



Training Presentation

Session 2

MPower[®]
Digital Switching Platform

Session 1 Overview:

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

Session 2 Overview:

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

SWITCHING CONCEPTS

Inter-System Communication Method (Discrete I/O)

CLMD16



| Channel | Trigger |
|---------|---------------|
| 1 | Breaker 1 On |
| 2 | Breaker 2 On |
| 3 | Breaker 3 On |
| 4 | Breaker 4 On |
| 5 | Breaker 5 On |
| 6 | Breaker 6 On |
| 7 | Breaker 7 On |
| 8 | Breaker 8 On |
| 9 | Breaker 9 On |
| 10 | Breaker 10 On |
| 11 | Breaker 11 On |
| 12 | Breaker 12 On |
| 13 | Breaker 13 On |
| 14 | Breaker 14 On |
| 15 | Breaker 15 On |
| 16 | Breaker 16 On |

| Channel | Trigger |
|---------|--|
| 17 | Input 1 (Voltage Sensing) 'On Level' |
| 18 | Input 2 (Voltage Sensing) 'On Level' |
| 19 | Input 3 (Voltage Sensing) 'On Level' |
| 20 | Input 4 (Voltage Sensing) 'On Level' |
| 21 | Input 5 (Voltage Sensing) 'On Level' |
| 22 | Input 6 (Voltage Sensing) 'On Level' |
| 23 | Input 7 (Voltage Sensing) 'On Level' |
| 24 | Input 8 (Voltage Sensing) 'On Level' |
| 25 | Input 9 (Resistance to DC -) 'On Level' |
| 26 | Input 10 (Resistance to DC -) 'On Level' |
| 27 | Input 11 (Current Loop Pair) 'On Level' |

CLMD12

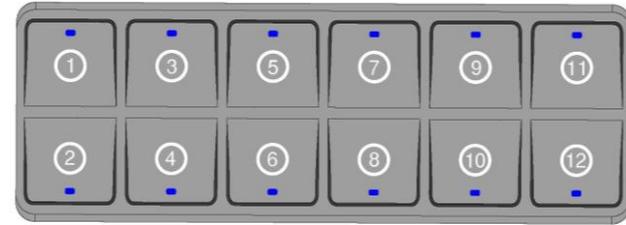


| Channel | Trigger |
|---------|---------------|
| 1 | Breaker 1 On |
| 2 | Breaker 2 On |
| 3 | Breaker 3 On |
| 4 | Breaker 4 On |
| 5 | Breaker 5 On |
| 6 | Breaker 6 On |
| 7 | Breaker 7 On |
| 8 | Breaker 8 On |
| 9 | Breaker 9 On |
| 10 | Breaker 10 On |
| 11 | Breaker 11 On |
| 12 | Breaker 12 On |

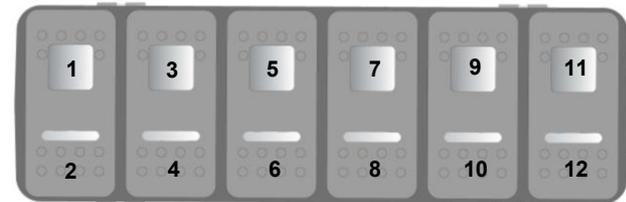
| Channel | Trigger |
|---------|--|
| 13 | Input 1 (Voltage Sensing) 'On Level' |
| 14 | Input 2 (Voltage Sensing) 'On Level' |
| 15 | Input 3 (Voltage Sensing) 'On Level' |
| 16 | Input 4 (Voltage Sensing) 'On Level' |
| 17 | Input 5 (Voltage Sensing) 'On Level' |
| 18 | Input 6 (Voltage Sensing) 'On Level' |
| 19 | Input 7 (Voltage Sensing) 'On Level' |

- The CLMD16, CLMD12, VMM6 and CKM12 send and receive NMEA 2000® 127501 Binary Status Report PGN. The tables below show the channel definition of the sent 127501 Binary Status Report for MPower Devices.
- This Binary Status Report is the signaling used for communicating from box to box over NMEA 2000.

CKM12



VMM6



SWITCHING CONCEPTS

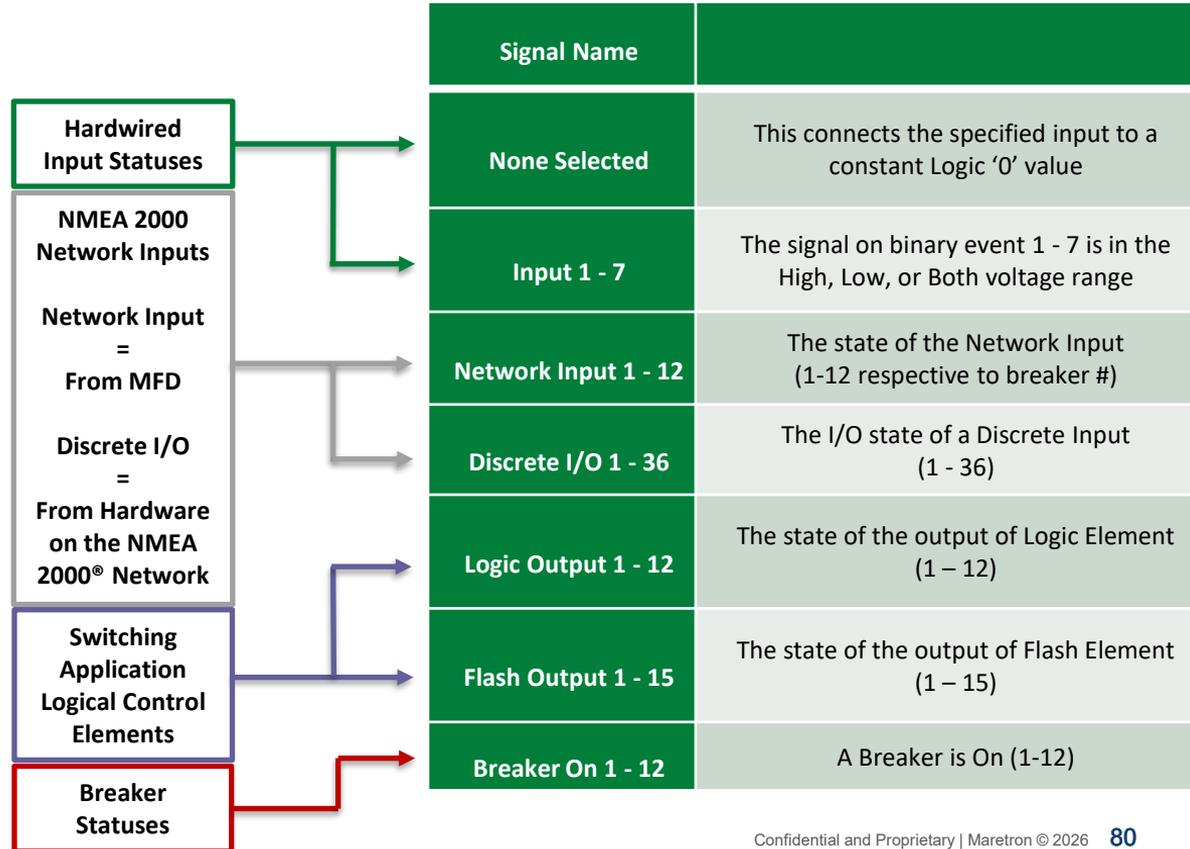
CLMD12 - Configuration Elements



Let's review Input signal options of the CLMD12, and review all of the different types of input potentials we have.

Everything Starts With an 'Input'

Logical Switching Elements receive an Input and then their Output can be used as the Input of the next desired action



SWITCHING CONCEPTS

CLMD16 - Configuration Elements

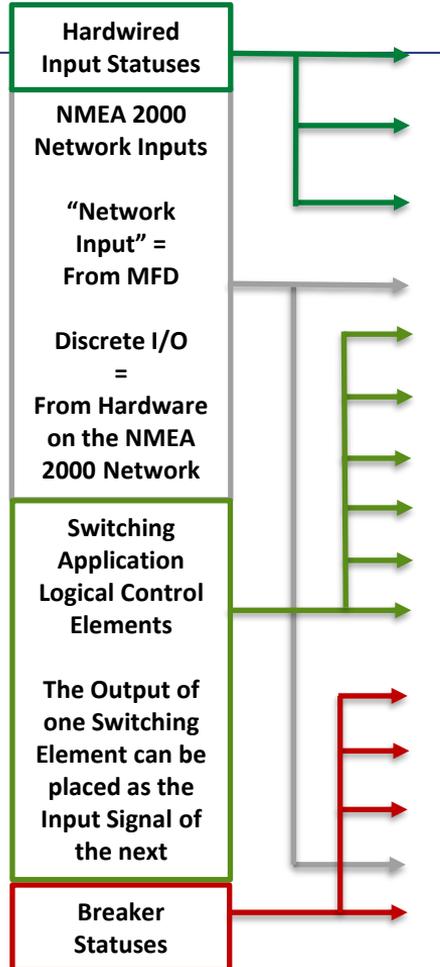


Now let's jump to the big brother, the CLMD16, and review all of the different types of input potentials we have.

Everything Starts With an 'Input'

Logical Switching Elements receive an Input and then their Output can be used as the Input of the next desired action

See the CLMD16's 'Available Signal list' to the right for a description of the Inputs that can be used to switch a load(s) or placed into one another before switching a load(s).



| Signal Name | Description |
|------------------------------|---|
| None Selected | This connects the specified input to a constant Logic '0' value |
| Input 1-11 Low | The signal on binary event 1 - 11 is in the Low voltage range |
| Input 1-11 Float | The signal on binary event 1 - 11 is in the Float voltage range |
| Input 1 - 11 High | The signal on binary event 1 - 11 is in the High voltage range |
| Network Input 1 - 16 | The state of the Network Input (1-16 respective to breaker #) |
| Logic Output 1 - 48 | The state of the output of Logic Element (1 - 48) |
| Latch Output 1 - 16 | The state of the output of Latch Element (1 - 16) |
| Toggle Output 1 - 16 | The state of the output of Toggle Element (1 - 16) |
| Timer Output 1 - 16 | The state of the output of Delay Timer Element (1 - 16) |
| Flash Output 1 - 16 | The state of the output of Flash Element (1 - 16) |
| Counter Active 1 - 16 | The state of the output of Counter Element (1 - 16) |
| Over Current Fault Ch 1 - 16 | A Breaker Over Current Fault has been detected (1 - 16) |
| Ch 1 - 16 Tripped | A Breaker has tripped (1 - 16) |
| Ch 1 - 12 Thermal Limit Hit | A Breaker has reached its thermal limit (1 - 16) |
| Discrete I/O 1 - 32 | The I/O state of a Discrete Input (1 - 32) |
| Breaker On 1 - 16 | A Breaker is On (1-12) |

MPOWER CONFIGURATION

Note:

'Manual Mode' is the means in which to sever the direct communication / control of the Breaker from MFD(s). By default, compatible MFD(s) present on the network containing a Maretron CLMD product will have direct control access unless Manual Mode is enabled.

CLMD12 - Configuration Example Description Using Discrete I/O

- The 'Discrete I/O' Data Instance and Indicator is the input relative to an instance of the NMEA 2000 127501 Binary Status Report PGN.

CLMD12 Features Pre-Defined Discrete I/O Input Functions:

| | |
|----------------------------|-------------------------------|
| Discrete I/O Function: | Disabled |
| <input type="checkbox"/> 5 | <input type="checkbox"/> 6 |
| | Always Turn ON |
| | Always Turn OFF |
| | Toggle ON/OFF |
| | Brighten |
| | Dim |
| | Flash |
| | Turn OFF w/Lock |
| | Unlock |
| | One Button Smooth High-to-Low |
| | One Button Smooth Low-to-High |
| | Smooth Scroll |
| | One Button Smooth Scroll |
| | Discrete Momentary Inverted |
| | Discrete Momentary |

General Tab

Name the circuit and set the breakers trip parameters and default power-up state

Is this a Dimmable (PWM) Circuit?

Does this breaker need to be combined or Paralleled with another?

Discrete I/O Tab

What's the Binary Status Input Source?

What's the Function?

Assign Breaker(s)

MPOWER CONFIGURATION

CLMD16 - Configuration Example Description Using Discrete I/O

Note:

'Manual Mode' is the means in which to sever the direct communication / control of the Breaker from MFD(s).
By default, compatible MFD(s) present on the network containing a Maretron CLMD product will have direct control access unless Manual Mode is enabled.

Discrete I/O Tab

General Tab

CLMD16 (0x00) 1540225 - Configuration Dialog

CLMD 16 (0x00) 1540225 - Configuration Dialog

Discrete I/O #1

Data Instance: 50 Indicator: 1

Name the circuit and set the breaker's type, trip parameters and default power-up state

Set the input signal for the breaker

Discrete I/O @ 'Data Instance 50, Indicator / Channel 1'

is the **Toggle** control method for 'Breaker #1'

General | Control | Alarm | Advanced | Counter | Flash | Grouping | Inputs | Tanks | Latch | LoadShedding | Logic | Timer | Toggle | Discrete I/O | Installat

Label (Max. 32 Characters)
#36 Instance: 36

Breaker #1
Label: Breaker #1 Manual Mode: OFF Type: DC
State: OFF Long Time Delay: FAST Input Signal: Discrete I/O 1
Instantaneous Pickup: 10 Toggle Mode: ON
Current Rating: 10.08 A Short Time Pickup: 1.5

Status
 Tripped Thermal Protection Short To Battery
 Instant Trip Load Shed Open Load
 Short Time Trip Hardware Fault Over Current
 Long Time Trip Short To Ground

Default State: OFF
Def. Lock State: Unlocked
Voltage: 0.700 V
Current: 0.700 A

MPOWER CONFIGURATION

CLMD16 - More Advanced Configuration Flow Explained

Everything Starts With an 'Input'

The screenshot displays the MPOWER configuration interface for CLMD16 (0x00) 1540225. It is divided into three main sections: Logic Tab, Timer Tab, and General Tab.

Logic Tab: Shows a truth table with columns A, B, C, and Output. Below the table, three input selection dropdowns are highlighted with a red circle: Input A (Input 1 Low), Input B (Discrete I/O 1), and Input C (None Selected). A red box labeled "Logic Output #1" is positioned above the table.

| A | B | C | Output |
|---|---|---|--------|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 |

Timer Tab: Shows the configuration for "Timer Output #1". The "Delay Signal" dropdown is set to "Logic Output 1" and is highlighted with a red box. The "Delay Time" is set to 3 seconds. The "Delay Type" is set to "OFF Delay".

General Tab: Shows the configuration for "Breaker #1 (12A)". The "Input Signal" dropdown is set to "Timer Output 1" and is highlighted with a red box. Other settings include "Label: CLMD16 Breaker 1", "Manual Mode: OFF", "Type: DC", "State: OFF", "Long Time Delay: SLOW", "Instantaneous Pickup: 10", "Current Rating: 5.04 A", "Short Time Pickup: 6.0", "Default State: OFF", and "Def. Lock State: Unlocked".

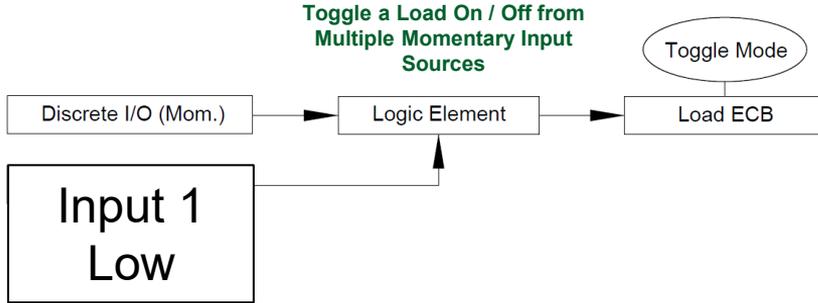
The Switching Application Elements can be placed in any order without regulation, even into one another for example, a Logic Element can be the Input of another Logic Element or Timer Elements can be sequenced by placing one Timer Element Output to another.

