

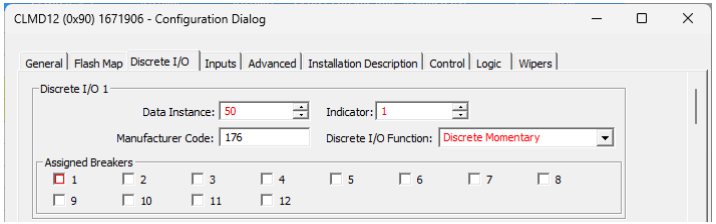
Allows a user to operate a Wiper controller system with synchronized behavior for up to 4 Wiper circuits via the NMEA 2000® network.

The Slow and Fast Input entries are generally connected to different discrete input signals for control from a CKM12 or VMM6, so you set up a discrete I/O entry for each switch and then specify that discrete I/O entry here.

Each circuit of the Wiper controller will be controlled for Slow & Fast controls. Define Input Signal in appropriate Breaker connections.







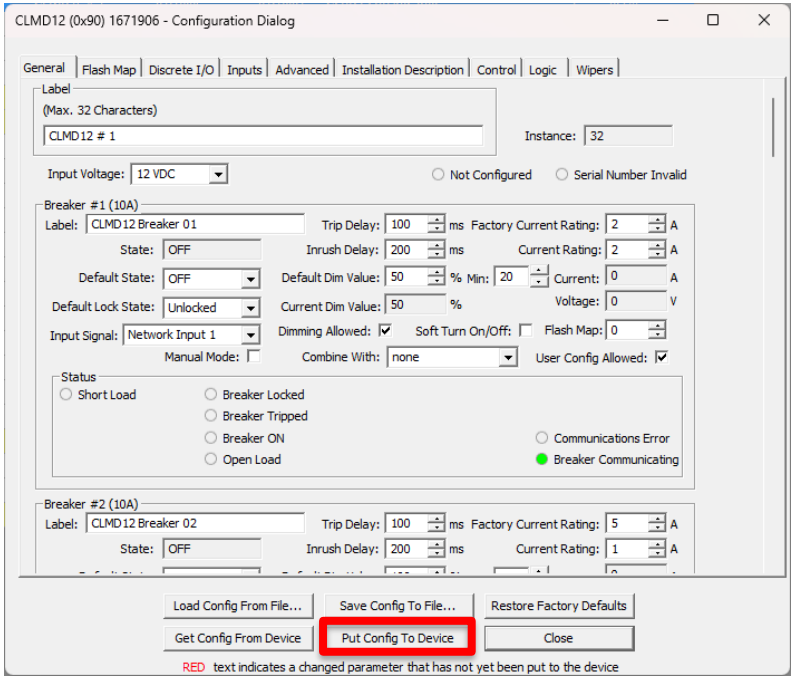
NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD12

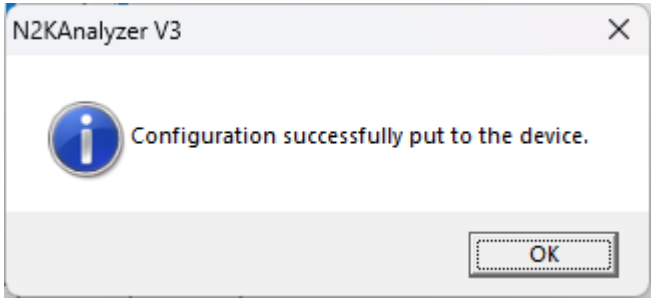
Applying a Configuration to a Device

Apply a Configuration

Select **Put Config To Device** from the buttons at the foot of the device's configuration window.

After this is complete the red text will change to black indicating the device has applied the settings.





NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD16

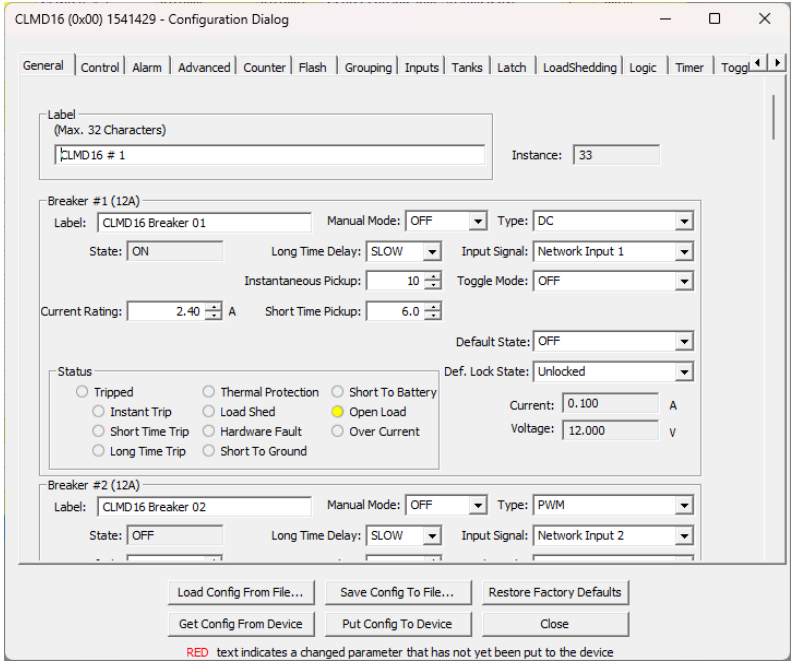
Overview

This manual corresponds to CLMD16 firmware revision (**1.0.3.66**)

NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD16

General Tab

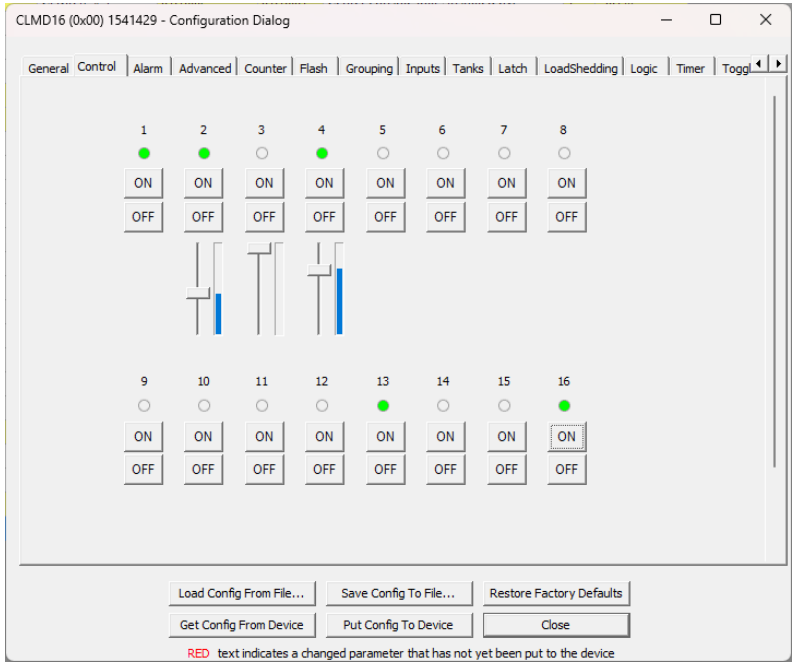
- Use the General tab to alter the names of the loads connected to the CLMD16 as well as breaker configurations
- Some fields are greyed out as they show live data



NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD16

Control Tab

- Can be used to manually test the functionality of the breakers on your CLMD16
- Blue sliders control PWM when dimming has been enabled on a breaker
- Provides real time feedback of signal with a function light

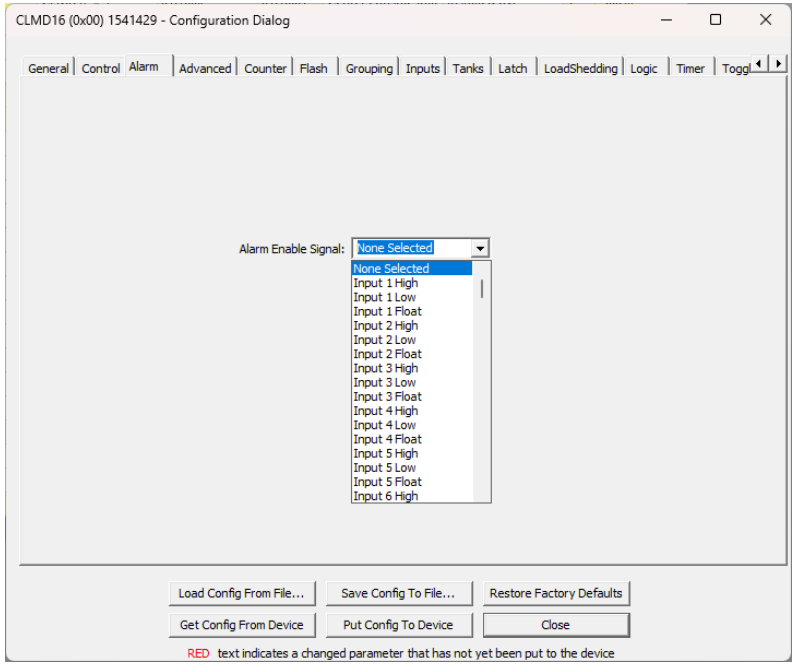


NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD16

Alarm Tab

The Alarm tab allows you to select an internal signal to be used to control the alarm outputs of the CLMD16.