MPOWER CONFIGURATION

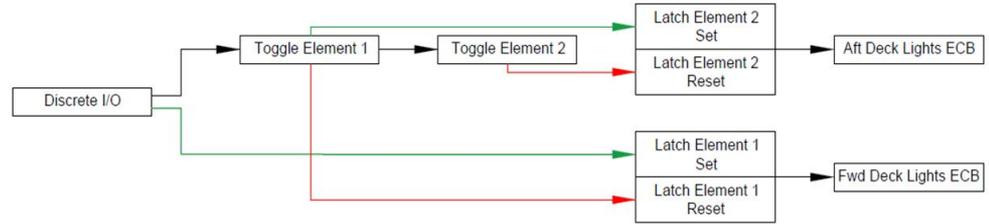
CLMD16 - Switch Application Possibilities

Below are some examples of the usage of CLMD16 Switching Application Elements for more advanced control.

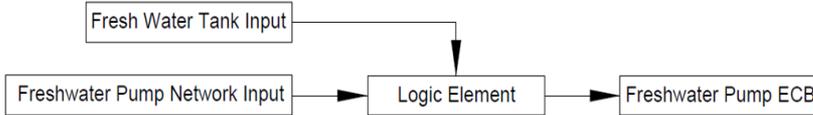
Toggle a Load On / Off from Multiple Momentary Input Sources



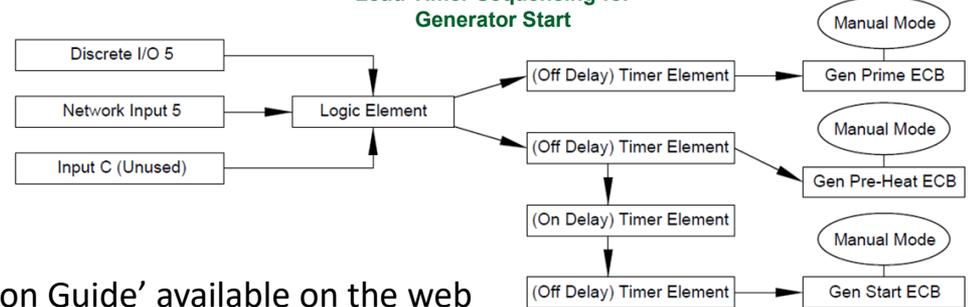
Single Input Load Control Sequence



Turning On or Off a Circuit Based on Fluid Level (Save your pumps by disallowing them to run dry)



Load Timer Sequencing for Generator Start



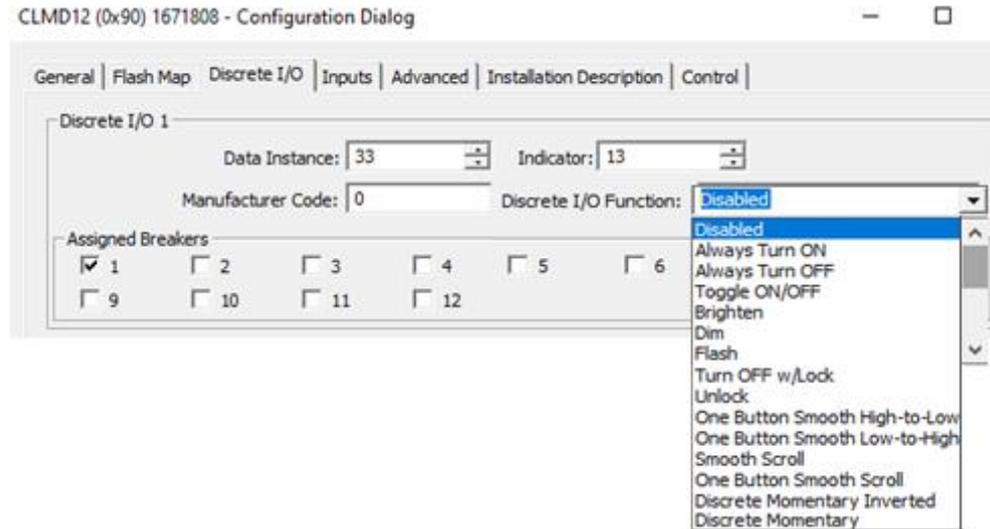
For more examples, please see our 'CLMD16 Configuration Guide' available on the web
"CLMD16's Configuration Capacity Is Only Limited By your Imagination"

CLMD SWITCHING APPLICATION FEATURES

Overview – CLMD12

How we bring the input signal into a CLMD module slightly differs between the CLMD12 and the CLMD16 due to available features. The CLMD12 offers a more direct approach.

- Define the source of the 127501 command on the NMEA 2000® network, could be local (same device) or via the network
- Define the Function, how we want our circuit to respond to this incoming signal
- Assign the breakers for this incoming signal and apply the desired function we have selected



CLMD12 SWITCHING APPLICATION FEATURES

Always Turn On

The 'Always Turn On' switching application feature located in the 'Discrete I/O' section when configuring an CLMD12 makes the output turn On if the output is Off when the associated input / command becomes activated.

Notice in the video demonstration, the input / command will only turn On the output and nothing else.

Video Demonstration:

N2KAnalyzer Configuration Dialog:

The screenshot shows the 'Discrete I/O 1' configuration window in N2KAnalyzer. The window has several tabs: 'General', 'Flash Map', 'Discrete I/O', 'Inputs', 'Advanced', 'Installation Description', and 'Control'. The 'Discrete I/O' tab is active. Inside this tab, there are fields for 'Data Instance' (set to 33), 'Indicator' (set to 13), and 'Manufacturer Code' (set to 0). The 'Discrete I/O Function' dropdown menu is set to 'Always Turn ON'. Below these fields is a section titled 'Assigned Breakers' with a grid of checkboxes for breakers 1 through 12. Breaker 1 is checked, while all others are unchecked.



<https://youtu.be/7Guye-yc25c>

CLMD12 SWITCHING APPLICATION FEATURES

Always Turn Off

The 'Always Turn Off' switching application feature located in the 'Discrete I/O' section when configuring a CLMD12 makes the output turn Off if the output is On when the associated input / command becomes activated.

Notice in the video demonstration, the input / command will only turn Off the output and nothing else.

N2KAnalyzer Configuration Dialog:

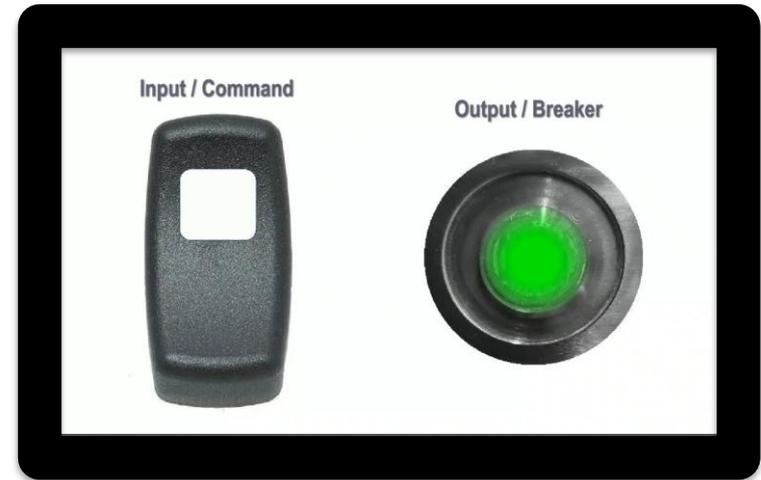
The screenshot shows the 'Discrete I/O 1' configuration window in N2KAnalyzer. The window has several tabs: General, Flash Map, Discrete I/O (selected), Inputs, Advanced, Installation Description, and Control. The 'Discrete I/O 1' section contains the following fields:

- Data Instance: 33
- Indicator: 13
- Manufacturer Code: 0
- Discrete I/O Function: Always Turn OFF

Below these fields is a section for 'Assigned Breakers' with a grid of checkboxes:

| | | | | | | | |
|---------------------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| <input checked="" type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 | <input type="checkbox"/> 6 | <input type="checkbox"/> 7 | <input type="checkbox"/> 8 |
| <input type="checkbox"/> 9 | <input type="checkbox"/> 10 | <input type="checkbox"/> 11 | <input type="checkbox"/> 12 | | | | |

Video Demonstration:



<https://youtu.be/-wFApTe90KA>

CLMD12 SWITCHING APPLICATION FEATURES

Toggle On / Off

The 'Toggle On / Off' switching application feature located in the 'Discrete I/O' section when configuring an CLMD12 makes the output turn On if the output is Off and turn Off if the output is On anytime the associated input is activated. Each subsequent input / command will make the output / breaker change to the opposite state.

N2KAnalyzer Configuration Dialog:

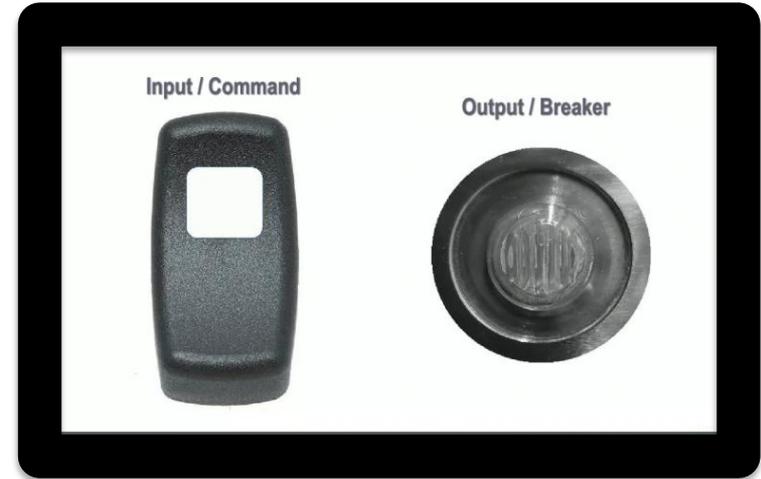
The screenshot shows the 'Discrete I/O 1' configuration window in N2KAnalyzer. It has tabs for General, Flash Map, Discrete I/O, Inputs, Advanced, Installation Description, and Control. The 'Discrete I/O 1' section contains the following fields:

- Data Instance: 33
- Indicator: 13
- Manufacturer Code: 0
- Discrete I/O Function: Toggle ON/OFF

Below these fields is the 'Assigned Breakers' section with 12 checkboxes:

| | | | | | | | |
|---------------------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| <input checked="" type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 | <input type="checkbox"/> 6 | <input type="checkbox"/> 7 | <input type="checkbox"/> 8 |
| <input type="checkbox"/> 9 | <input type="checkbox"/> 10 | <input type="checkbox"/> 11 | <input type="checkbox"/> 12 | | | | |

Video Demonstration:



<https://youtu.be/jJC8OvE-aiQ>

CLMD12 SWITCHING APPLICATION FEATURES

Brighten

The 'Brighten' switching application feature located in the 'Discrete I/O' section when configuring an CLMD12 makes the output turn On if the output is Off and each subsequent presence of input / command will increase the PWM of the output. The 'Brighten' feature will only perform this behavior.

Video Demonstration:

N2KAnalyzer Configuration Dialog:

General | Flash Map | Discrete I/O | Inputs | Advanced | Installation Description | Control

Discrete I/O 1

Data Instance: 33 Indicator: 14

Manufacturer Code: 0 Discrete I/O Function: Brighten

Assigned Breakers

| | | | | | | | |
|---------------------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| <input checked="" type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 | <input type="checkbox"/> 6 | <input type="checkbox"/> 7 | <input type="checkbox"/> 8 |
| <input type="checkbox"/> 9 | <input type="checkbox"/> 10 | <input type="checkbox"/> 11 | <input type="checkbox"/> 12 | | | | |

(PWM increments have been expanded for this video demo)

- 'Dim' PWM increment size is 1% PWM



<https://youtu.be/FGkSxAv5U7U>

CLMD12 SWITCHING APPLICATION FEATURES

Dim

The 'Dim' switching application feature located in the 'Discrete I/O' section when configuring an CLMD12 decreases the output PWM when an Input / Command becomes active. Unlike 'Brighten', 'Dim' will not command the breaker On / Off but instead its function is only to decrease the PWM. Each subsequent presence of input / command will increase the PWM of the output. The 'Dim' feature will only perform this behavior.

N2KAnalyzer Configuration Dialog:

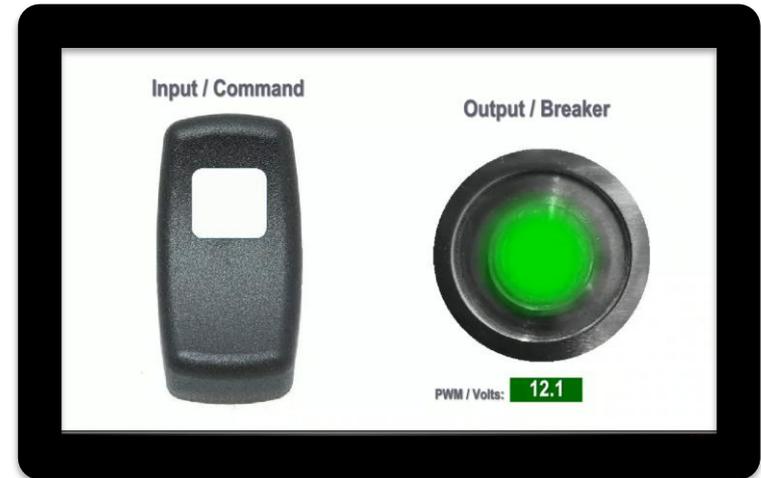
The screenshot shows the 'Discrete I/O 1' configuration window in N2KAnalyzer. The 'Discrete I/O Function' is set to 'Dim'. The 'Assigned Breakers' section shows breakers 1 through 12, with breaker 1 checked.

| Discrete I/O 1 | | | | | | | |
|---------------------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| Data Instance: 33 | Indicator: 14 | | | | | | |
| Manufacturer Code: 0 | Discrete I/O Function: Dim | | | | | | |
| Assigned Breakers | | | | | | | |
| <input checked="" type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 | <input type="checkbox"/> 6 | <input type="checkbox"/> 7 | <input type="checkbox"/> 8 |
| <input type="checkbox"/> 9 | <input type="checkbox"/> 10 | <input type="checkbox"/> 11 | <input type="checkbox"/> 12 | | | | |

(PWM increments have been expanded for this video demo)

- 'Dim' PWM increment size is 1% PWM

Video Demonstration:



<https://youtu.be/TDonJXwd5fk>

CLMD12 SWITCHING APPLICATION FEATURES

Turn Off w/ Lock

The 'Turn OFF w/Lock' switching application feature located in the 'Discrete I/O' section when configuring an CLMD12 makes the output turn Off if On and activates the breaker lock if the assigned Input is active. The breaker will 'Unlock' when the Input is no longer active.

N2KAnalyzer Configuration Dialog:

The screenshot shows the 'Discrete I/O 1' configuration window in N2KAnalyzer. It includes the following fields and options:

- General | Flash Map | **Discrete I/O** | Inputs | Advanced | Installation Description | Control
- Discrete I/O 1
 - Data Instance: 33
 - Indicator: 13
 - Manufacturer Code: 0
 - Discrete I/O Function: Turn OFF w/Lock
- Assigned Breakers
 - 1
 - 2
 - 3
 - 4
 - 5
 - 6
 - 7
 - 8
 - 9
 - 10
 - 11
 - 12

* Notice the 'Breaker Status' have an image of a lock appear when the Discrete I/O Input is active and then disappear when inactive. This will appear in N2KView with any switch associated with the respective breaker.

Video Demonstration:



https://youtu.be/_z3EMv8cU50

CLMD12 SWITCHING APPLICATION FEATURES

Unlock

The 'Unlock' switching application feature located in the 'Discrete I/O' section when configuring an CLMD12 unlocks a breaker lock if the assigned Input is active. The breaker will stay unlocked even after the Input is no longer active.

N2KAnalyzer Configuration Dialog:

The screenshot shows the 'Discrete I/O 1' configuration window in N2KAnalyzer. It includes tabs for General, Flash Map, Discrete I/O, Inputs, Advanced, Installation Description, and Control. The 'Discrete I/O 1' section contains the following fields:

- Data Instance: 33
- Indicator: 13
- Manufacturer Code: 0
- Discrete I/O Function: Unlock

Below these fields is the 'Assigned Breakers' section, which is a grid of checkboxes for breakers 1 through 12. Breaker 1 is checked, while breakers 2 through 12 are unchecked.

Video Demonstration:



<https://youtu.be/6Gj9U9gWrxs>

* Notice the 'Breaker Status' have an image of a lock that disappears when the Discrete I/O Input becomes active. The image of a lock will appear in N2KView with any switch associated with the respective breaker is in the locked state.

CLMD12 SWITCHING APPLICATION FEATURES

One Button Smooth High-to-Low

The 'One Button Smooth High-to-Low' switching application feature located in the 'Discrete I/O' section when configuring an CLMD12 turns on an assigned breaker when the input is first activated. When the input is held, the breaker's PWM level will decrease. Once the PWM level reaches 0% when the input is being held active, the breaker will start the PWM level decreasing from 100% PWM back down to 0% then restart at 100% in an endless loop.

Video Demonstration:

N2KAnalyzer Configuration Dialog:

The screenshot shows the 'Discrete I/O 1' configuration window in N2KAnalyzer. The 'Discrete I/O Function' is set to 'One Button Smooth High-to-Low'. The 'Assigned Breakers' section shows breaker 1 is selected.

| Discrete I/O 1 |
|--|
| Data Instance: 33 |
| Indicator: 13 |
| Manufacturer Code: 0 |
| Discrete I/O Function: One Button Smooth High-to-Low |
| Assigned Breakers |
| <input checked="" type="checkbox"/> 1 |
| <input type="checkbox"/> 2 |
| <input type="checkbox"/> 3 |
| <input type="checkbox"/> 4 |
| <input type="checkbox"/> 5 |
| <input type="checkbox"/> 6 |
| <input type="checkbox"/> 7 |
| <input type="checkbox"/> 8 |
| <input type="checkbox"/> 9 |
| <input type="checkbox"/> 10 |
| <input type="checkbox"/> 11 |
| <input type="checkbox"/> 12 |

* Notice the 'PWM Level' has a smooth movement from a higher PWM to a lower PWM



<https://youtu.be/8WVpWsbrU8Y>

CLMD12 SWITCHING APPLICATION FEATURES

One Button Smooth Low-to-High

The 'One Button Smooth Low-to-High' switching application feature located in the 'Discrete I/O' section when configuring an CLMD12 turns on an assigned breaker when the input is first activated. When the input is held, the breakers PWM level will increase. Once the PWM level reaches 100% when the input is being held active, the breaker will start the PWM level increasing from 0% PWM back up to 100% then restart at 0% in an endless loop.

N2KAnalyzer Configuration Dialog:

The screenshot shows the 'Discrete I/O 1' configuration window in N2KAnalyzer. It includes the following fields and options:

- General | Flash Map | **Discrete I/O** | Inputs | Advanced | Installation Description | Control
- Discrete I/O 1
 - Data Instance: 33
 - Indicator: 13
 - Manufacturer Code: 0
 - Discrete I/O Function: One Button Smooth Low-to-High
- Assigned Breakers
 - 1
 - 2
 - 3
 - 4
 - 5
 - 6
 - 7
 - 8
 - 9
 - 10
 - 11
 - 12

* Notice the 'PWM Level' has a smooth movement from a lower PWM to a higher PWM

Video Demonstration:



<https://youtu.be/79NmjEvBV3E>

CLMD12 SWITCHING APPLICATION FEATURES

Smooth Scroll

The 'Smooth Scroll' switching application feature located in the 'Discrete I/O' section when configuring an CLMD12 turns on an assigned breaker when the input is first activated. When the input is held, the breaker's PWM level will increase or decrease depending on the last state of PWM direction. Once the PWM level reaches 100% or 0% when the input is being held active, the breaker will start the PWM level increasing after reaching 0% or decreasing after reaching 100%.

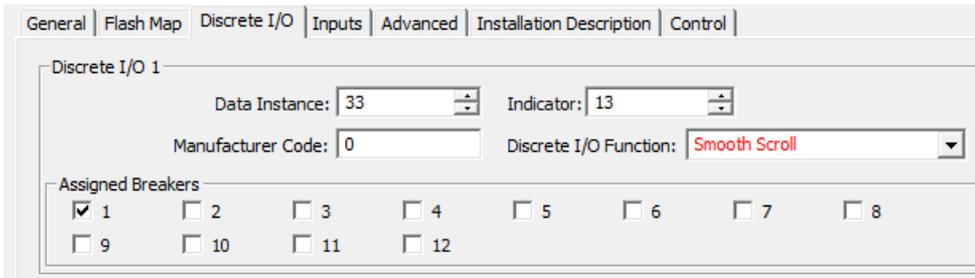
This will function in an endless loop if the associative input is active.

Video Demonstration:



<https://youtu.be/QTyO0DyBWyc>

N2KAnalyzer Configuration Dialog:

A screenshot of the N2KAnalyzer Configuration Dialog. The dialog has several tabs: General, Flash Map, Discrete I/O, Inputs, Advanced, Installation Description, and Control. The Discrete I/O tab is selected. Under "Discrete I/O 1", there are fields for "Data Instance" (33), "Indicator" (13), and "Manufacturer Code" (0). The "Discrete I/O Function" is set to "Smooth Scroll". Below these fields is a section for "Assigned Breakers" with checkboxes for breakers 1 through 12. Breaker 1 is checked, while breakers 2 through 12 are unchecked.

| Discrete I/O 1 |
|---------------------------------------|
| Data Instance: 33 |
| Indicator: 13 |
| Manufacturer Code: 0 |
| Discrete I/O Function: Smooth Scroll |
| Assigned Breakers |
| <input checked="" type="checkbox"/> 1 |
| <input type="checkbox"/> 2 |
| <input type="checkbox"/> 3 |
| <input type="checkbox"/> 4 |
| <input type="checkbox"/> 5 |
| <input type="checkbox"/> 6 |
| <input type="checkbox"/> 7 |
| <input type="checkbox"/> 8 |
| <input type="checkbox"/> 9 |
| <input type="checkbox"/> 10 |
| <input type="checkbox"/> 11 |
| <input type="checkbox"/> 12 |

CLMD12 SWITCHING APPLICATION FEATURES

One Button Smooth Scroll

The 'One Button Smooth Scroll' switching application feature located in the 'Discrete I/O' section when configuring an CLMD12 turns On and Off an assigned breaker in the same behavior as the 'Toggle' switching application however when the input for the breaker is held the 'Toggle' function is ignored and instead a 'Smooth Scroll' operation takes place.

The breaker's last PWM state is recalled whenever the breaker toggles from Off to On.

Video Demonstration:

N2KAnalyzer Configuration Dialog:

The screenshot shows the 'Discrete I/O 1' configuration window in N2KAnalyzer. The 'Discrete I/O Function' is set to 'One Button Smooth Scroll'. The 'Assigned Breakers' section shows breakers 1 through 12, with breaker 1 selected.

| Discrete I/O 1 |
|---|
| Data Instance: 33 |
| Indicator: 13 |
| Manufacturer Code: 0 |
| Discrete I/O Function: One Button Smooth Scroll |
| Assigned Breakers |
| <input checked="" type="checkbox"/> 1 |
| <input type="checkbox"/> 2 |
| <input type="checkbox"/> 3 |
| <input type="checkbox"/> 4 |
| <input type="checkbox"/> 5 |
| <input type="checkbox"/> 6 |
| <input type="checkbox"/> 7 |
| <input type="checkbox"/> 8 |
| <input type="checkbox"/> 9 |
| <input type="checkbox"/> 10 |
| <input type="checkbox"/> 11 |
| <input type="checkbox"/> 12 |



<https://youtu.be/t9NMRKH2EoE>

CLMD12 SWITCHING APPLICATION FEATURES

Discrete Momentary

The 'Discrete Momentary' switching application feature located in the 'Discrete I/O' section when configuring an CLMD12 makes the output turn On only if the Input controlling the breaker is On or being commanded.

N2KAnalyzer Configuration Dialog:

The screenshot shows the 'Discrete I/O' configuration window in N2KAnalyzer. The 'Discrete I/O 1' section is active, displaying the following settings:

- Data Instance: 33
- Indicator: 13
- Manufacturer Code: 0
- Discrete I/O Function: Discrete Momentary

Below these settings is the 'Assigned Breakers' section, which contains a grid of checkboxes for breakers 1 through 12. Breaker 1 is checked, while all other breakers (2-12) are unchecked.

Video Demonstration:



https://youtu.be/bwnZ8_txKtA

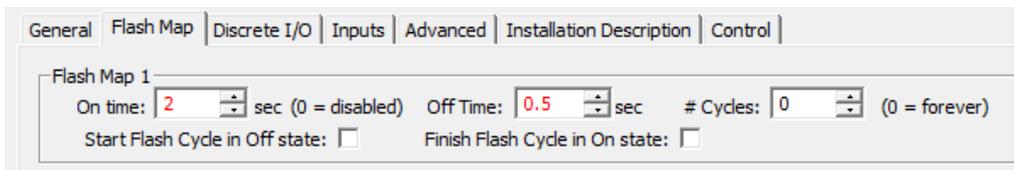
CLMD12 SWITCHING APPLICATION FEATURES

Flash Map

The 'Flash Map' switching application feature located in the 'Flash Map' section when configuring an CLMD12 makes the output turn On and Off in a configurable periodic manner.

In the following video example of 'Flash Map' behavior, the CLMD12 'Flash Map' is configured to turn the output On for 2s then off for 0.5s with an infinite cycle count.

N2KAnalyzer Configuration Dialog:



The screenshot shows the 'Flash Map' configuration dialog with the following settings:

- On time: 2 sec (0 = disabled)
- Off Time: 0.5 sec
- # Cycles: 0 (0 = forever)
- Start Flash Cycle in Off state:
- Finish Flash Cycle in On state:

Additional Definition:

Start Flash Cycle in Off State

This parameter allows you to configure the Flash Map to start with 'Off Time' as the first behavior of the Flash Map. The Flash Map will then execute the configured number of Cycles.

Finish Flash Cycle in On State

This parameter allows you to configure the Flash Map to stop the flash cycle with the breaker to finish in the On state once the configured number of cycles are executed.

Video Demonstration:



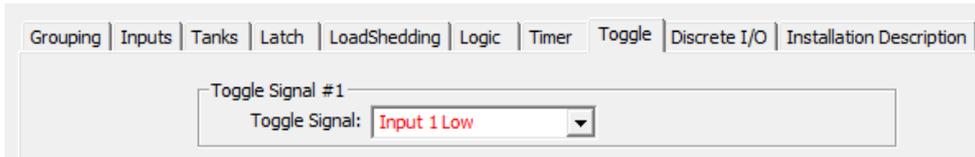
<https://youtu.be/wc0Oz46ZayU>

CLMD16 SWITCHING APPLICATION FEATURES

Toggle

The 'Toggle' switching application feature located in the 'Toggle' section when configuring an CLMD16 turns makes the output turn On if the output is Off and turn Off if the output is On anytime the associated input is activated. Each subsequent input / command will make the output / breaker change to the opposite state.

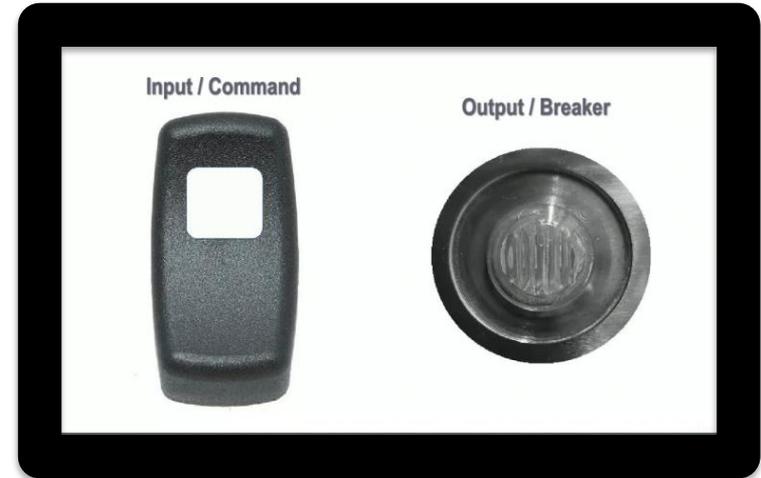
N2KAnalyzer Configuration Dialog:



The screenshot shows the 'Toggle' tab selected in the configuration dialog. The 'Toggle Signal #1' field is set to 'Input 1 Low'.

| Grouping | Inputs | Tanks | Latch | LoadShedding | Logic | Timer | Toggle | Discrete I/O | Installation Description |
|---|--------|-------|-------|--------------|-------|-------|--------|--------------|--------------------------|
| Toggle Signal #1 | | | | | | | | | |
| Toggle Signal: Input 1 Low | | | | | | | | | |

Video Demonstration:



<https://youtu.be/jJC8OvE-aiQ>

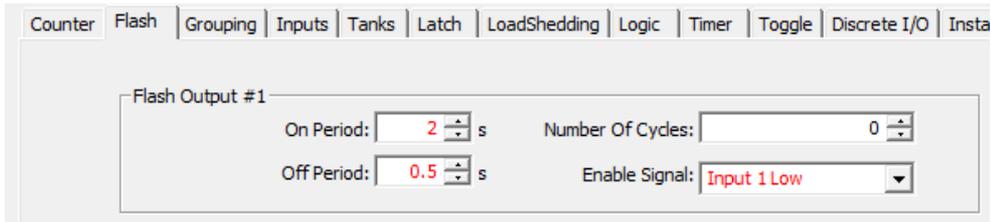
CLMD16 SWITCHING APPLICATION FEATURES

Flash

The 'Flash' switching application feature located in the 'Flash' section when configuring an CLMD16 makes the output turn On and Off in a configurable periodic manner.

In the following video example of 'Flash' behavior, the CLMD16 'Flash' is configured to turn the output On for 2s then off for 0.5s with an infinite cycle count.

N2KAnalyzer Configuration Dialog:



The screenshot shows the 'Flash' tab in the N2KAnalyzer Configuration Dialog. The 'Flash Output #1' section is active, displaying the following configuration:

| Parameter | Value |
|------------------|-------------|
| On Period | 2 s |
| Off Period | 0.5 s |
| Number Of Cycles | 0 |
| Enable Signal | Input 1 Low |

Video Demonstration:



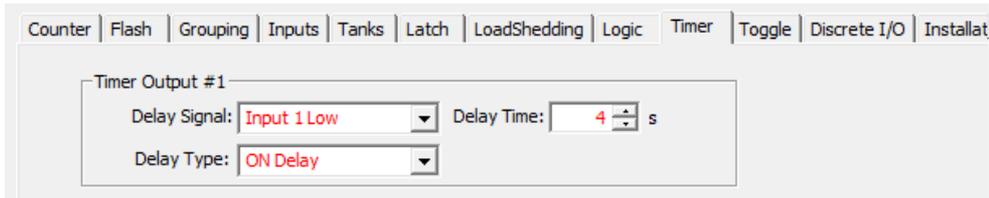
<https://youtu.be/wc0Oz46ZayU>

CLMD16 SWITCHING APPLICATION FEATURES

Time (On Delay)

The 'Timer' switching application feature located in the 'Timer' section when configuring an CLMD16 allows for a configurable delay for the respective timer output. When activated, the 'On Delay Timer' will turn On it's output signal after the configured time. In the video demonstration below the 'Timer (ON Delay)' is configured to 4s

N2KAnalyzer Configuration Dialog:



The screenshot shows the configuration dialog for the Timer Output #1. The 'Delay Signal' is set to 'Input 1 Low' and the 'Delay Time' is set to 4 s. The 'Delay Type' is set to 'ON Delay'.

| Counter | Flash | Grouping | Inputs | Tanks | Latch | LoadShedding | Logic | Timer | Toggle | Discrete I/O | Installat |
|-----------------|-------|-------------|-------------|-------|-------|--------------|-------|-------|--------|--------------|-----------|
| Timer Output #1 | | | | | | | | | | | |
| Delay Signal: | | Input 1 Low | Delay Time: | | 4 | s | | | | | |
| Delay Type: | | ON Delay | | | | | | | | | |

*Tip:

Timer outputs can be the input to the next desired timer allowing the CLMD16 to control operations in a timed sequenced manner.