- **Additional** 300mA capacity circuit
- This parameter allows you to select an internal signal to control the alarm outputs. The alarm outputs are connected whenever this signal is activated.
- Independent of NMEA 2000® Alert PGN
- Great for a local buzzer of piezo alarm

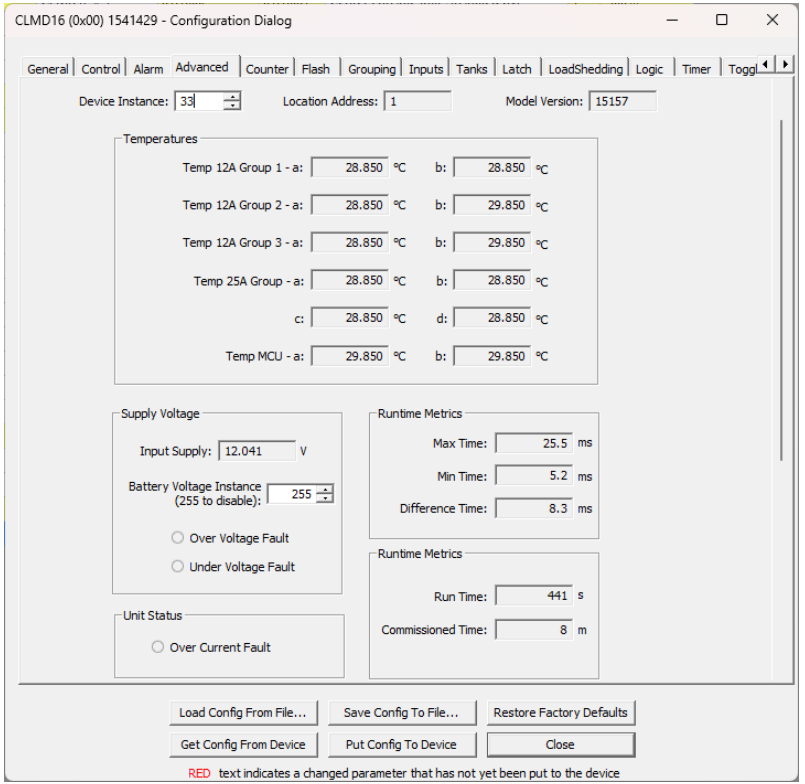


NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD16

Advanced Tab

The Advanced tab is used to configure and observe parameters that do not normally require changing, other than Device Instance to avoid Instancing conflicts.

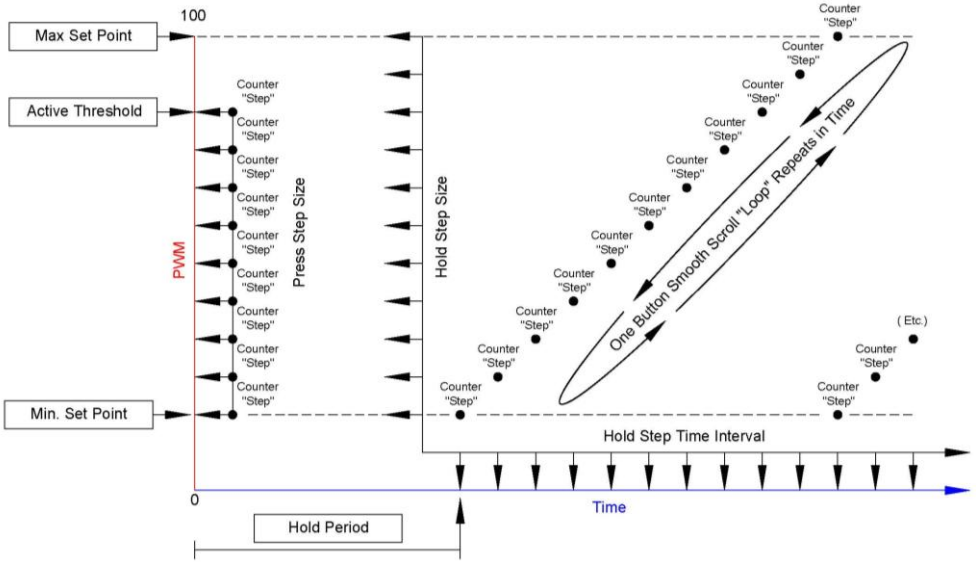
- Device Instance
- Model Version
- Temperatures of certain areas of the board
- Supply Voltage
- Battery Voltage – Publish the Input supply under 127508 (Battery Voltage)
- Run Time Metrics

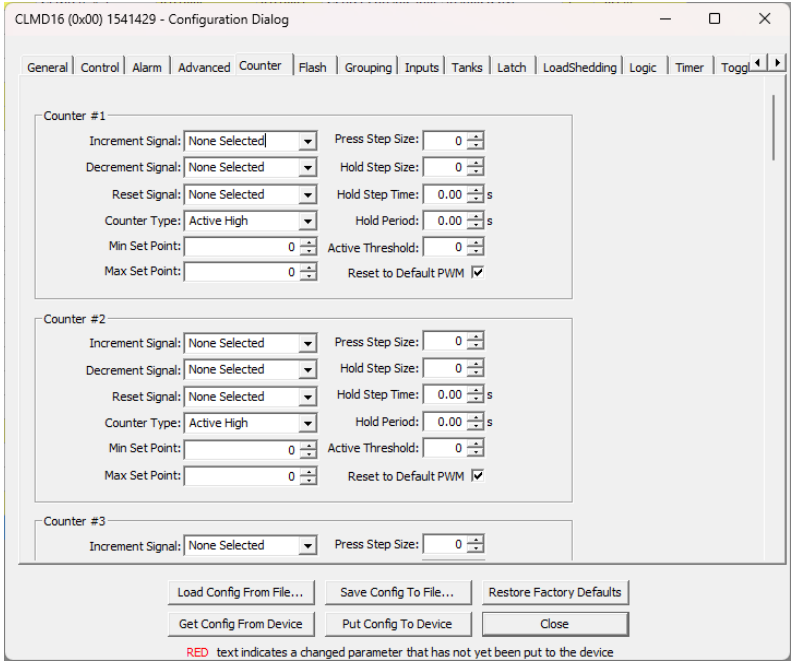


NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD16

Counter

- Use this tab to set Counter Parameters that can be used for general purposes or PWM control.
- Below is a chart that shows the Counter parameter's relation to PWM control.



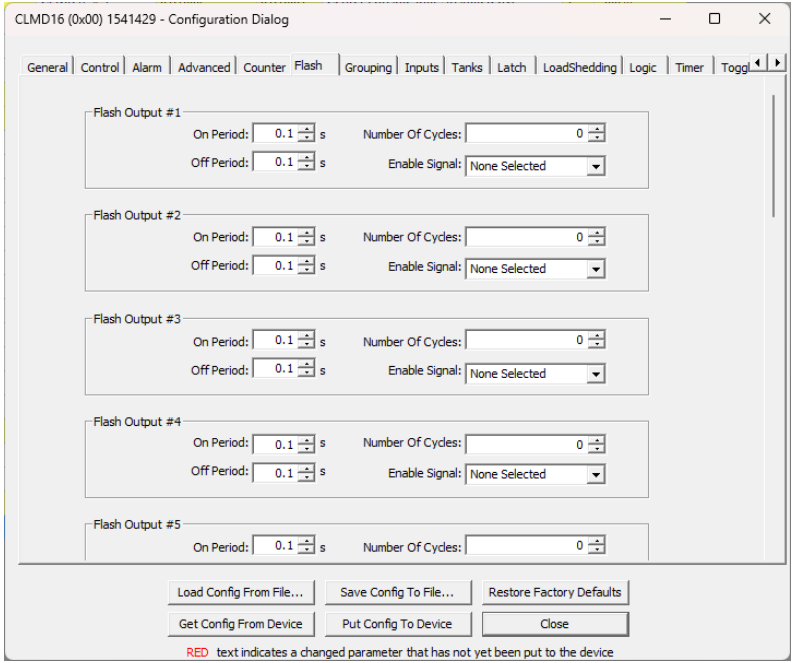


NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD16

Flash Timer Elements

The Flash function provides the Switching Application the ability to turn an output on and off at set frequencies.

This function can be used to generate unique visual error codes using a load output channel connected to an LED such as Indication of a network or power supply low voltage state. Or to flash a mast clearance strobe, Pulse an intermittent bilge pump, or for use with intermittent ON ventilation systems.