Video Demonstration:



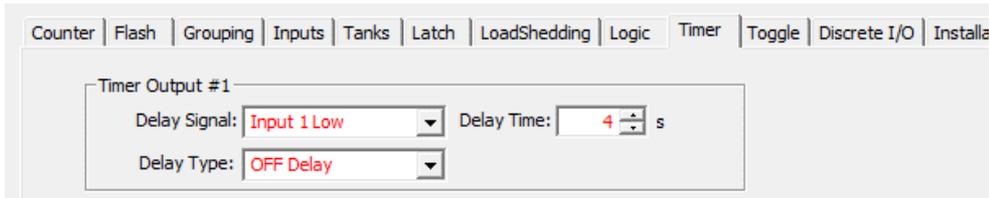
<https://youtu.be/HOs0v3TgmJE>

CLMD16 SWITCHING APPLICATION FEATURES

Time (Off Delay)

The 'Timer' switching application feature located in the 'Timer' section when configuring an CLMD16 allows for a configurable delay for the respective timer output. When activated, the 'OFF Delay Timer' will first turn On the output, then there will be a delay respective to the configured 'OFF Delay' time until the output will turn Off. In the video demonstration below the 'Timer (Off Delay)' is configured to 4s.

N2KAnalyzer Configuration Dialog:



The screenshot shows the configuration dialog for the CLMD16. The 'Timer' tab is selected. Under 'Timer Output #1', the 'Delay Signal' is set to 'Input 1 Low' and the 'Delay Time' is set to 4 seconds. The 'Delay Type' is set to 'OFF Delay'.

*Tip:

Timer outputs can be the input to the next desired timer allowing the CLMD16 to control operations in a timed sequenced manner.

Video Demonstration:



<https://youtu.be/3eqnjpI1UvY>

CLMD16 SWITCHING APPLICATION FEATURES

Latch

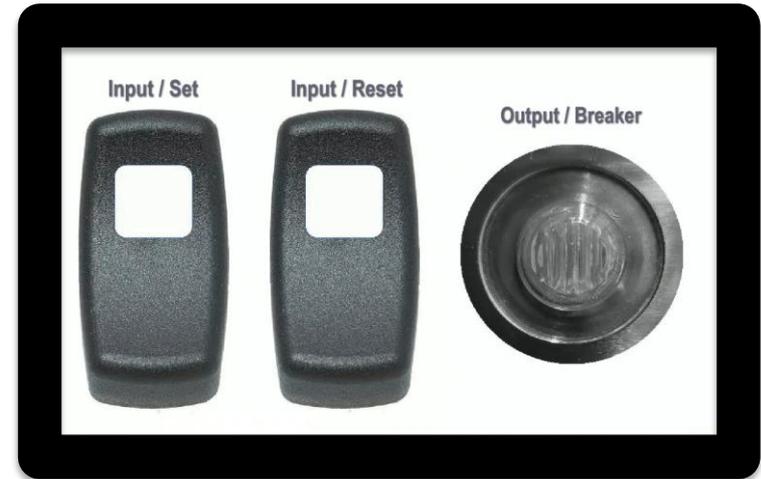
The 'Latch' switching application feature located in the 'Latch' section when configuring an CLMD16 allows for toggle behavior of the output however, requires two inputs separate from each other to 'Latch / Set' and 'Unlatch / Reset' the output. In the video demonstration below notice one input to turn On the output and another to turn Off the output.

N2KAnalyzer Configuration Dialog:



The screenshot shows the 'Latch' configuration dialog in the N2KAnalyzer software. At the top, there is a navigation bar with tabs for 'Advanced', 'Counter', 'Flash', 'Grouping', 'Inputs', 'Tanks', 'Latch', 'LoadShedding', 'Logic', 'Timer', 'Toggle', and 'Discrete'. The 'Latch' tab is selected. Below the navigation bar, there is a section labeled 'Latch Output #1'. Inside this section, there are two dropdown menus: 'Set Signal:' and 'Reset Signal:'. The 'Set Signal' dropdown is set to 'Input 1 Low' and the 'Reset Signal' dropdown is set to 'Input 2 Low'.

Video Demonstration:



<https://youtu.be/3eqnjp11UvY>

CLMD16 SWITCHING APPLICATION FEATURES

Counter

The 'Counter' switching application feature located in the 'Counter' section when configuring an CLMD16 can be used as a general counter and applied to a breaker or other switching application element once the counter's active threshold is met. 'Counters' can also be configured to be used as a means to control PWM behavior of an output. In the following demonstrations there are configured circuits in where the 'Counter' switching application element is applied to PWM breakers to bring visual representation to the behavior the Counter switching applications perform.

CLMD16 SWITCHING APPLICATION FEATURES

Counter (Rising Edge)

The 'Rising Edge Counter Type' switching application located in the 'Counter' section when configuring an CLMD16 is demonstrated below by applying the 'Counter' to a PWM breaker for visible understanding. The 'Press Step Size', which is the percentage of PWM change in the following example is set to 5% therefore for every input signal to increment or decrement the PWM percentage, the percentage of PWM will change 5%. 'Rising Edge' counter type means the 5% increment or decrement will occur the instant the increment or decrement input signal is active.

Video Demonstration:

N2KAnalyzer Configuration Dialog:

Counter #1

Increment Signal: Press Step Size:

Decrement Signal:

Reset Signal:

Counter Type:

Min Set Point: Active Threshold:

Max Set Point:



<https://youtu.be/yHiPEgD39jY>

CLMD16 SWITCHING APPLICATION FEATURES

Counter (Falling Edge)

The 'Falling Edge Counter Type' switching application located in the 'Counter' section when configuring an CLMD16 is demonstrated below by applying the 'Counter' to a PWM breaker for visible understanding. The 'Press Step Size', which is the percentage of PWM change in the following example is set to 5% therefore for every input signal to increment or decrement the PWM percentage, the percentage of PWM will change 5%. 'Falling Edge' counter type means the 5% increment or decrement will occur the instant the increment or decrement input signal goes from an active state to an inactive state.

Video Demonstration:

N2KAnalyzer Configuration Dialog:

General | Control | Alarm | Advanced | Counter | Flash | Grouping | Inputs | Tanks | Latch | LoadShedding | Logic

Counter #1

Increment Signal: Input 1 Low Press Step Size: 5

Decrement Signal: Input 2 Low

Reset Signal: None Selected

Counter Type: Falling Edge

Min Set Point: 5 Active Threshold: 0

Max Set Point: 100



<https://youtu.be/nUsHAjyFAnI>

CLMD16 SWITCHING APPLICATION FEATURES

Counter (Active High)

The 'Active High Counter Type' switching application located in the 'Counter' section when configuring an CLMD16 is demonstrated below by applying the 'Counter' to a PWM breaker for visible understanding. The 'Active High' Counter Type configuration refers to when the input signal to increment or decrement is considered active. When 'Active High' type is selected the Counter will increment or decrement when the input is active or 'On'. The 'Hold Step Time' and 'Hold period' is a configurable parameter when this counter type is selected.

N2KAnalyzer Configuration Dialog:

Counter #1

| | | | |
|-------------------|---------------|-------------------|--------|
| Increment Signal: | Input 1 High | Press Step Size: | 5 |
| Decrement Signal: | Input 2 High | Hold Step Size: | 5 |
| Reset Signal: | None Selected | Hold Step Time: | 0.05 s |
| Counter Type: | Active High | Hold Period: | 2.00 s |
| Min Set Point: | 0 | Active Threshold: | 0 |
| Max Set Point: | 100 | | |

*Notice the 'Hold Period' time frame must be met before the 'Hold Step Size' and 'Hold Step Time' becomes the active counter adjustment parameters whereas only 'Press Step Size' is acknowledged for the initial activation happening in a timeframe less than 'Hold Period'.

Video Demonstration:



<https://youtu.be/4nYiCwTen98>

CLMD16 SWITCHING APPLICATION FEATURES

Counter (Active Low)

The 'Active Low Counter Type' switching application located in the 'Counter' section when configuring an CLMD16 is demonstrated below by applying the 'Counter' to a PWM breaker for visible understanding. The 'Active Low' Counter Type configuration refers to when the input signal to increment or decrement is considered active. When 'Active Low' type is selected the Counter will increment or decrement when the input is inactive or 'Off'. The 'Hold Step Time' and 'Hold period' is a configurable parameter when this counter type is selected.

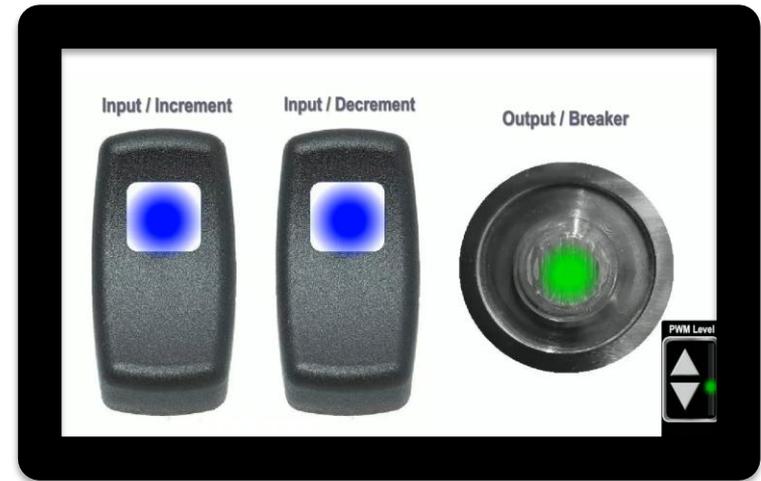
N2KAnalyzer Configuration Dialog:

The screenshot shows the 'Counter' configuration dialog for Counter #1. The 'Counter Type' is set to 'Active Low'. The configuration parameters are as follows:

| Parameter | Value |
|------------------|---------------|
| Increment Signal | Input 1 High |
| Decrement Signal | Input 2 High |
| Reset Signal | None Selected |
| Counter Type | Active Low |
| Min Set Point | 0 |
| Max Set Point | 100 |
| Press Step Size | 5 |
| Hold Step Size | 5 |
| Hold Step Time | 0.05 s |
| Hold Period | 2.00 s |
| Active Threshold | 0 |

*Notice the 'Hold Period' time frame must be met before the 'Hold Step Size' and 'Hold Step Time' becomes the active counter adjustment parameters whereas only 'Press Step Size' is acknowledged for the initial activation happening in a timeframe less than ' Hold Period'.

Video Demonstration:



<https://youtu.be/cYv6gWSMGLo>

CLMD16 SWITCHING APPLICATION FEATURES

Counter (Change Detected)

The 'Change Detected Counter Type' switching application located in the 'Counter' section when configuring an CLMD16 is demonstrated below by applying the 'Counter' to a PWM breaker for visible understanding. The 'Press Step Size', which is the percentage of PWM change in the following example is set to 5% therefore for every input signal to increment or decrement the PWM percentage, the percentage of PWM will change 5%. 'Change Detected' counter type means the 5% increment or decrement will occur the instant the increment or decrement input signal goes from an inactive state to an active state and also from an active state to an inactive state or otherwise upon every input signal change.

N2KAnalyzer Configuration Dialog:

General | Control | Alarm | Advanced | Counter | Flash | Grouping | Inputs | Tanks | Latch | LoadShedding | Logic

Counter #1

Increment Signal: Input 1 High Press Step Size: 5

Decrement Signal: Discrete I/O 2

Reset Signal: None Selected

Counter Type: Change Detected

Min Set Point: 5 Active Threshold: 0

Max Set Point: 100

* Notice the 'PWM Level' change both when the input signal becomes active and becomes inactive.

Video Demonstration:



<https://youtu.be/BNOjSgKzv-o>

CLMD16 SWITCHING APPLICATION FEATURES

Counter (One Button Smooth Scroll)

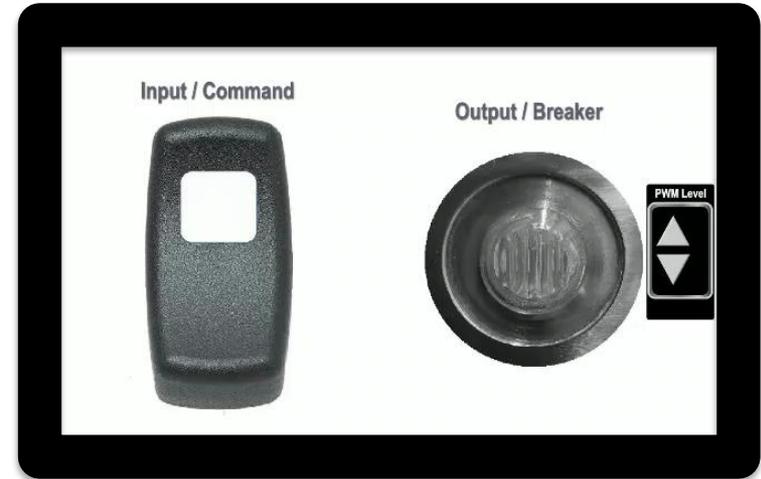
The 'One Button Smooth Scroll' switching application located in the 'Counter' section when configuring an CLMD16 has been designed exclusively to be applied to PWM circuit breakers. The feature turns On and Off an assigned breaker in the same behavior as the 'Toggle' switching application however when the input for the breaker is held the 'Toggle' function is ignored and instead a Smooth Scrolling PWM operation takes place. The breaker's last PWM state is recalled whenever the breaker toggles from Off to On

Video Demonstration:

N2KAnalyzer Configuration Dialog:

Counter #1

| | | | |
|-------------------|-------------------|------------------|--------|
| Increment Signal: | Input 1 Low | Press Step Size: | 0 |
| Decrement Signal: | | Hold Step Size: | 1 |
| Reset Signal: | None Selected | Hold Step Time: | 0.02 s |
| Counter Type: | One Button Smooth | Hold Period: | 0.50 s |
| Min Set Point: | 5 | | |
| Max Set Point: | 100 | | |



<https://youtu.be/t9NMRKH2EoE>

CLMD16 SWITCHING APPLICATION FEATURES

Logic (Example 1)

The 'Logic' switching application located in the 'Logic' section when configuring an CLMD16 allows for Boolean Logic to be applied to an output directly or could be applied as imposing logic to create a logic rule for a breaker or other parts of the switching application. In the following example the logic created is an OR Gate in where two inputs can activate the 'Logic Output', 'Input 1' OR 'Input 2'. Where '1' is 'On' and '0' is 'Off' the columns 'A', 'B', and 'C' indicate the possible states of 'Inputs A, B and C' respectively. The 'Output' of '1' or '0' indicates the desired 'Logic Output' state of 'On' or 'Off' for the combinatory arrangement indicated for the row.

N2KAnalyzer Configuration Dialog:

Counter | Flash | Grouping | Inputs | Tanks | Latch | LoadShedding | Logic | Timer | Toggle | Discrete I/O | Installat

Logic Output #1

Input A:

Input B:

Input C:

| A | B | C | Output |
|---|---|---|--------|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 |

Video Demonstration:



<https://youtu.be/MvkMxKGuCwM>

CLMD16 SWITCHING APPLICATION FEATURES

Logic (Example 2)

The 'Logic' switching application located in the 'Logic' section when configuring an CLMD16 allows for Boolean Logic to be applied to an output directly or could be applied as imposing logic to create a logic rule for a breaker or other parts of the switching application. In the following example the logic created is an AND Gate in where it requires two inputs it activate the 'Logic Output', 'Input 1' AND 'Input 2'. Where '1' is 'On' and '0' is 'Off' the columns 'A', 'B', and 'C' indicate the possible states of 'Inputs A, B and C' respectively. The 'Output' of '1' or '0' indicates the desired 'Logic Output' state of 'On' or 'Off' for the combinatory arrangement indicated for the row.

Video Demonstration:

N2KAnalyzer Configuration Dialog:

Flash | Grouping | Inputs | Tanks | Latch | LoadShedding | Logic | Timer | Toggle | Discrete I/O | Installation Descrip...

Logic Output #1

Input A:

Input B:

Input C:

| A | B | C | Output |
|---|---|---|--------|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 0 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 0 |



https://youtu.be/Kp_B-OW5rk



MPower[®]

Digital Switching Platform

Demo Board Overview

HARDWARE DESCRIPTION:



**CLMD16
Hardwired Inputs**

**CLMD16
Output Indication
LEDs**

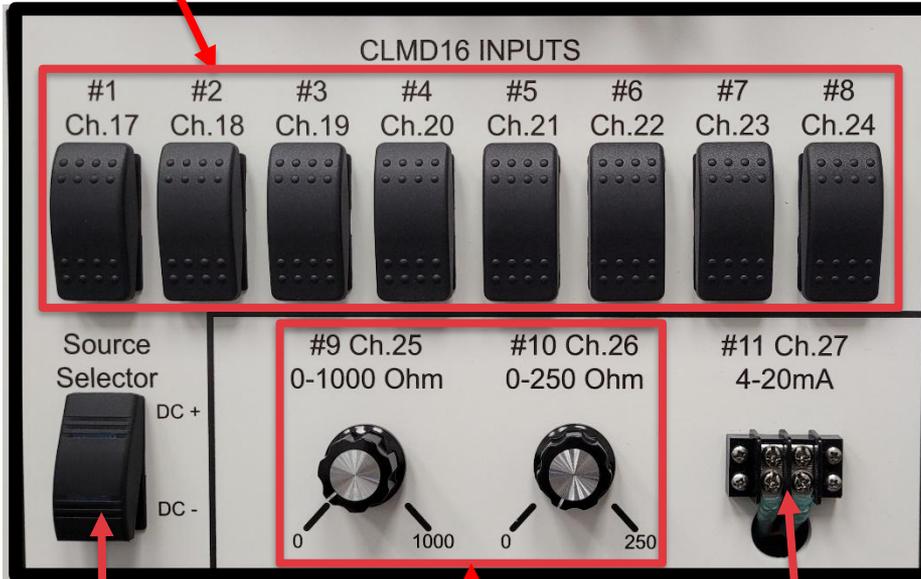
**CLMD16
Alarm Output**

**CLMD12
Hardwired Inputs**

**CLMD12
Output Indication
LEDs**

CLMD16 & CLMD12 HARDWIRED INPUT SWITCHES & POTS

CLMD16 Input #
Connection Switches

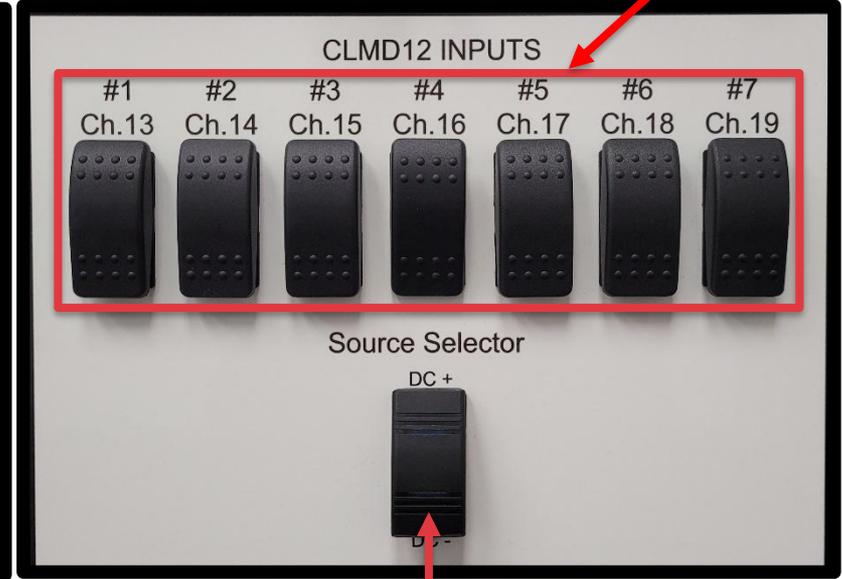


Input Polarity
Selector

Resistive Input Channels
Signal Adjustment
(0 - 1k Ω & 0-500 Ω)

Current Loop Input
Connecting Point

CLMD12 Input #
Connection Switches



Input Polarity
Selector



MPower[®]

Digital Switching Platform

Configuration Training

MPOWER CONFIGURATION TRAINING

Device Instance

- Ensure the device instances for the MPower devices are unique from one another
In this demonstration we will be using the following Device Instances for the MPower devices contained on the demonstration board.

CLMD16

Device Instance: **32**



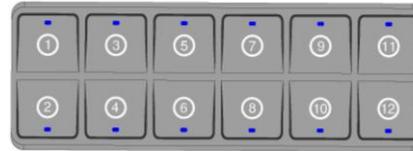
CLMD12

Device Instance: **33**



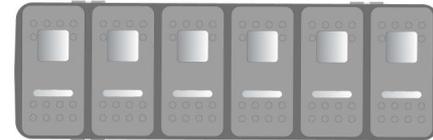
CKM12

Device Instance: **50**



VMM6

Device Instance: **51**



MPOWER CONFIGURATION TRAINING

CLMD12 - Configuring Breaker Trip Values



CLMD12 (0x90) 1671808 - Configuration Dialog

General Tab

General | Flash Map | Discrete I/O | Inputs | Advanced | Installation Description | Control

Label (Max. 32 Characters)
CLMD12 Out of Box Configuration Instance: 32

Input Voltage: 12 VDC Not Configured Serial Number Invalid

Breaker #1 (10A)
Label: CLMD12 Breaker 1
State: OFF
Default State: OFF
Default Lock State: Unlocked
Manual Mode:

Trip Delay: 750 ms
Inrush Delay: 500 ms
Default Dim Value: 100 %
Current Dim Value: 100 %
Dimming Allowed:

Factory Current Rating: 10 A
Current Rating: 10 A
Current: 0 A
Voltage: 0 V
Flash Map: 0
Combine With: none
User Config Allowed:

Status
 Short Load
 Breaker Locked
 Breaker Tripped
 Breaker ON
 Open Load
 Communications Error
 Breaker Communicating

Set In-Rush Trip Delay and Current rating of the breaker

If the breaker is to be PWM enabled, select 'Dimming Allowed'.

Parallel breakers with the 'Combine With' function

Turn Manual Mode On/Off with the Manual Mode checkbox

If using Flash Map, assign the Flash Map respective to the desired Flash Table

Name the Breaker

Choose the default power-up state of the breaker.

MPOWER CONFIGURATION TRAINING

CLMD12 - Configuring Hardwired Input Signals



Name the Input

Choose if you want to transmit 127508 Battery Status PGN associated with this voltage sensing input.

CLMD12 (0x90) 1671808 - Configuration Dialog

Inputs Tab

General | Flash Map | Discrete I/O | **Inputs** | Advanced | Installation Description | Control

Instance: 32

Input 1 (Channel/Indicator 13)
Label: Cabin Lights Wall Switch OnLevel(s): Low State: OFF
 Transmit Battery Voltage

Input 2 (Channel/Indicator 14)
Label: Start Battery Voltage OnLevel(s): High State: OFF
 Transmit Battery Voltage Battery Instance: 1

Input 3 (Channel/Indicator 15)
Label: Normally Open OnLevel(s): Both State: OFF
 Transmit Battery Voltage

Input 4 (Channel/Indicator 16)
Label: Normally Open OnLevel(s): Both State: OFF
 Transmit Battery Voltage

Input 5 (Channel/Indicator 17)
Label: Normally Open OnLevel(s): Both State: OFF
 Transmit Battery Voltage

Choose 'High', 'Low' or 'Both' To tell the CLMD12 whether your CLMD12 will be receiving a High or DC (+) signal or a Low or DC (-) Signal.

Check the real-time status of the input here.

MPOWER CONFIGURATION TRAINING

CLMD12 - Configuring its own Input to switch a breaker



CLMD12: Device Instance: **33**

NMEA Data Instance: **33**

Instance Channel / Indicator: **13**

| Channel | Trigger |
|---------|--|
| 13 | Input 1 (Voltage Sensing) 'On Level' |
| 14 | Input 2 (Voltage Sensing) 'On Level' |
| 15 | Input 3 (Voltage Sensing) 'On Level' |
| 16 | Input 4 (Voltage Sensing) 'On Level' |
| 17 | Input 5 (Voltage Sensing) 'On Level' |
| 18 | Input 6 (Voltage Sensing) 'On Level' |
| 19 | Input 7 (Voltage Sensing) 'On Level' |

| Channel | Trigger |
|---------|---------------|
| 1 | Breaker 1 On |
| 2 | Breaker 2 On |
| 3 | Breaker 3 On |
| 4 | Breaker 4 On |
| 5 | Breaker 5 On |
| 6 | Breaker 6 On |
| 7 | Breaker 7 On |
| 8 | Breaker 8 On |
| 9 | Breaker 9 On |
| 10 | Breaker 10 On |
| 11 | Breaker 11 On |
| 12 | Breaker 12 On |

- CLMD12 Switching Application Behavior is selected in the Discrete I/O Function dialog. A breaker is assigned by checking the assigned breaker checkbox

CLMD12 (0x90) 1671808 - Configuration Dialog

General | Flash Map | Discrete I/O | **Inputs** | Advanced | Installation Description | Control

Discrete I/O 1

Data Instance: 33 Indicator: 13

Manufacturer Code: 0 Discrete I/O Function: Toggle ON/OFF

Assigned Breakers

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

Note:

Ensure the Input signal is configured in the Inputs Tab Dialog

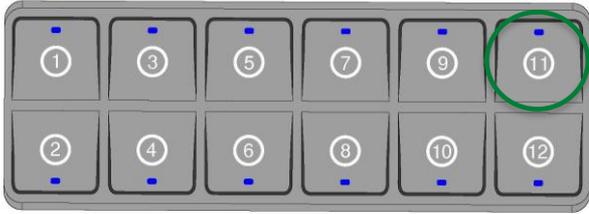
MPOWER CONFIGURATION TRAINING

CLMD12 - Configuring a CKM12 key to a breaker

CKM12: Device Instance: **50**

NMEA Data Instance: **50**

Instance Channel / Indicator: **11**



Breaker 2's function is 'One Button Smooth Scroll' when (50 / 11) is active

CLMD12 Discrete I/O Tab



CLMD12 (0x90) 1671808 - Configuration Dialog

General | Flash Map | **Discrete I/O** | Inputs | Advanced | Installation Description | Control

Discrete I/O 2

Data Instance: 50 Indicator: 11

Manufacturer Code: 0 Discrete I/O Function: One Button Smooth Scroll

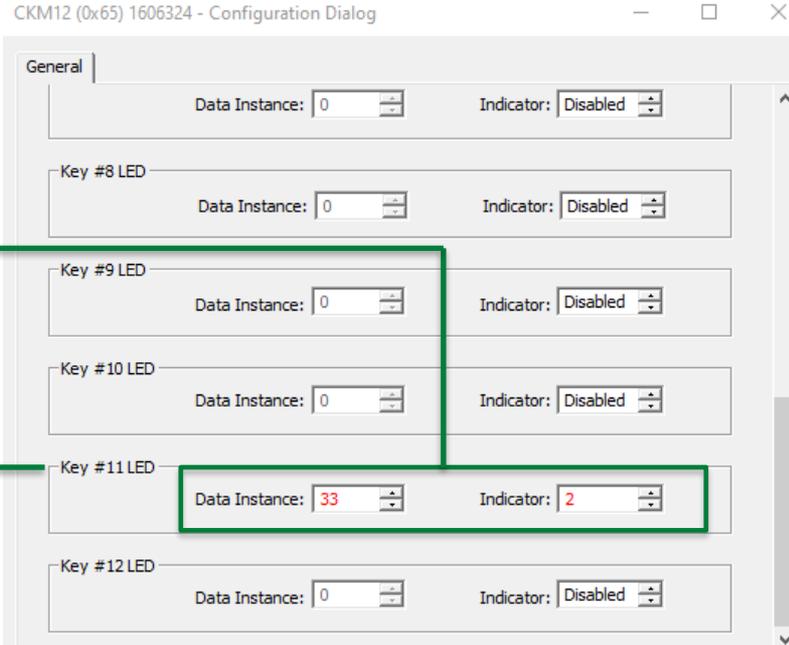
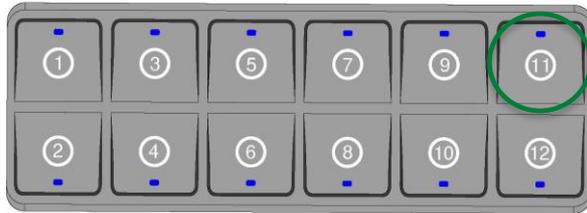
Assigned Breakers

| | | | | | | | |
|----------------------------|---------------------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| <input type="checkbox"/> 1 | <input checked="" type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 | <input type="checkbox"/> 6 | <input type="checkbox"/> 7 | <input type="checkbox"/> 8 |
| <input type="checkbox"/> 9 | <input type="checkbox"/> 10 | <input type="checkbox"/> 11 | <input type="checkbox"/> 12 | | | | |

MPOWER CONFIGURATION TRAINING

CKM12 - Configuring the CKM key's LED to illuminate when a breaker is On

CLMD12: Device Instance: **33**
Breaker 2: Channel / Indicator: **2**



CKM12 'Key 11' LED will now illuminate when CLMD12 'Breaker 2' is On.