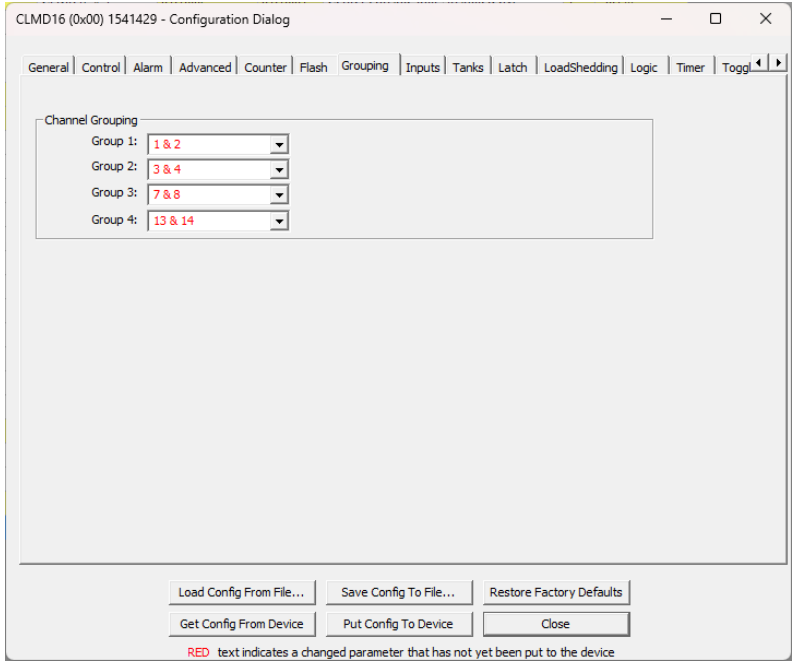


NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD16

Grouping / Paralleling of Breakers

- Use this tab to enable grouping/paralleling of breakers, drop down menu selection
  - Group 1 1 & 2
  - Group 2 3 & 4
  - Group 3 7 & 8
  - Group 4 13 & 14

- This will apply a software sync of the settings between the connected circuits, user/installer is still responsible the physical external connections



NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD16

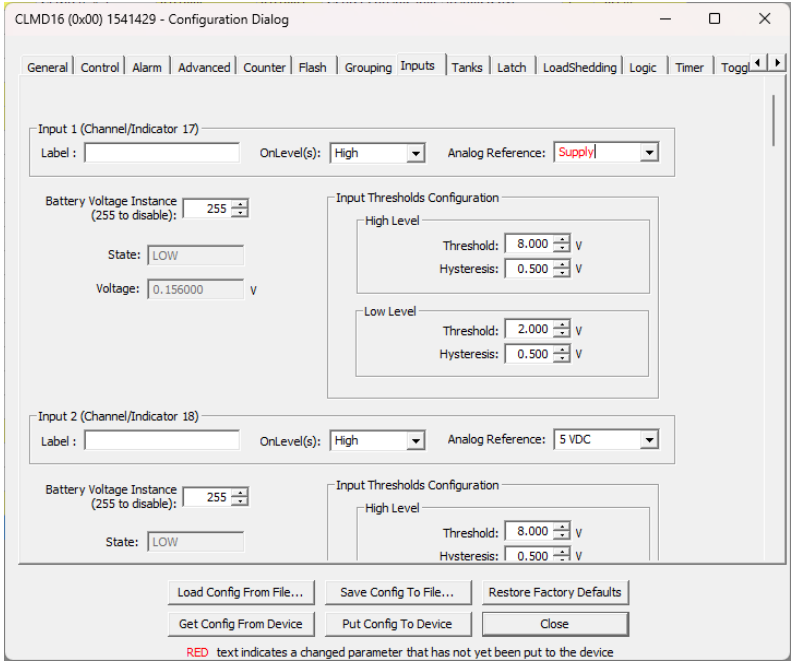
Inputs

The Inputs tab allows us to define the mechanical/hardwired inputs (J3 Connector) of the CLMD16

- Populates individual entries for Inputs 1-11
  ** Take note of the Indicator # as this will correspond to setting up any functions

- On Level(s) refers to when do I define this input to be classified as On/Active
  - ➢ High When voltage is applies to the circuit
  - ➢ Low When a ground connection is applied

- Shows the active status and voltage of the hardwired inputs

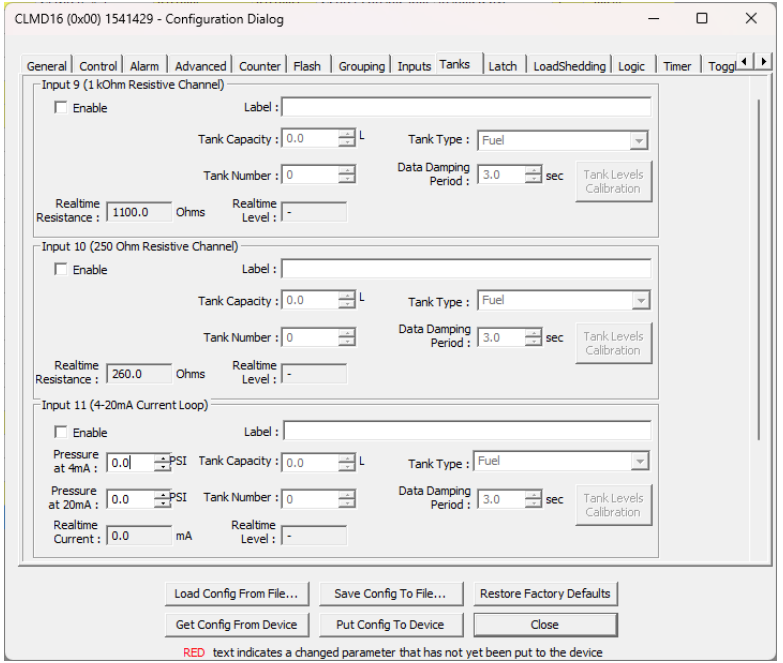


NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD16

Tanks

Use the Tank tab to enable tank level output similarly to:

- Inputs 9 & 10 - TLA100
  (Tank Level Adapter)
- Input 11 - FPM100 Channel
  (Fluid Pressure Monitor)

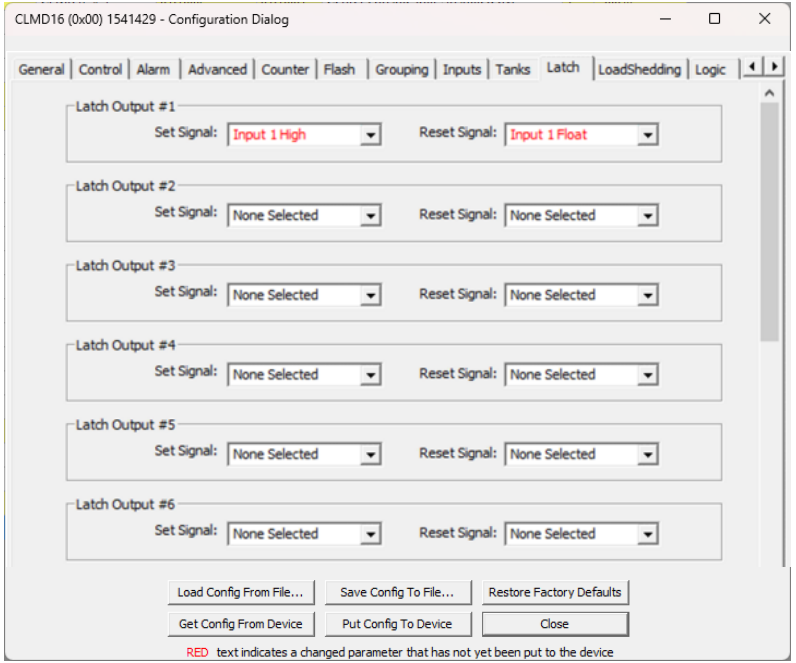


NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD16

Latch Elements

The Latch function has the below input signals:

- Set Signal – This signal will cause the Latch Output signal to turn On for a select circuit
- Reset Signal – This signal will cause the Latch Output signal to turn Off for a select circuit



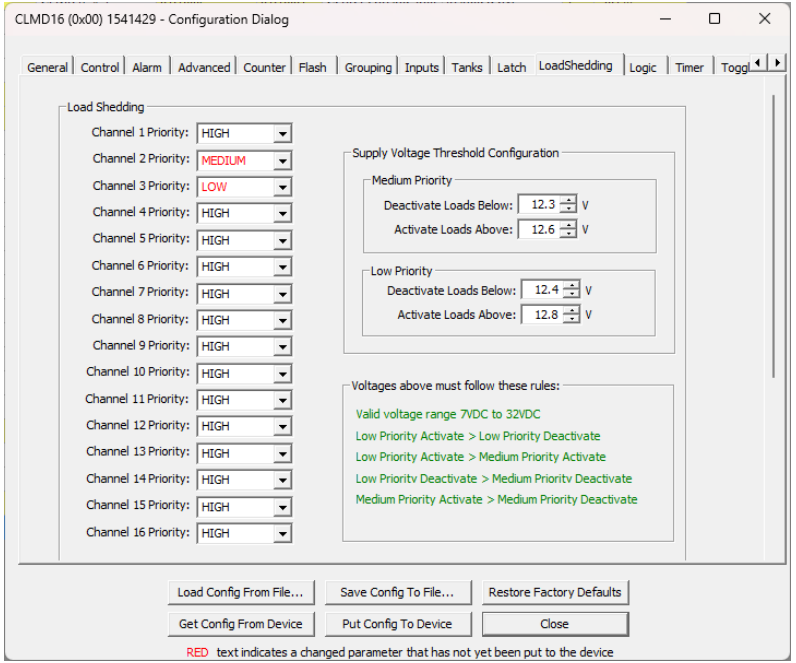
NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD16

Load Shedding

- Load Shedding is used to extend the time a system functions when battery voltage is low. As the battery/source voltage drops, the CLMD16 will turn off lower priority loads

- There are 3 priority levels which can be assigned to each CLMD16 load:
  - Low
  - Medium
  - High (default)