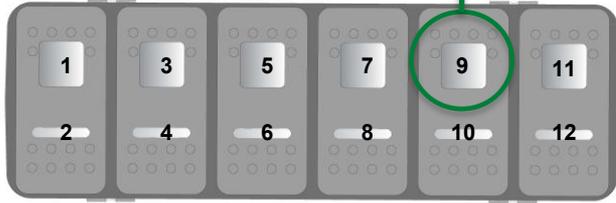
MPOWER CONFIGURATION TRAINING

CLMD12 - Configuring a VMM switch to a breaker

VMM6: Device Instance: **51**

NMEA Data Instance: **51**

Instance Channel / Indicator: **9**



Breaker 3's function is 'Discrete Momentary' when (51 / 9) is active

CLMD12 Discrete I/O Tab



CLMD12 (0x90) 1671808 - Configuration Dialog

The screenshot shows the 'Discrete I/O' tab in the configuration dialog. The 'Discrete I/O 3' section has 'Data Instance' set to 51 and 'Indicator' set to 9, both circled in green. The 'Manufacturer Code' is 0 and the 'Discrete I/O Function' is 'Discrete Momentary'. The 'Assigned Breakers' section shows a list of breakers 1 through 12, with breaker 3 checked.

| Breaker | Assigned |
|---------|-------------------------------------|
| 1 | <input type="checkbox"/> |
| 2 | <input type="checkbox"/> |
| 3 | <input checked="" type="checkbox"/> |
| 4 | <input type="checkbox"/> |
| 5 | <input type="checkbox"/> |
| 6 | <input type="checkbox"/> |
| 7 | <input type="checkbox"/> |
| 8 | <input type="checkbox"/> |
| 9 | <input type="checkbox"/> |
| 10 | <input type="checkbox"/> |
| 11 | <input type="checkbox"/> |
| 12 | <input type="checkbox"/> |

MPOWER CONFIGURATION TRAINING

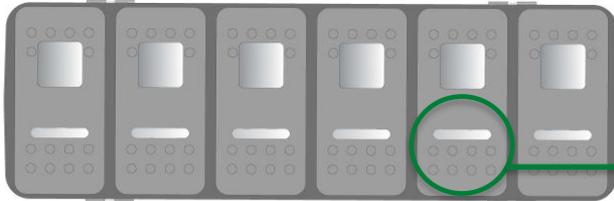
VMM6 - Configuring the VMM switch's LED to illuminate when a breaker is On

CLMD12: Device Instance: **33**
Breaker 2: Channel / Indicator: **3**

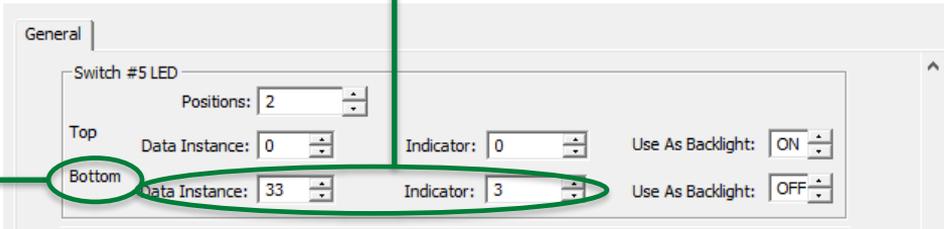


- The VMM6 'Switch 5, Bottom' LED will now illuminate when CLMD12 'Breaker 3' is On.
- The 'Switch 5, Top' LED will stay illuminated at all times via the 'Use as Backlight' function.

'Sw. 1' 'Sw. 2' 'Sw. 3' 'Sw. 4' 'Sw. 5' 'Sw. 6'



VMM6 (0x82) 1278560 - Configuration Dialog



MPOWER CONFIGURATION TRAINING

CLMD16 - Configuring Breaker Trip Values



General Tab

CLMD16 (0x00) 1540225 Configuration Dialog

General | Control | Alarm | Advanced | Counter | Flash | Grouping | Inputs | Tanks | Latch | LoadShedding | Logic

Label
(Max. 32 Characters)
CLMD16 Example Instance: 32

Breaker #1 (12A)
Label: CLMD16 Breaker 1 Manual Mode: OFF Type: DC
State: OFF Long Time Delay: SLOW Input Signal: Timer Output 1
Instantaneous Pickup: 10 Toggle Mode: OFF
Current Rating: 5.04 A Short Time Pickup: 6.0

Status
 Tripped Thermal Protection Short To Battery
 Instant Trip Load Shed Open Load
 Short Time Trip Hardware Fault Over Current
 Long Time Trip Short To Ground

Default State: OFF
Def. Lock State: Unlocked
Current: 0.600 A
Voltage: 0.700 V

These parameters are usually setup if there is a need to have more than MFD control.

Manual Mode disallows direct MFD control

Input Signal is the signal used to activate the breaker

Toggle Mode On makes for each rising edge of the input signal to toggle the breaker state.

Choose the breaker type

Set the default power-up states of the breaker here

Name the Breaker

Set the trip current rating of the breaker here

Set the trip curve of the breaker here

MPOWER CONFIGURATION TRAINING

CLMD16 - Configuring Hardwired Input Signals



Name the Input

Check the real-time status of the input here.

CLMD16 (0x00) 1540225 - Configuration Dialog

Inputs Tab

Choose your reference voltage, is it the supply voltage range, or 5v sensor range?

Choose 'High' or 'Low' to configure when the CLMD16 will change the Binary Status Report PGN from 'Off' to 'On'. Please note that 'High' and 'Low' voltage thresholds are configurable.

Configure 'High' and 'Low' voltage thresholds here if needed

Input 1 (Channel/Indicator 17)

Label:

OnLevel(s): High Low

Analog Reference:

State:

Voltage: v

Input Thresholds Configuration

High Level

Threshold: v

Hysteresis: v

Low Level

Threshold: v

Hysteresis: v

MPOWER CONFIGURATION TRAINING

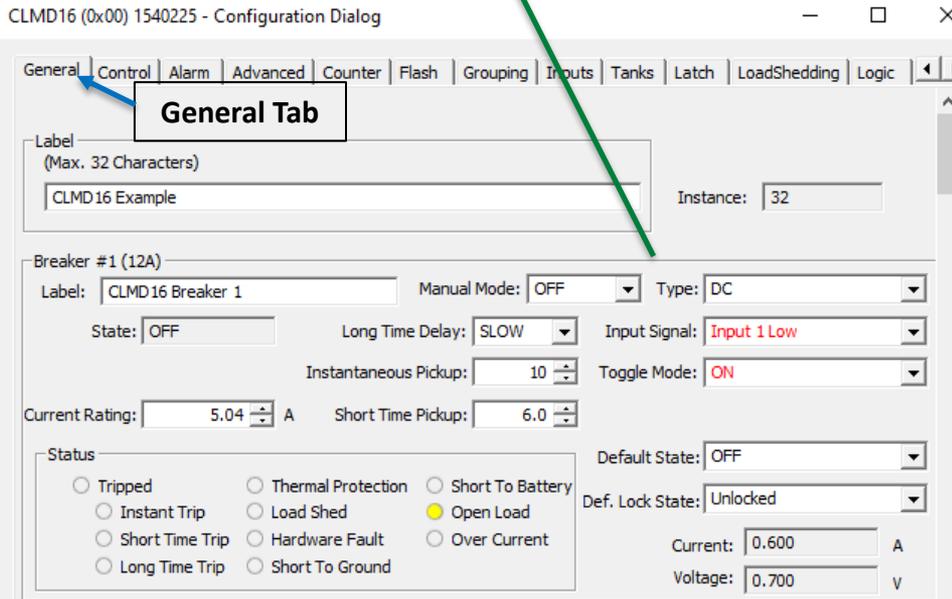
CLMD16 - Configuring its own Input to switch a breaker



| Channel | Trigger |
|---------|---------------|
| 1 | Breaker 1 On |
| 2 | Breaker 2 On |
| 3 | Breaker 3 On |
| 4 | Breaker 4 On |
| 5 | Breaker 5 On |
| 6 | Breaker 6 On |
| 7 | Breaker 7 On |
| 8 | Breaker 8 On |
| 9 | Breaker 9 On |
| 10 | Breaker 10 On |
| 11 | Breaker 11 On |
| 12 | Breaker 12 On |
| 13 | Breaker 13 On |
| 14 | Breaker 14 On |
| 15 | Breaker 15 On |
| 16 | Breaker 16 On |

| Channel | Trigger |
|---------|--|
| 17 | Input 1 (Voltage Sensing) 'On Level' |
| 18 | Input 2 (Voltage Sensing) 'On Level' |
| 19 | Input 3 (Voltage Sensing) 'On Level' |
| 20 | Input 4 (Voltage Sensing) 'On Level' |
| 21 | Input 5 (Voltage Sensing) 'On Level' |
| 22 | Input 6 (Voltage Sensing) 'On Level' |
| 23 | Input 7 (Voltage Sensing) 'On Level' |
| 24 | Input 8 (Voltage Sensing) 'On Level' |
| 25 | Input 9 (Resistance to DC -) 'On Level' |
| 26 | Input 10 (Resistance to DC -) 'On Level' |
| 27 | Input 11 (Current Loop Pair) 'On Level' |

Instead of using the Binary Status Channel
(in the CLMD16's case 'Input 1' would be 'Channel / Indicator #17'),
The input's 'High', 'Low' or 'Float' status can be placed directly into
the breaker's Input



'Input 1 Low' will Toggle 'Breaker 1' with this configuration

Unlike CLMD12, the CLMD16 has direct access to the Hardwired Input status inside it's Switching Application. This is because by separating the Switching Application Elements instead of having pre-defined functions like the CLMD12, the CLMD16 can perform advanced Logic operations.

MPOWER CONFIGURATION TRAINING

CLMD16 - Configuring Multiple Inputs to a single breaker

In this example, we will configure a 'Logic OR Gate' to configure both 'Input 1 Low' and 'Input 2 Low' to toggle breaker 1.

Logic Tab

CLMD16 (0x00) 1540225 - Configuration Dialog

Counter | Flash | Grouping | Inputs | Tanks | Latch | LoadShedding | **Logic** | Timer | Toggle | Discrete I/O | Installat

Logic Output #1

| A | B | C | Output |
|---|---|---|--------|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 |

Input A: Input 1 Low
Input B: Input 2 Low
Input C: None Selected

CLMD16 (0x00) 1540225 - Configuration Dialog

General | Control | Alarm | Advanced | Counter | Flash | Grouping | Inputs | Tanks | Latch | LoadShedding | **Logic**

Label (Max. 32 Characters)
CLMD16 Example Instance: 32

Breaker #1 (12A)
Label: CLMD16 Breaker 1 Manual Mode: OFF Type: DC
State: OFF Long Time Delay: SLOW Input Signal: Logic Output 1
Instantaneous Pickup: 10 Toggle Mode: ON
Current Rating: 5.04 A Short Time Pickup: 6.0

Status

- Tripped
- Instant Trip
- Short Time Trip
- Long Time Trip
- Thermal Protection
- Load Shed
- Hardware Fault
- Short To Ground
- Short To Battery
- Open Load
- Over Current

Default State: OFF
Def. Lock State: Unlocked
Current: 0.600 A
Voltage: 0.700 V

MPOWER CONFIGURATION TRAINING

CLMD16 - Alarm Output



In this example, we will configure a hardwired input to the Alarm Output

Inputs Tab

Alarm Tab

CLMD16 (0x00) 1540225 - Configuration Dialog

CLMD16 (0x00) 1540225 - Configuration Dialog

Advanced Counter Flash Grouping **Inputs** Tanks Latch LoadShedding Logic Timer Toggle Discrete I

Input 3 (Channel/Indicator 19)

Label: High Water Bilge Pump OnLevel(s): High Analog Reference: Supply

State: FLOAT

Voltage: 4.359000 v

Input Thresholds Configuration

High Level

Threshold: 8.000 V

Hysteresis: 0.500 V

Low Level

Threshold: 2.000 V

Hysteresis: 0.500 V

Voltage:

General Control **Alarm** Advanced Counter Flash Grouping Inputs Tanks Latch LoadShedding Logic

Alarm Enable Signal: Input 3 High

MPOWER CONFIGURATION TRAINING

CLMD16 - Tanks



Tanks Tab

CLMD16 (0x00) 1540225 - Configuration Dialog

Control | Alarm | Advanced | Counter | Flash | Grouping | Inputs | **Tanks** | Latch | LoadShedding | Logic | Timer

Input 9 (1 kOhm Resistive Channel)

Enable

Label : Fuel

Tank Capacity : 100.0 Gal

Tank Type : Fuel

Tank Number : 0

Data Damping Period : 3.0 sec

Realtime Resistance : 259.5 Ohms

Realtime Level : -

Press 'Enable' to enable the broadcast of the NMEA 2000 Tank Data PGN (127505)

See the real-time measurements of the input here

Label the tank input, set the tank capacity, NMEA 2000 instance/tank number, fluid type and capacity into these fields.

The data damping period prevents rapid data changes that can be caused by tank sloshing.

CLMD16 (0x00) 1540225 - Tank Calibration

Manual Table | Step Fill

Current Tank Calibration

| | Resistance | Level (%) | Volume (Gal) |
|----|------------|-----------|--------------|
| 1 | 240 | 0.0 | 0.0 |
| 2 | 33 | 100.0 | 100.0 |
| 3 | - | - | - |
| 4 | - | - | - |
| 5 | - | - | - |
| 6 | - | - | - |
| 7 | - | - | - |
| 8 | - | - | - |
| 9 | - | - | - |
| 10 | - | - | - |
| 11 | - | - | - |
| 12 | - | - | - |
| 13 | - | - | - |
| 14 | - | - | - |
| 15 | - | - | - |
| 16 | - | - | - |

Meas. Resistance (Ohms):

259

Use the calibration table entry points to calibrate the tank level input.

Step fill calibration can be used to calibrate the tank input in real time as the tank is physically filled

Number of Table Entries: 2

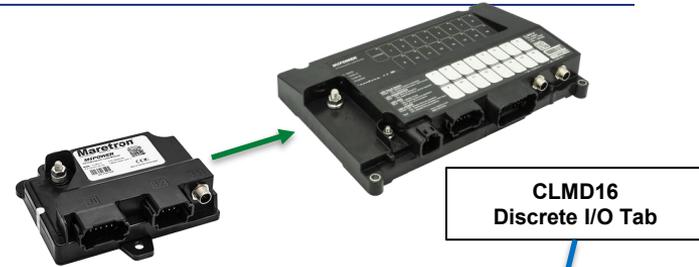
Load Config From File... Save Config To File...
Get Config From Device Put Config To Device
Close

RED text indicates a changed parameter that has not yet been put to the device

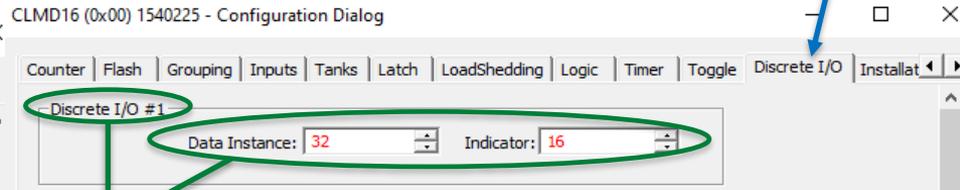
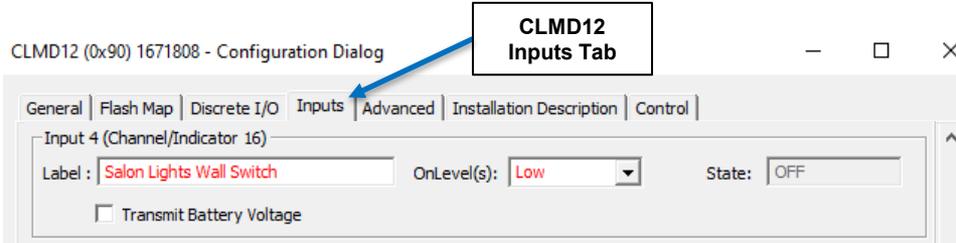
MPOWER CONFIGURATION TRAINING

CLMD - Configuring One CLMD Hardwired Input to Switch a Breaker on another CLMD Unit.

In this example, we will configure a CLMD12 hardwired Input to One Button Smooth Scroll a CLMD16 breaker

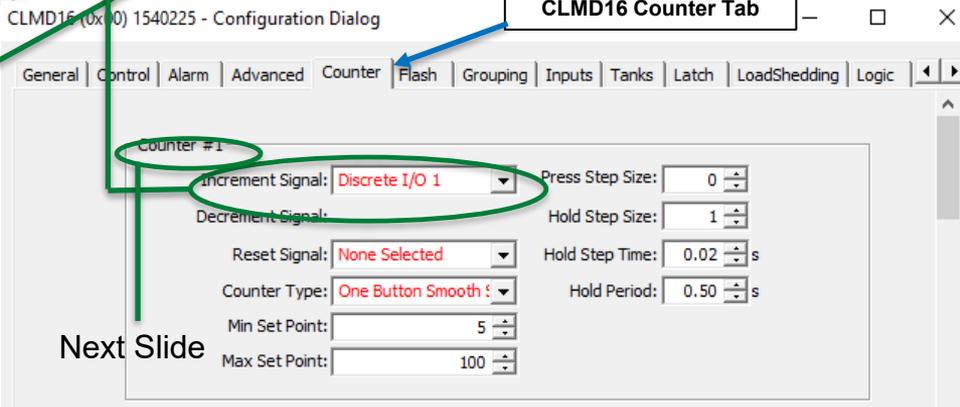


1. Start by configuring the desired CLMD12 Hardwired Input



Remember, in this training we had configured the CLMD12 to have a device instance of '33', so this input's NMEA 2000 Binary Status can be monitored by observing Device instance 33, channel / indicator 16.