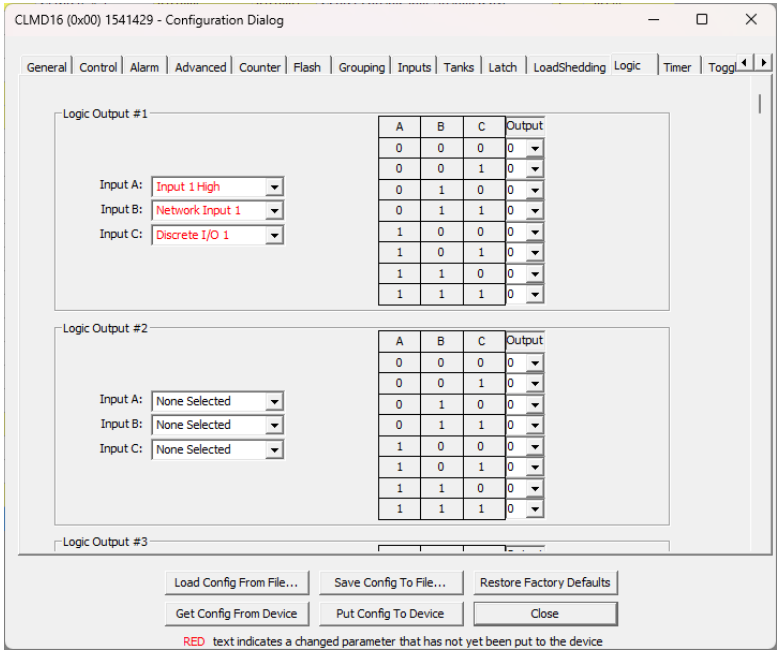
- The parameters that define when a load is shut off are the Voltage Thresholds. The user defines the voltage when the CLMD16 deactivates loads, and also the voltage where they can be reactivated once battery/source voltage has increased again



NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD16

Logic Elements

- Primarily used in applications where an output is being controlled from 2 or 3 different places on a vessel. Additionally, logic can be applied for more complex functions such things as generating rulesets for slide out controls or lockouts
- Where “1” is On and “0” is Off, the top row indicates the status of “Input A”, “Input B”, and “Input C”’s combination of On or Off state
- Filling the row for each Logic Output #, place a 1 when the combination is to turn the Logic Output On and a “0” when the combination is to turn the Logic Output Off



NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD16

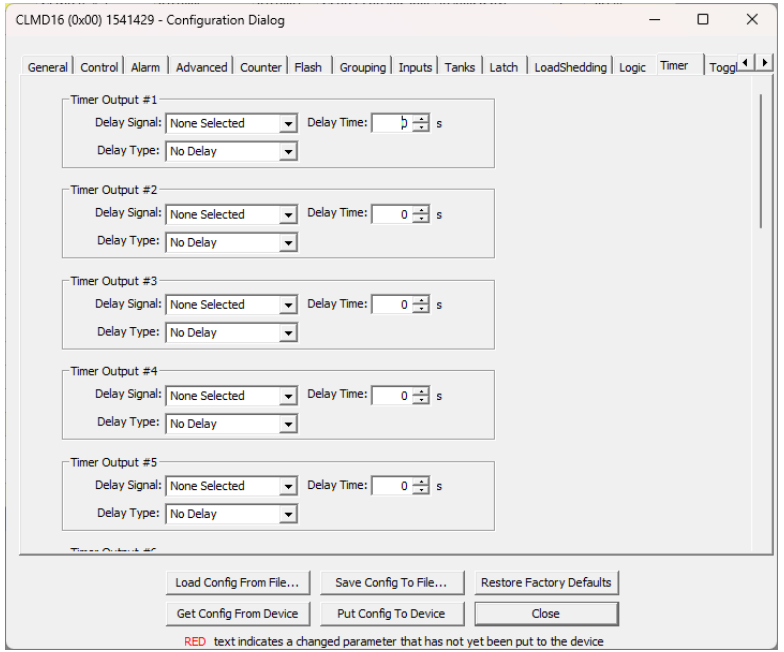
Timer Elements

The Timer function provides the Switching Application the ability to postpone the activation of load

output channels upon receiving channel activation commands up to 65,535 seconds for each.

Each timer can be configured to one of the following modes:

- ON Delay – When the input signal is applied, the output is delayed by the delay period
- OFF Delay – When the input signal is removed, the output is delayed by the delay period
- No Delay – the output signal is a replica of the input signal



NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD16

Toggle Elements

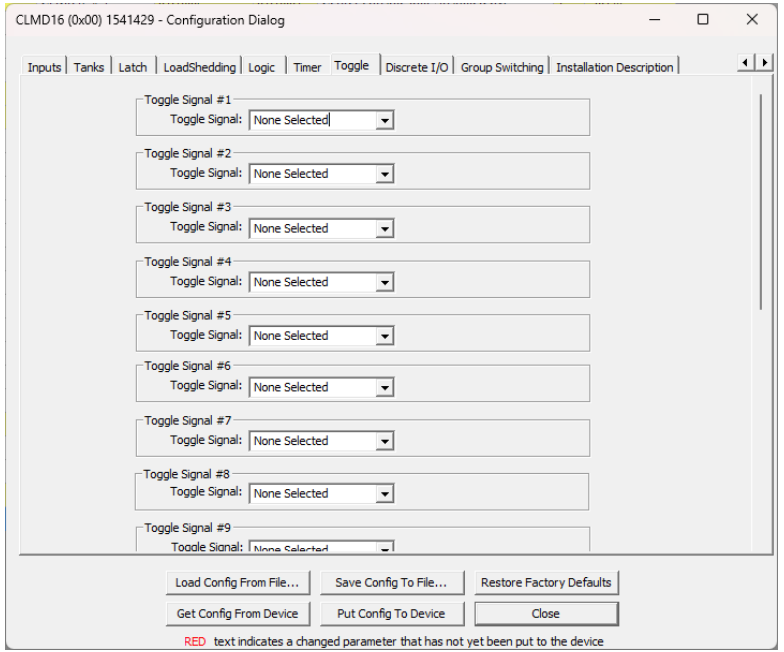
CLMD16 offers up to 16 Toggles which could be used for loads that latch using a single input.

If you wanted to use two inputs to latch a breaker, you will create a Latch function in the “Latch” Tab

Each toggle maintains its logic state until the single input signal to the toggle transitions from a On to Off.

The Toggle function has the following input signals:

- Toggle Input – when this signal is changed from On to Off (Usually a momentary event), it will cause the Toggle Output signal to change to the opposite of its current state; for example, if the Toggle Output signal is On, then will change to Off, and if the Toggle Output signal is Off, it will change to On.

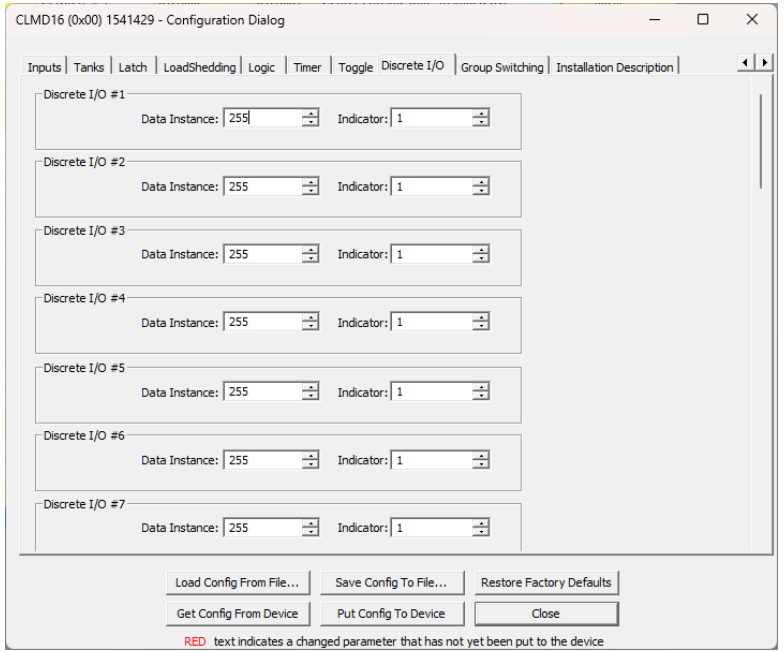


NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD16

Discrete I/O

The Discrete I/O tab should be used when you want to define breaker signal control coming from a single input source on an NMEA 2000® network.

- Similar concept that was introduced with the CLMD12
- 32 Discrete I/O's can be configured for each CLMD16



Data Instance

- This parameter allows you to configure the Data Instance of the NMEA 2000® PGN 127501 (Binary Status Report) that is desired to be used an a Discrete I/O input to the CLMD16.