2. Configure '33 / 16' in an available CLMD16 Discrete I/O
3. Configure the CLMD16 Discrete I/O to an available Counter Element and set up the One Button Smooth Scroll parameters



Next Slide

MPOWER CONFIGURATION TRAINING

CLMD - Configuring One CLMD Hardwired Input to Switch a Breaker on another CLMD Unit Continued

Last, Configure the One Button Smooth Scroll Counter Signal to the Desired Breaker



CLMD16 General Tab

CLMD16 (0x00) 1540225 - Configuration Dialog

General | Control | Alarm | Advanced | Counter | Flash | Grouping | Inputs | Tanks | Latch | LoadShedding | Logic

Breaker #4 (12A)

Label: Manual Mode: Type:

State: Long Time Delay: Input Signal:

PWM Default: % Instantaneous Pickup: Toggle Mode:

Current Rating: A Short Time Pickup: PWM Counter:

Status

Tripped Thermal Protection Short To Battery

Instant Trip Load Shed Open Load

Short Time Trip Hardware Fault Over Current

Long Time Trip Short To Ground

Default State: Def. Lock State:

Current: A
Voltage: V

MPOWER CONFIGURATION TRAINING

CLMD16 - Timer Sequencing and when to use Manual Mode



In this example, we will be configuring a hypothetical generator start sequence. This Generator Start Sequence will be controlled by a single Input therefore in order for MFDs not to have access to break into the sequence some of the controlling breakers will need to have 'Manual Mode' enabled.

Let's say the following sequence will be used for 'Generator Prime', 'Preheat', and 'Start' sequencing.

In this example a Logic OR Gate will be used to allow multiple inputs to start the following sequence:

'Timer 1' is used as the input signal to a

'Generator Prime' Breaker.

'Timer 2' is used as the input signal to a

'Generator Preheat' Breaker.

'Timer 3' is used to create a timed gap before 'Timer 4' is enabled to ensure the first two processes are complete first and finally, 'Timer 4' is used as the input signal to a 'Generator Start' Breaker.

Logic Output #5

| A | B | C | Output |
|---|---|---|--------|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 |

Input A: Network Input 5
Input B: Input 5 High
Input C: None Selected

Alarm | Advanced | Counter | Flash | Grouping | Inputs | Tanks | Latch | LoadShedding | Logic | Timer | Toggle | D |

Timer Output #1
Delay Signal: Logic Output 5 Delay Time: 6 s
Delay Type: OFF Delay

Timer Output #2
Delay Signal: Logic Output 5 Delay Time: 10 s
Delay Type: OFF Delay

Timer Output #3
Delay Signal: Timer Output 2 Delay Time: 10 s
Delay Type: ON Delay

Timer Output #4
Delay Signal: Timer Output 3 Delay Time: 3 s
Delay Type: OFF Delay

MPOWER CONFIGURATION TRAINING

Timer Sequencing & Manual Mode Continued

'Manual Mode' is enabled on these breakers to ensure that direct breaker control from MFD is disallowed therefore only this sequence can be performed when the inputs that were added to the Logic OR Gate are commanded. The inputs we assigned are :

Logic Output #5

| | A | B | C | Output |
|--|---|---|---|--------|
| | 0 | 0 | 0 | 0 |
| | 0 | 0 | 1 | 1 |
| | 0 | 1 | 0 | 1 |
| | 0 | 1 | 1 | 1 |
| | 1 | 0 | 0 | 1 |
| | 1 | 0 | 1 | 1 |
| | 1 | 1 | 0 | 1 |
| | 1 | 1 | 1 | 1 |

Input A: Network Input 5
Input B: Input 5 High
Input C: None Selected

'Network Input 5' (which is the MFD command for 'Breaker 5') and 'Input 5 High'. Either one of these two input signals will start the Configured Timer sequence

Breaker #5 (12A)

Label: Generator Fuel Prime Manual Mode: ON Type: DC

State: OFF Long Time Delay: SLOW Input Signal: Timer Output 1

Instantaneous Pickup: 10 Toggle Mode: OFF

Current Rating: 10.08 A Short Time Pickup: 6.0

Status

Tripped Thermal Protection Short To Battery

Instant Trip Load Shed Open Load

Short Time Trip Hardware Fault Over Current

Long Time Trip Short To Ground

Default State: OFF

Def. Lock State: Unlocked

Current: 0.000 A

Voltage: 2.200 V

Breaker #6 (12A)

Label: Generator Preheat Manual Mode: ON Type: DC

State: ON Long Time Delay: SLOW Input Signal: Timer Output 2

Instantaneous Pickup: 10 Toggle Mode: OFF

Current Rating: 10.08 A Short Time Pickup: 6.0

Status

Tripped Thermal Protection Short To Battery

Instant Trip Load Shed Open Load

Short Time Trip Hardware Fault Over Current

Long Time Trip Short To Ground

Default State: OFF

Def. Lock State: Unlocked

Current: 0.000 A

Voltage: 13.000 V

Breaker #7 (12A)

Label: Generator Start Solenoid Manual Mode: ON Type: DC

State: OFF Long Time Delay: SLOW Input Signal: Timer Output 4

Instantaneous Pickup: 10 Toggle Mode: OFF

Current Rating: 10.08 A Short Time Pickup: 6.0

Status

Tripped Thermal Protection Short To Battery

Instant Trip Load Shed Open Load

Short Time Trip Hardware Fault Over Current

Long Time Trip Short To Ground

Default State: OFF

Def. Lock State: Unlocked

Current: 0.000 A

Voltage: 2.100 V

MPOWER CONFIGURATION TRAINING

Timer Sequencing & Manual Mode Continued

Now, one may ask “How do you prevent my start sequence from starting once my generator is started or the sequence is already started”

This problem can be easily remedied.

Let's have some fun and add more Logic to the same circuit.

Taking the original Logic OR we will modify it and add more to it to add a 'Lockout feature' with the idea that we will receive a 'Generator Running' signal from the generator (in this case, I will choose 'Input 6 High' and lastly I will need to monitor the assigned breakers for this sequence (Breakers 5,6,7) so that if any of the three are 'ON' not to allow the re-start of the sequence as this will signify that the sequence has already started. This is how this would look:

'Generator Running' Signal (Input 6 High)

First, modify the original input OR Gate to feature another Logic input and adjust the Logic gate to make this additional input to be the 'Lockout Input'

Logic Output #5

| A | B | C | Output |
|---|---|---|--------|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 0 |

Input A: Network Input 5
Input B: Input 5 High
Input C: Logic Output 6

Second, add the 'Generator Running' signal to the Lockout

Logic Output #6

| A | B | C | Output |
|---|---|---|--------|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 |

Input A: Input 6 High
Input B: Logic Output 7
Input C: None Selected

Add another Logic element to expand the input ability

Last, add the 'Breaker On 5-7' signal to the lockout

Logic Output #7

| A | B | C | Output |
|---|---|---|--------|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 |

Input A: Breaker On 5
Input B: Breaker On 6
Input C: Breaker On 7

USER INTERFACE CONFIGURATION

WSV100 - Overview

Vessel Monitoring and Control Web Server

- ✓ 9-30VDC Power Supply, 1.5A MAX
- ✓ 1 x Gigabit Ethernet (HTML Web Server)
 - Garmin OneHelm, Raymarine LightHouse, Simrad, B&G, Furuno, Hatteland, Q-Experience and most devices with a browser.
 - Dual Isolated NMEA 2000® network connections
 - Navigation
 - Vessel Monitoring
- ✓ 1 x USB Port (Ethernet adapter, updates, cellular)
- ✓ 1 x RS232 Port (Future Use)
- ✓ Telemetric
- ✓ VPN

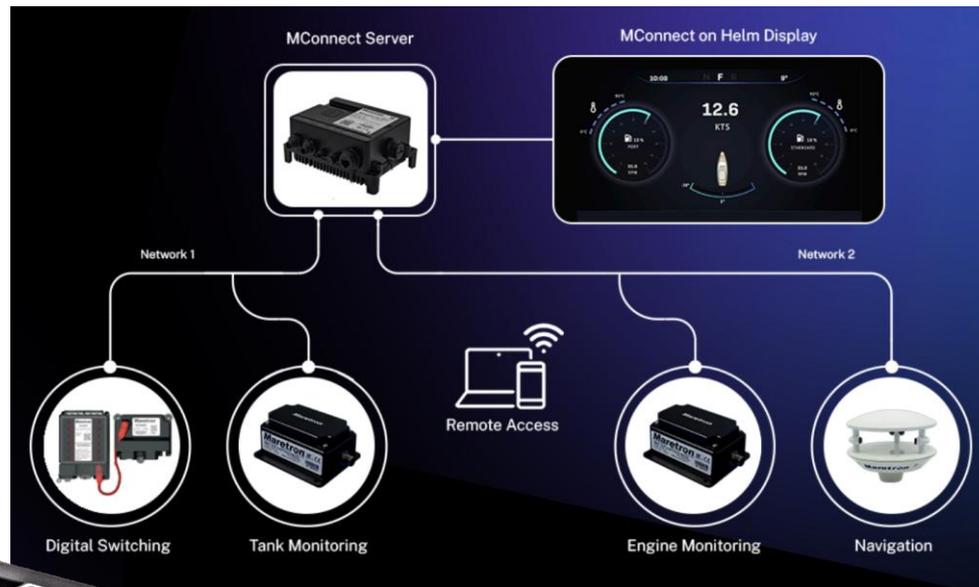


USER INTERFACE CONFIGURATION

WSV100 - HTML Webserver

MConnect is a cutting-edge, NMEA 2000®, certified web server and screen editor.

MConnect connects to hundreds of NMEA 2000® data points on your boat and displays vessel information with visually engaging graphics on your multi-function display so you can monitor your vessel at a glance.



CONFIGURATION
(NEW-DEFAULT)

SCREEN
(POWER) 888 X 498

COMPONENTS
(1 OF 66)

| Component | Parameter | Title | Comment |
|-----------|--------------------|-----------------------|---------------|
| ... | Digital Custom 2x1 | Date / Time | Date : |
| ... | Digital Custom 2x1 | Date / Time | Time : |
| ... | Digital 1x1 | Latitude / Longitude | : |
| ... | Digital 2x1 | Vessel Mode | Vessel Mode : |
| ... | Digital 2x1 | Depth of Water | Depth : |
| ... | Digital 2x1 | Heading | Heading : |
| ... | Digital 2x1 | Variation | Variation : |
| ... | Digital 2x1 | Temperature (Outside) | Temp : |
| ... | Screen Status 2x1 | Screen Status | Home |
| ... | Screen Status 2x1 | Screen Status | Engine |
| ... | Screen Status 2x1 | Screen Status | Tanks : |
| ... | Screen Status 2x1 | Screen Status | Weathr |
| ... | Screen Status 2x1 | Screen Status | Power |
| ... | Action Button 1x1 | Invisible | Open Setting |
| ... | Image | Image | : |
| ... | Image | Image | : |
| ... | Image | Image | : |

SWITCH GROUPS

VESSEL DATA

ACTIONS/CONDITIONS

Undo | Redo | Save | Cancel Changes

CONFIGURATION: new-default | SCREEN: Power

16:25:25
09/02/2025

26°07.344'N
80°08.244'W

- HOME
- ENGINES
- TANKS
- WEATHER
- POWER

AWAY
Vessel Mode

FEET
8.9
Depth

°
273
Heading

°
-6.9
Variation

°C
20.2
Temperature

Maretron

Vessel Monitoring & Control

| Service Battery | Inverter | AC Main |
|--|--|---|
| <p>VOLTS 13.6 12.1 ... 14.2</p> <p>AMPS 5.7</p> <p>80.0 % SOC</p> | <p>VOLTS 119 118 ... 122</p> <p>AMPS 17.4 Inverter Current</p> <p>60.1 Inverter Frequency</p> | <p>VOLTS 119 Generator Voltage</p> <p>AMPS 19.0 Generator Current</p> <p>60.0 Generator Hz</p> |
| <p>VOLTS 125 Shore Power</p> <p>AMPS 21.8 Shore Power Cur...</p> <p>59.6 Shore Power Hz</p> | <p>Outlets Port</p> <p>Outlets Galley</p> <p>Refrigerator</p> <p>Spare</p> <p>Spare</p> | <p>Battery Charger</p> <p>Air Conditioning Pump</p> <p>Air Cond. Aft Cabin</p> <p>Air Cond. Fwd Cabin</p> <p>Spare</p> |
| <p>Electronics</p> <p>Refrigerator</p> <p>Water Pressure</p> <p>Saloon Lights</p> <p>Cabin Lights</p> <p>Red Lights</p> | <p>Navigation Lights</p> <p>Steaming Light</p> <p>Anchor Light</p> <p>Deck Lights</p> <p>Cockpit Lights</p> <p>Bilge Pump</p> | <p>Top Right AC Main</p> <p>Freezer</p> <p>Air Cond. Saloon</p> <p>Watermaker</p> <p>Spare</p> |

➔

EDIT COMPONENT ID: 23

Add

Delete

Parameter: Generator - Avera

Component: Digital 2x1

Parameter Fields

Comment:

Use Label from Device:

Instance: 101

Units: Volts

Component Fields

Left: 638

Top: 97

Width: 90

Title: Generator Voltage

Format: Decimal (1 place)

Ranges:

Backplate Color: #0e0e0e

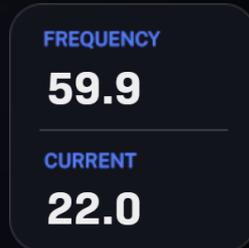
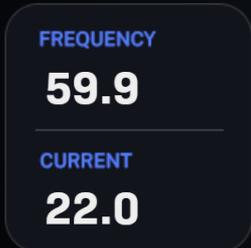
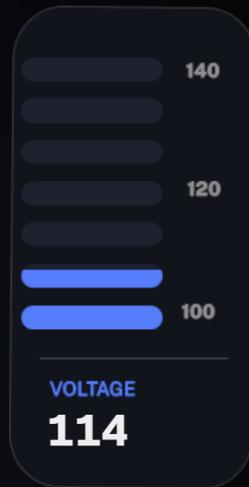
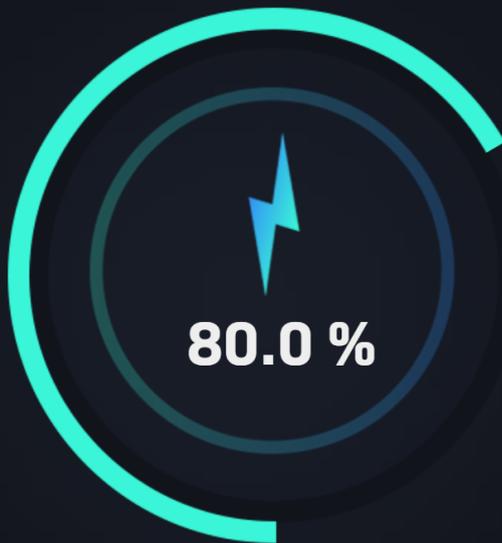
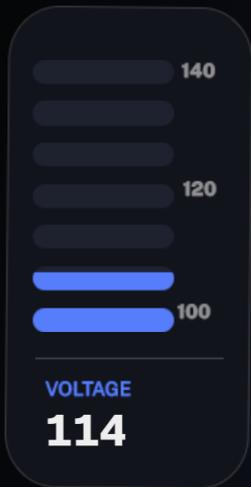
Backplate Opacity: 0

Include in screen status when ANCHORED:

16:12

N F R

 69°



Generator One

Generator Two

House Battery

Invertor

Shore Power



USER INTERFACE CONFIGURATION

N2KView® V3

Maretron's N2KView® V3 is a comprehensive vessel monitoring and control software that goes beyond simple monitoring.