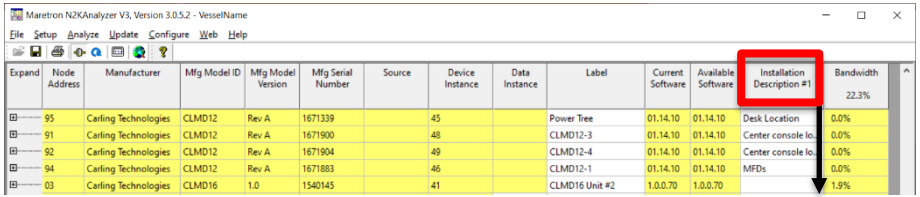
Indicator

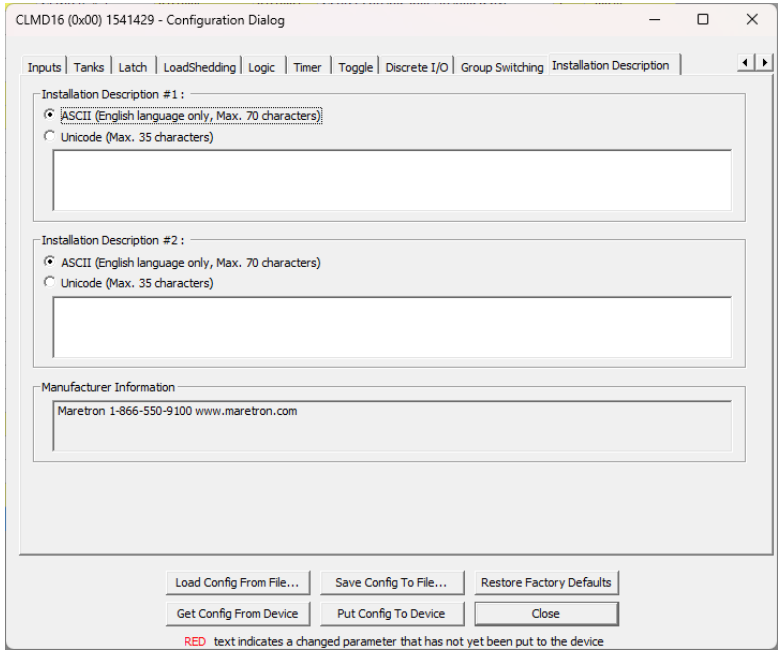
- This parameter allows you to configure the Channel / Indicator number within the PGN 127501 that is desired to be used an a Discrete I/O input to the CLMD16.

NAVIGATING N2KANALYZER V3 FOR MPOWER CLMD16

Installation Description

- Provides a 70 character text field that can be stored by the CLMD16
- If filled in, will appear on N2KAnalyzer V3 in the below highlighted column for the CLMD16
- 2 Installation Description fields, usually used for location and one for function





NAVIGATING N2KANALYZER V3 FOR MPOWER VMM6

Overview

This manual corresponds to VMM6 firmware revision (**1.07.00**)

NAVIGATING N2KANALYZER V3 FOR MPOWER VMM6

General Settings

- Set the instance for the device

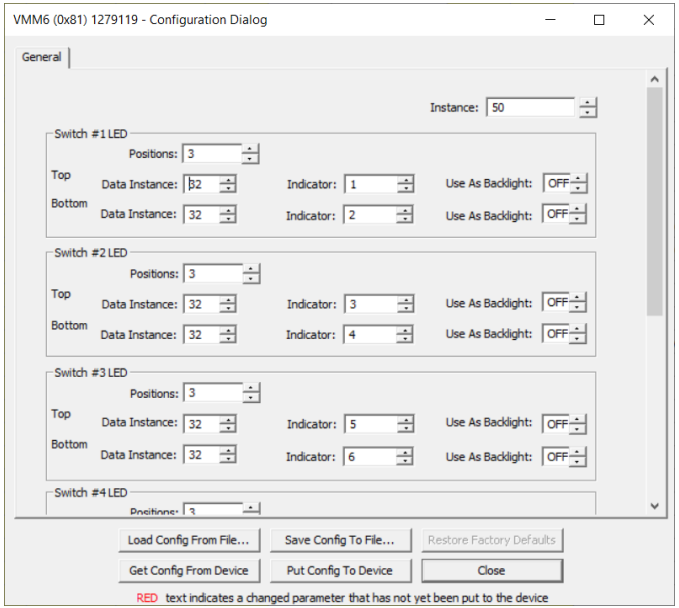
  ** Make sure this value is unique compared to any other device transmitting the NMEA PGN **127501**
  - CKM12, CLMD12, CLMD16, DCR100, RIM100, SIM100

- As a reminder, we are only programming the LED response of a connected circuit on the network

- Define the switch profile (2 or 3 positions)
  ** For the Marine VMM switch line, all switches will be 2 position, besides Switch # 6 if ordered the Nav/Anch model

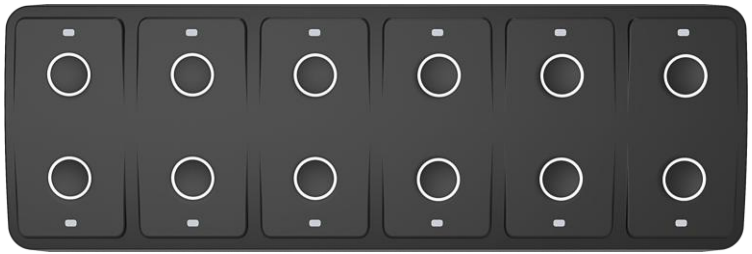
- As there are 2 LEDs within each of the rocker, you can designate the behavior of each separately, top and bottom.

  One can be used as a backlight, while the other indicates the breakers status of the associated circuit



NAVIGATING N2KANALYZER V3 FOR MPOWER CKM12

Overview



This manual corresponds to CKM12 firmware revision (**2.01.00**)

NAVIGATING N2KANALYZER V3 FOR MPOWER CKM12

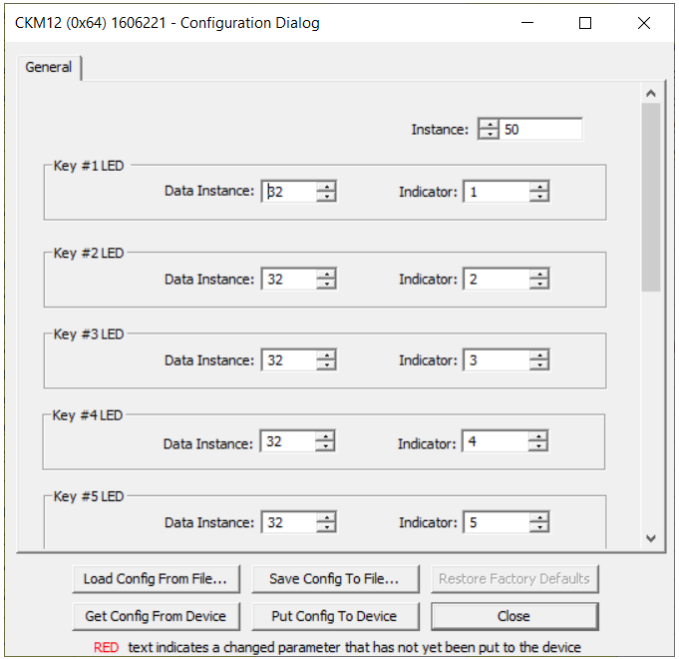
General Settings

The CKM12 setup will be very similar to the setup of the VMM6

- Set the instance for the device

  ** Make sure this value is unique compared to any other device transmitting the NMEA PGN **127501**
  - CKM12, CLMD12, CLMD16, DCR100, RIM100, SIM100

- As a reminder, we are only programming the LED response of a connected circuit on the network

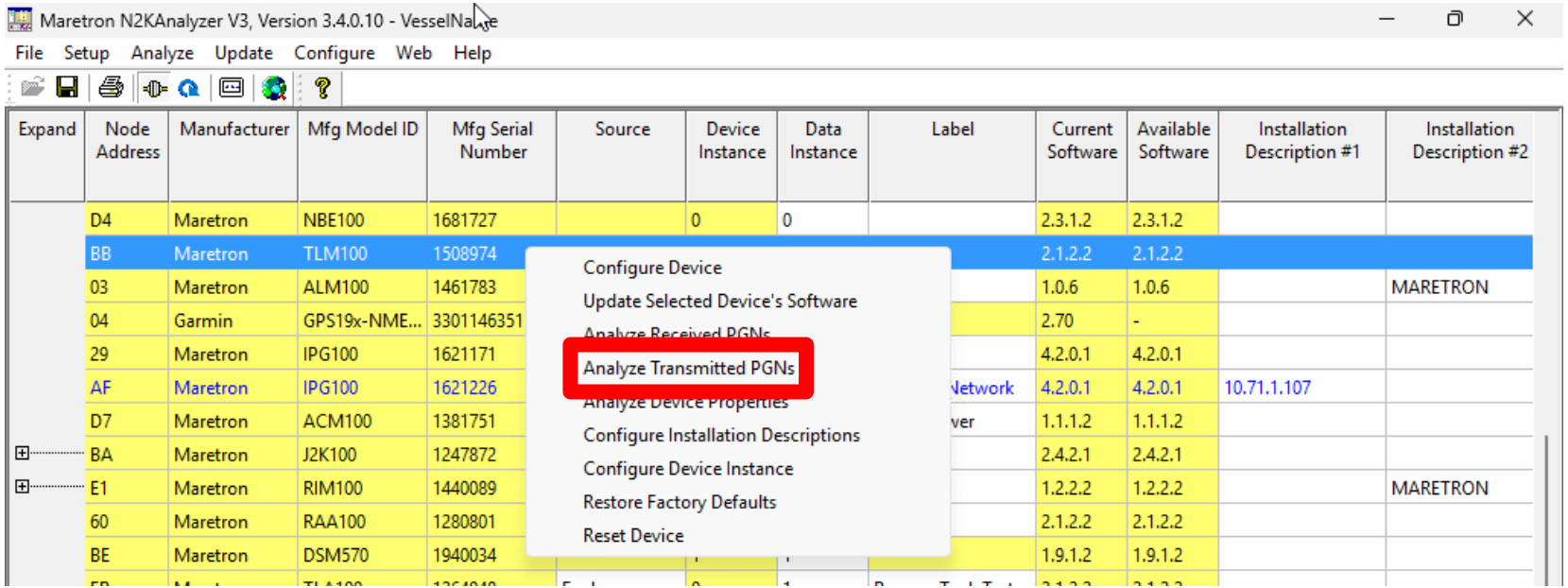


CONFIGURATION

Using N2KAnalyzer® V3 – Verify Output

Verify data output of a Device.

Select your target device by left-clicking once, then right-click and select Analyze Transmitted PGNs.

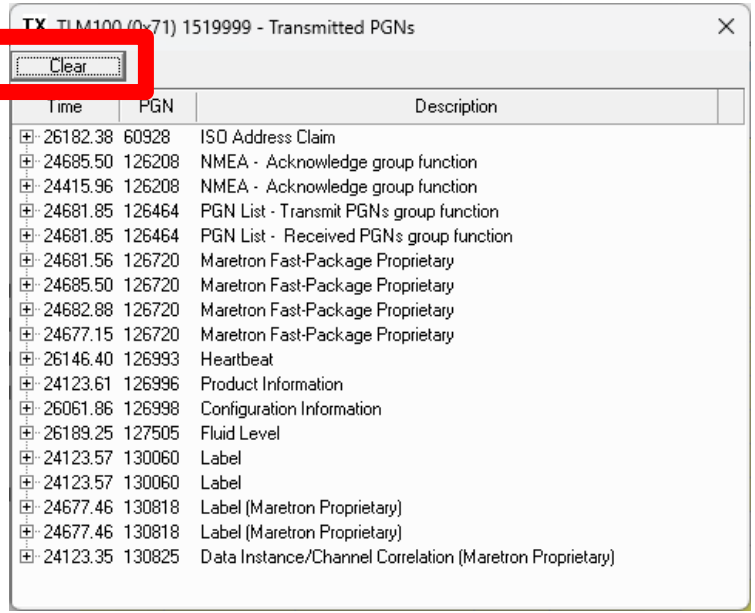


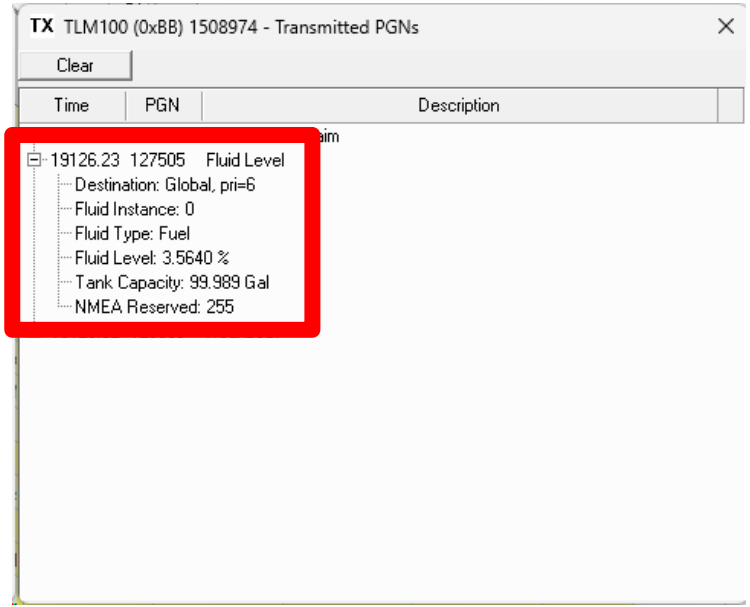
CONFIGURATION

Using N2KAnalyzer® V3 – Transmitted PGNs

Clear & View transmitted list.

Press the **Clear** to refresh the list to view data that is actively being transmitted from the device.





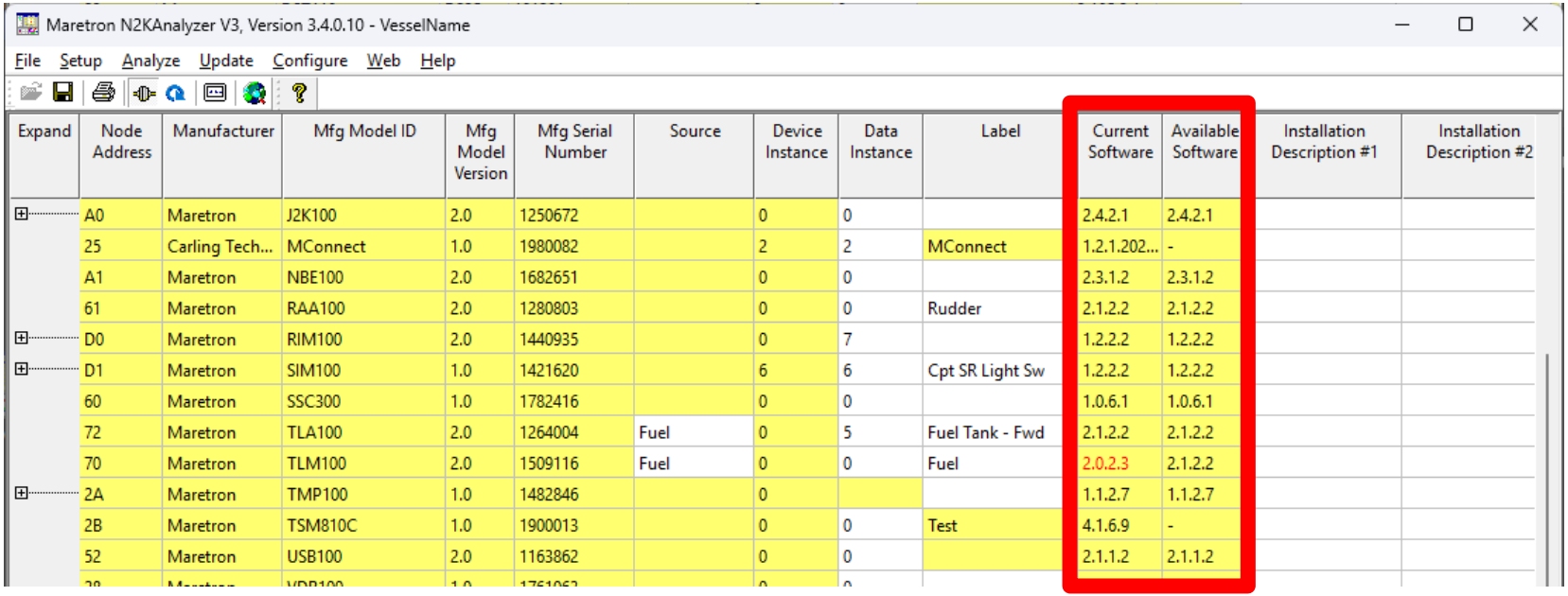
CONFIGURATION

Using N2KAnalyzer® V3 – Verify Output

Update Maretron equipment.

Reviewing your tank monitoring products Current Software version versus currently Available Software.

If Current Software is illustrated in RED text, this implies that an update is available for your product.