N2KView V3 is completely user-configurable, and you are free to create different screens for your exact needs while easily switching from screen to screen for monitoring all your systems.

Vessel Monitoring & Control Software for PCs

- ✓ Connects to NMEA 2000® Network via a Maretron Gateway, either USB100 (Windows®) or IPG100 (Windows & MAC)
- ✓ Comprehensive software includes services of Monitoring, Control, Alerts, Video, Power Management, and Fuel Management
- ✓ Engines, Generators, Electrical, Tanks, Rudders, Navigation instruments, and so much more.

N2KView V3 software built in!

- ✓ TSM810C & MBB300C



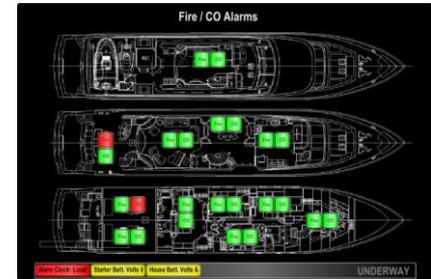
[N2KView Datasheet](#)



USER INTERFACE CONFIGURATION

N2KView® V3

- ✓ Optimized for Touchscreen Interface (Full Support for Keyboard and Pointing Devices)
- ✓ Favorite Screens are Completely User Defined and Tailored for Installed NMEA 2000® Sensors
- ✓ As Many Favorite Screens as Desired, User Defined Tab Names
- ✓ User Defined Background Images (Vessel Profiles, Deck Views, Systems Diagrams, etc.)
- ✓ Integrated Video with Pan, Tilt, and Zoom Controls
- ✓ Comprehensive Alerts System Showing Alarms and Warnings at Bottom of Screen
- ✓ Emailing & Texting* On User Selectable Alerts
*NA Customers Only with the SMS200
- ✓ User Defined Graphs for Monitoring Trends



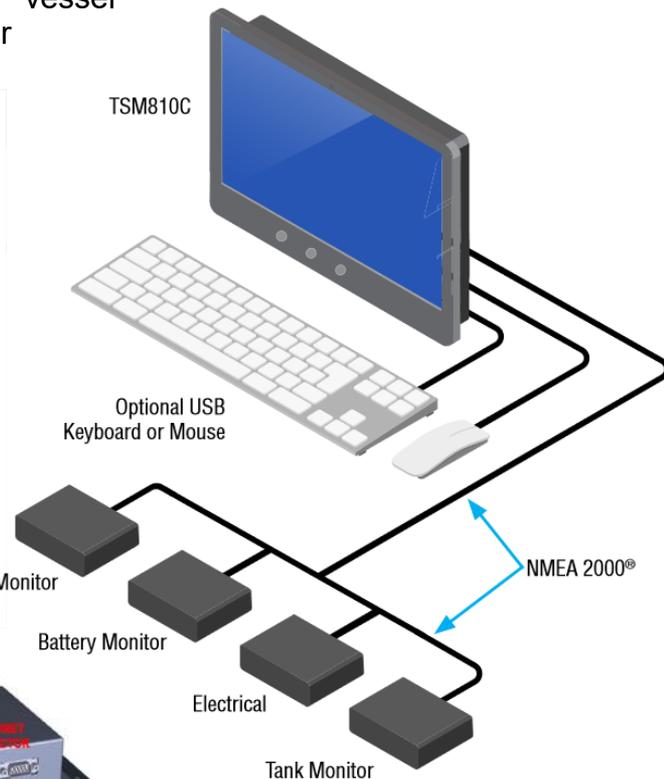
USER INTERFACE CONFIGURATION

TSM810C - 8" Vessel Monitoring & Control Touchscreen

The TSM810C is an 8" dedicated touchscreen that includes Maretron's N2KView® vessel monitoring and control software, providing an extremely simple touch interface for monitoring and controlling critical systems from anywhere on the vessel

Features:

- ✓ 800 x 480 LED backlit LCD Panel
- ✓ Widescreen aspect ratio 5:3
- ✓ 9-32VDC Power, Supply 2 Watts
- ✓ Solid State Disk Drive
- ✓ Dedicated Hardware Boots and Runs N2KView® V3
- ✓ Fanless (Salt Air Not Pulled through the Unit)
- ✓ IP66 Front Panel Protection
- ✓ Flush or VESA mounting capability
- ✓ Dual NMEA 2000® ports for Single or Redundant Network Connections
- ✓ Two USB Ports for Keyboard, Mouse, Trackball, or other connections
- ✓ Ethernet Connector for IP Camera Input or Email Notifications



[TSM810C Datasheet](#)



USER INTERFACE CONFIGURATION

MBB300C - Vessel Monitoring & Control Black Box

Maretron's third generation Black Box (MBB300C) is a dedicated processing unit that includes Maretron's N2KView®.

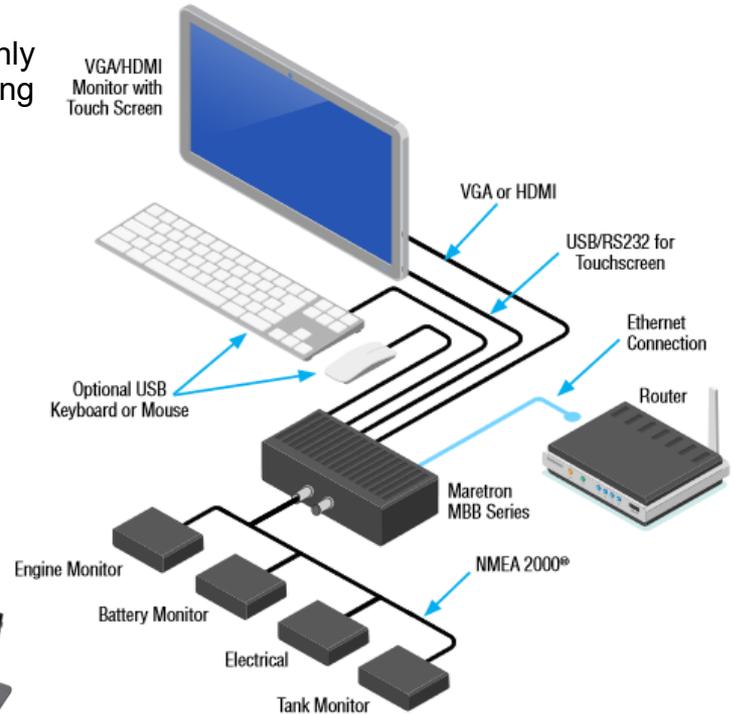
Unlike a PC that allows any software to be loaded, the MBB300C runs only N2KView® software making it extremely stable and dedicated to monitoring and controlling your vessel

Other Features:

- Solid State Disk Drive
- Fanless Cooling System
- Dual NMEA 2000 ports for Single or Redundant Network Connections
- Four USB Ports for Touchscreen, Keyboard, Mouse, Trackball, or other connections
- VGA or HDMI Video Connection (2560 x 1600 Maximum Resolution)
- Ethernet Connector for IP Camera Input or Email Notifications



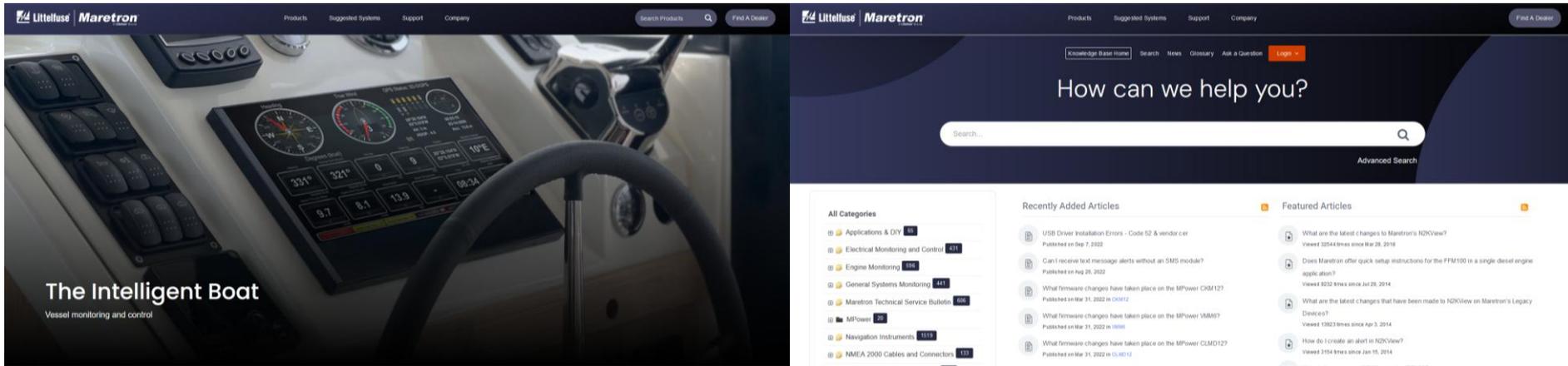
[MBB300C Datasheet](#)



CONFIGURATION

Website Resources

The Maretron website has been recently updated to offer our users access to all of the latest technical materials with the ease of navigation. Datasheets, Manuals, Training Videos, Software, Knowledge Base and Sample Systems and more at your fingertips!!



<https://www.maretron.com/>
<https://www.maretron.com/wp-content/phpkbv95/>

WEBSITE RESOURCES

N2KAnalyzer - Training Videos

Overview

Applications

Documentation

Downloads

— Videos



N2KAnalyzer Introduction - Part I

| | | | | | | | | | |
|----|-----------------|--------|------------|---|---------------------|----------|---------|----------------------|----------------|
| 9C | Maretron | SSC200 | 1120707 | 0 | Primary Heading | 5.0.3 | 5.0.4.1 | Midship | Installed 2013 |
| A0 | Maretron | IK2100 | 1241404 | 0 | ICE Maker | 1.0.13.2 | 1.2.1.1 | | Installed 2013 |
| 30 | Maretron | GPS100 | 3431140010 | 3 | | 2.40 | | | |
| 7C | Maretron | TLM100 | 1500082 | 0 | Fresh Water | | | | |
| 74 | Maretron | TLM150 | 1529901 | 0 | Fuel | | | | |
| B5 | Maretron | WSD100 | 1201734 | | | | | | |
| 72 | Maretron | DST110 | * | 0 | | | | | |
| 71 | Maretron | ALM100 | 1469902 | 5 | Engine Room | 1.0.6 | 1.0.6 | Engine Room | Installed 2013 |
| 2D | Maretron | GPS200 | 15266 | 0 | Primary | 3.5 | 3.7.1.1 | Primary GPS Ant... | Installed 2013 |
| CF | Maretron | DCM100 | 1400046 | 1 | N2Kpower | 1.0.4 | 1.0.5.2 | System Power | Installed 2013 |
| 71 | Maretron | TLM200 | 1540111 | 2 | Fuel | | | | |
| 23 | Maretron | HT200 | 11902103 | 2 | | | | | |
| 26 | Maretron | VDR100 | 1760014 | 0 | Primary Data Rec... | 2.0.3.4 | 3.0.3.1 | Connected Fuel Bus | Installed 2013 |
| 0B | Lowrance Etc... | EP-DOS | 316 | 5 | | | | | |
| 1A | Maretron | ALM100 | 1460041 | 0 | Dark Alarm | 1.0.6 | 1.0.6 | Located Abnove De... | Installed 2013 |



N2KAnalyzer Introduction - Part II

| | | | | | | | | | |
|-------------|--------------------|---|------------|---|-----------------|----------|---------|--------------------|----------------|
| M250 | 1.0 | | 1300176 | 1 | Deck Display | 1.4.17.5 | 1.6.3.4 | | Installed 2013 |
| C20 | 1.0 | | 1389904 | 0 | Primary Heading | 5.0.3 | 5.0.4.1 | Midship | Installed 2013 |
| CM100 | 1.0 | | 1389904 | 0 | A/C Bus | 1.0.8.2 | 1.0.9.2 | Main A/C Bus A | Installed 2013 |
| C100 | 1.0 | | 1241404 | 0 | ICE Maker | 1.0.13.2 | 1.2.1.1 | | Installed 2013 |
| S17x-NME... | 1.00 | | 3431140010 | 3 | | 2.40 | | | |
| S100 | 1.1 | | 1140232 | 2 | | 1.6.13.0 | 2.3.0.1 | Backup 1 | Installed 2013 |
| M100 | 1.0 | | 1500082 | 0 | Fresh Water | | | | Installed 2013 |
| M150 | 1.0 | | 1529901 | 0 | Fuel | | | | Installed 2013 |
| SO100 | 2.0 | | 1201734 | | | | | | Installed 2013 |
| IT110 | D235-S1-TS-A-02/06 | * | | 0 | Wind Sensor | 2.0.13 | 2.0.13 | | Installed 2013 |
| M100 | 1.0 | | 1469902 | 5 | Engine Room | 1.0.6 | 1.0.6 | Engine Room | Installed 2013 |
| S200 | 2.0 | | 15266 | 0 | Primary | 3.5 | 3.7.1.1 | Primary GPS Ant... | Installed 2013 |
| CM100 | 1.0 | | 1400046 | 1 | N2Kpower | 1.0.4 | 1.0.5.2 | System Power | Installed 2013 |
| M200 | 1.0 | | 1540111 | 2 | Fuel | | | | Installed 2013 |

<https://www.maretron.com/products/n2kanalyzer-v3-nmea-2000-analysis-software/>

WEBSITE RESOURCES

MConnect - Training Videos

Overview

Key Features

Specifications

Documentation

Diagram

— Videos

Configurations

Updates

Software Revision History



<https://www.maretron.com/products/mconnect/>

WEBSITE RESOURCES

N2KView - Training Videos

- Overview
- Applications
- Alerts
- Videos**
- Documentation
- Application Design
- BNWAS
- Video Cameras
- Screenshots
- Downloads
- Anchoring

Maretron N2KView Basic Operation - Overview



Maretron N2KView Basic Operation - Component Types 2



Maretron N2KView Basic Operation - Component Types



Maretron N2KView Basic Operation - Alerts



<https://www.maretron.com/products/n2kview-vessel-monitoring-and-control-software/>

MARETRON WEB PAGES

Technical Support

Maretron Technical Support (Maretron, MPower and OctoPlex Brands)

Monday – Friday 830am - 5pm (EST)

End-User Support: (603) 324-7900

Inquiries & RMAs



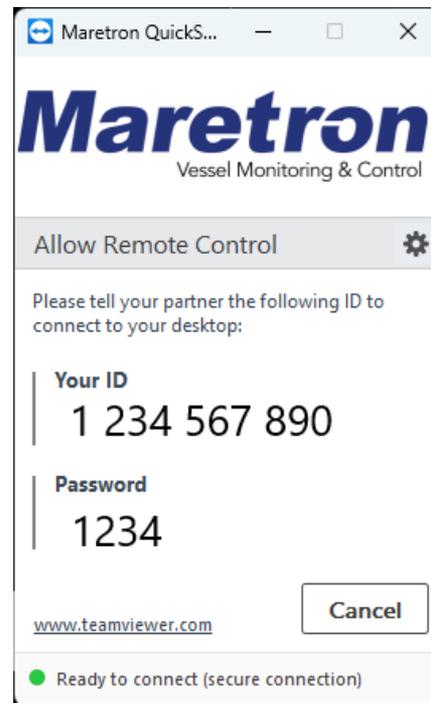
Add to Contacts



Knowledge Base

[Raymarine](#)

[Maretron](#)



maretron.com/remotesupport

Maretron[®]

Vessel Monitoring & Control

www.Maretron.com

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