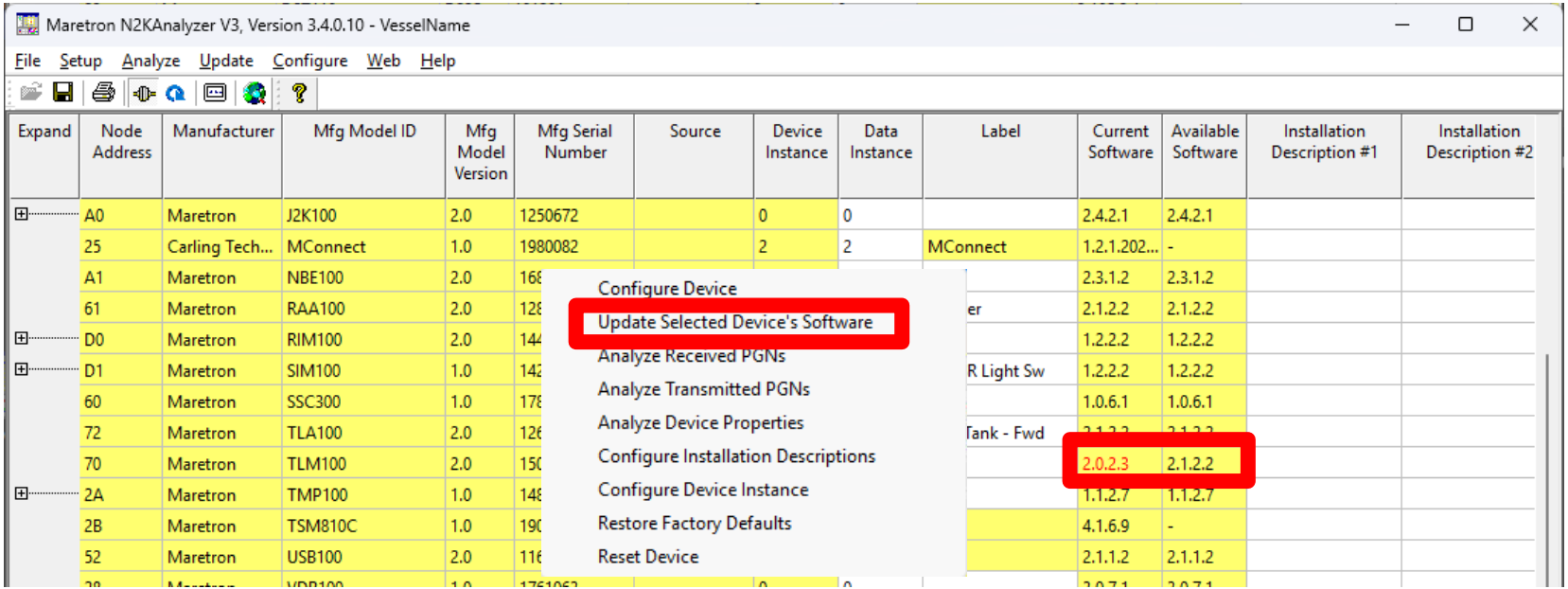


Expand	Node Address	Manufacturer	Mfg Model ID	Mfg Model Version	Mfg Serial Number	Source	Device Instance	Data Instance	Label	Current Software	Available Software	Installation Description #1	Installation Description #2
⊞	A0	Maretron	J2K100	2.0	1250672		0	0		2.4.2.1	2.4.2.1		
	25	Carling Tech...	MConnect	1.0	1980082		2	2	MConnect	1.2.1.202...	-		
	A1	Maretron	NBE100	2.0	1682651		0	0		2.3.1.2	2.3.1.2		
	61	Maretron	RAA100	2.0	1280803		0	0	Rudder	2.1.2.2	2.1.2.2		
⊞	D0	Maretron	RIM100	2.0	1440935		0	7		1.2.2.2	1.2.2.2		
⊞	D1	Maretron	SIM100	1.0	1421620		6	6	Cpt SR Light Sw	1.2.2.2	1.2.2.2		
	60	Maretron	SSC300	1.0	1782416		0	0		1.0.6.1	1.0.6.1		
	72	Maretron	TLA100	2.0	1264004	Fuel	0	5	Fuel Tank - Fwd	2.1.2.2	2.1.2.2		
	70	Maretron	TLM100	2.0	1509116	Fuel	0	0	Fuel	2.0.2.3	2.1.2.2		
⊞	2A	Maretron	TMP100	1.0	1482846		0			1.1.2.7	1.1.2.7		
	2B	Maretron	TSM810C	1.0	1900013		0	0	Test	4.1.6.9	-		
	52	Maretron	USB100	2.0	1163862		0	0		2.1.1.2	2.1.1.2		

CONFIGURATION

Using N2KAnalyzer® V3 – Verify Output

Select the target device by left-clicking once, right-click and select **Update Selected Device's Software**.

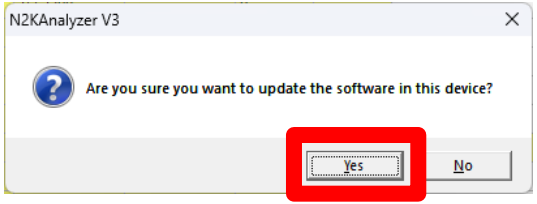


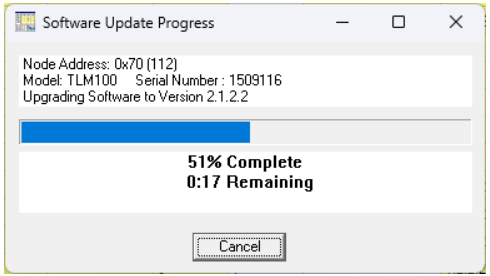
CONFIGURATION

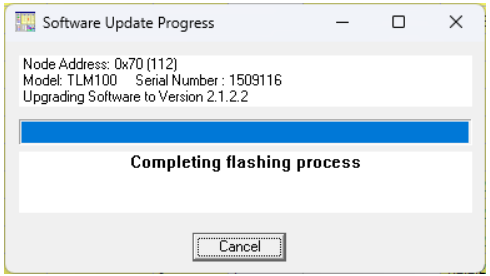
Using N2KAnalyzer® V3 – Verify Output

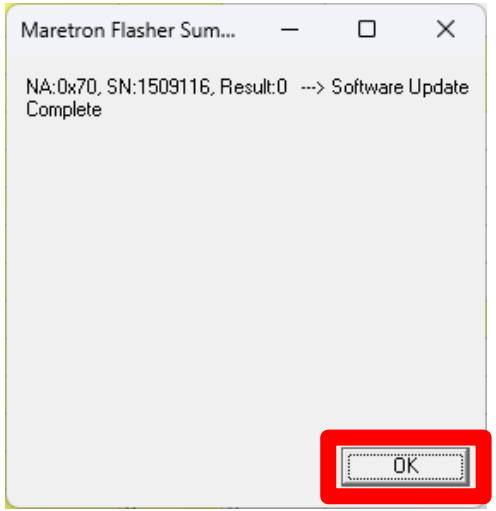
Follow the on-screen prompts until the update is complete, the unit will power cycle when complete.

Press OK to close the menu.







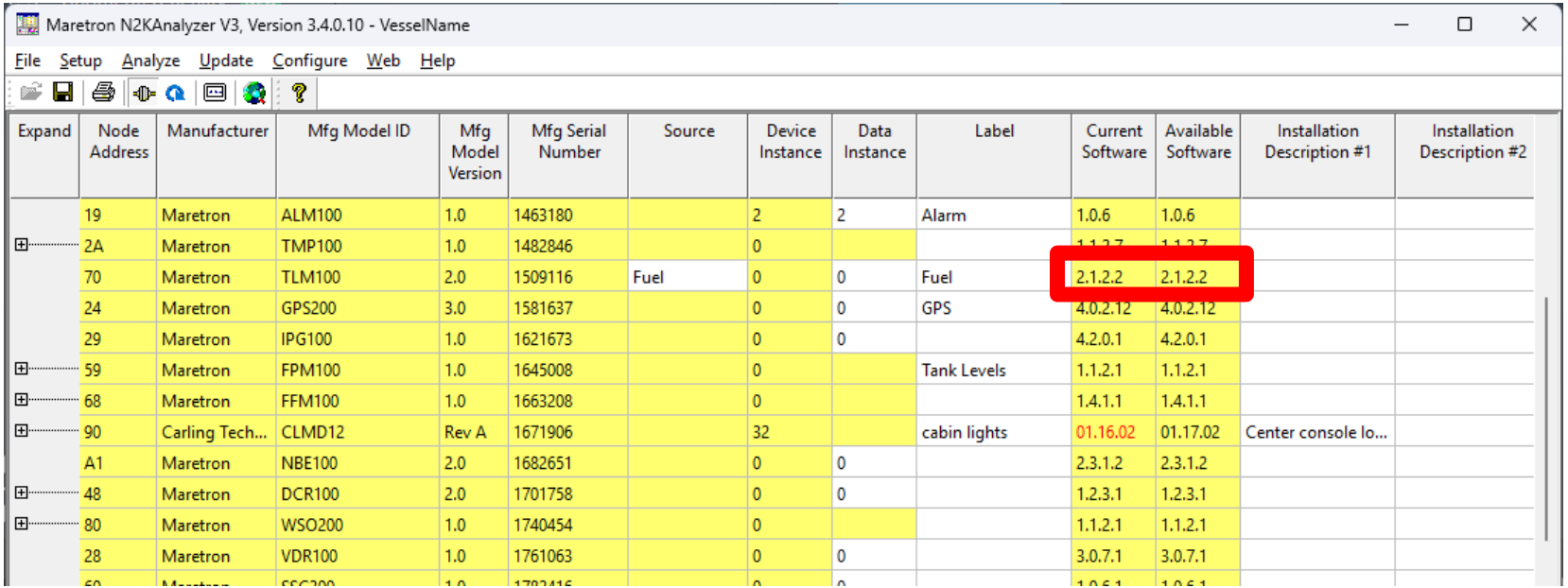


CONFIGURATION

Using N2KAnalyzer® V3 – Verify Output

Confirming software is up to date!!

** Keeping N2KAnalyzer up to date will also offer the latest supported release of software for Maretron, MPower and OctoPlex branded products!



Expand	Node Address	Manufacturer	Mfg Model ID	Mfg Model Version	Mfg Serial Number	Source	Device Instance	Data Instance	Label	Current Software	Available Software	Installation Description #1	Installation Description #2
	19	Maretron	ALM100	1.0	1463180		2	2	Alarm	1.0.6	1.0.6		
⊞	2A	Maretron	TMP100	1.0	1482846		0						
	70	Maretron	TLM100	2.0	1509116	Fuel	0	0	Fuel	2.1.2.2	2.1.2.2		
	24	Maretron	GPS200	3.0	1581637		0	0	GPS	4.0.2.12	4.0.2.12		
	29	Maretron	IPG100	1.0	1621673		0	0		4.2.0.1	4.2.0.1		
⊞	59	Maretron	FPM100	1.0	1645008		0		Tank Levels	1.1.2.1	1.1.2.1		
⊞	68	Maretron	FFM100	1.0	1663208		0			1.4.1.1	1.4.1.1		
⊞	90	Carling Tech...	CLMD12	Rev A	1671906		32		cabin lights	01.16.02	01.17.02	Center console lo...	
	A1	Maretron	NBE100	2.0	1682651		0	0		2.3.1.2	2.3.1.2		
⊞	48	Maretron	DCR100	2.0	1701758		0	0		1.2.3.1	1.2.3.1		
⊞	80	Maretron	WSO200	1.0	1740454		0			1.1.2.1	1.1.2.1		
	28	Maretron	VDR100	1.0	1761063		0	0		3.0.7.1	3.0.7.1		

SIMPLE SYSTEMS W/ COMPATIBLE MFD

NMEA 2000® Standard Digital Switching

- Some MPower systems such as a system with a single CLMD unit applied to a compatible MFD can require no configuration at all.
- The CLMD units are pre-configured with an out of box configuration. If the out of box configuration breaker value mix works for the client, and the unit is applied to MFD only, no configuration is needed outside of building the ‘Switching Screen’s appeal on the MFD.
- The following video shows an example of how quickly one of these easy systems could be in use.
- If more than one CLMD product is needed for the system, hardwired inputs will be in use or additional devices such as CKM or VMM switch banks need to be applied to the system, the system will need to be configured via N2KAnalyzer V3.

Out of Box Breaker Values

Breaker 1	5A
Breaker 2	5A
Breaker 3	5A
Breaker 4	5A
Breaker 5	5A
Breaker 6	5A
Breaker 7	5A
Breaker 8	5A
Breaker 9	5A
Breaker 10	5A
Breaker 11	5A
Breaker 12	5A

Breaker 1	5A	Breaker 13	10A
Breaker 2	5A	Breaker 14	10A
Breaker 3	5A	Breaker 15	15A
Breaker 4	5A	Breaker 16	15A
Breaker 5	5A		
Breaker 6	5A		
Breaker 7	5A		
Breaker 8	5A		
Breaker 9	5A		
Breaker 10	5A		
Breaker 11	5A		
Breaker 12	5A		

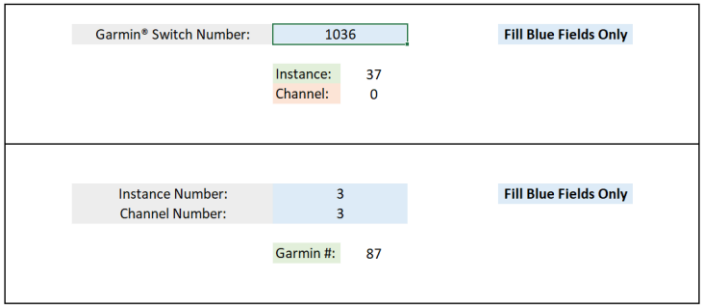
MPower-Garmin Setup Video

WEBSITE RESOURCES

MPower W/ Garmin System Design Resources

MFD Setup Guide Video

Garmin Switch Number to MPower Channel Conversion Sheet



Garmin® Switch Number:	1036	Fill Blue Fields Only
Instance:	37	
Channel:	0	
Instance Number:	3	Fill Blue Fields Only
Channel Number:	3	
Garmin #:	87	

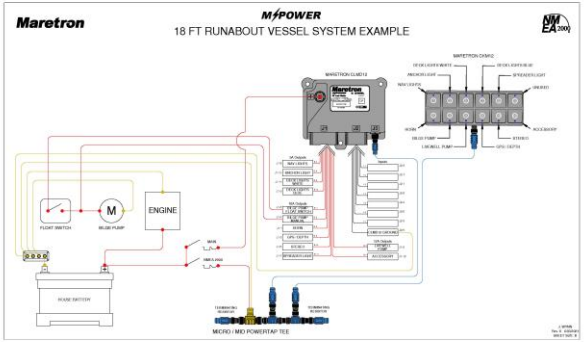
MFD Setup Guide

https://www.maretron.com/examples/applications/digitalSwitching/DigitalSwitching.php

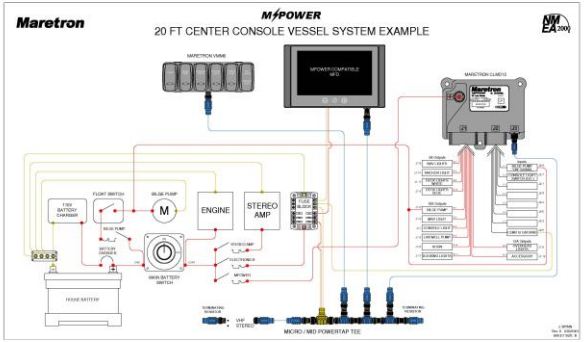
WEBSITE RESOURCES

MPower System Examples Including Wiring Diagrams, Bill of Materials, and Pre-built Configurations

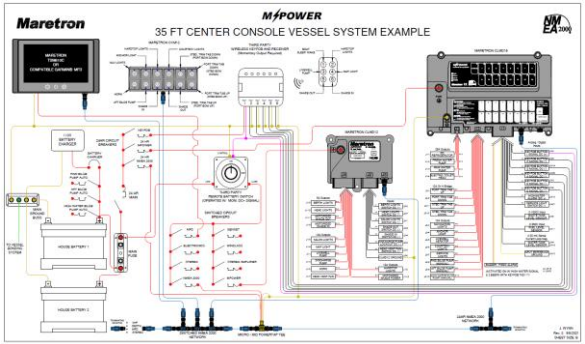
18Ft Runabout



20Ft Center Console



35Ft Center Console

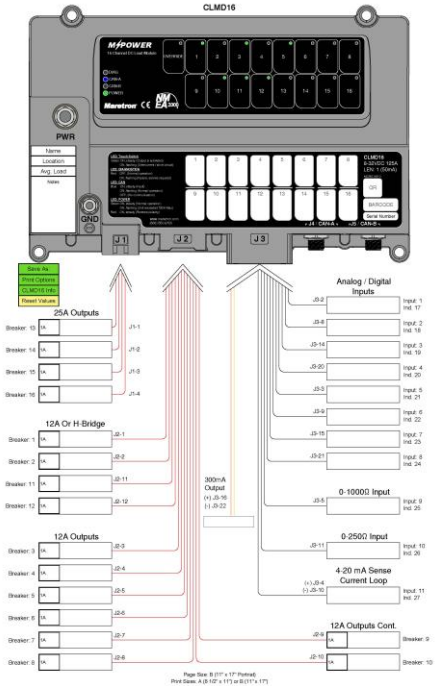


https://www.maretron.com/examples/applications/digitalSwitching/DigitalSwitching.php

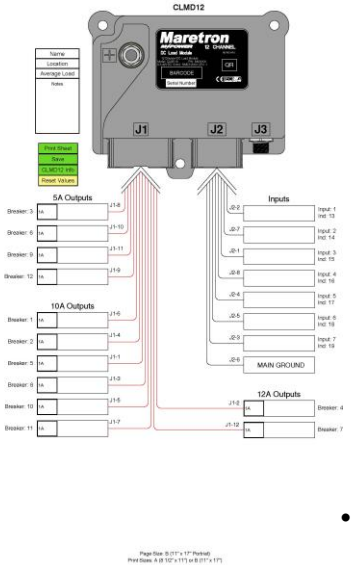
WEBSITE RESOURCES

MPower Documentation Sheets

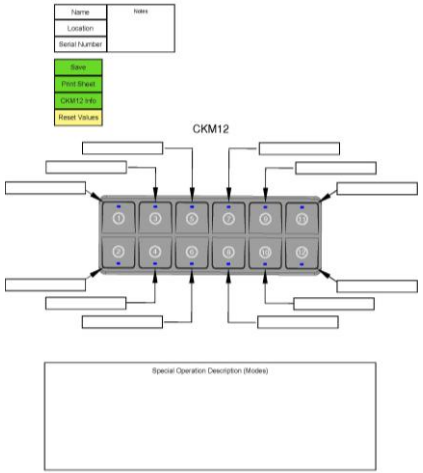
CLMD16



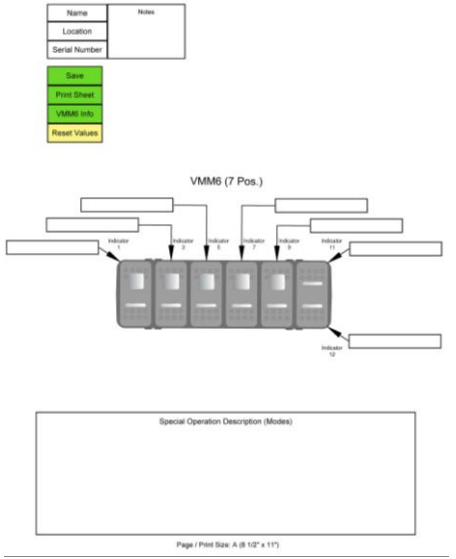
CLMD12



CKM12



VMM6



- Fillable forms that can be saved, archived and printed to keep inside your clients User's Manual or System Documentation.

Located under the 'Documentation' section of each product location

Maretron®

Vessel Monitoring & Control

www.Maretron.com

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