

Digital Switching products integration on Simrad NSX series MFDs

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I. Preface

Our Digital switching products support standard NMEA 2000 PGNs: 127507 “Switch Bank Status” and 127502 “Switch Bank Control”. However, those PGNs are still rarely used on NMEA 2000 displays, chartplotters and MFDs. Most of older units support Digital Switching via CZone extension only, which is rather cumbersome to use.

Good news it that DS via standard PGNs is slowly adopted by major MFDs manufacturers. In this document we will tell you how to integrate our Digital Switching products with Simrad NSX chartplotters, that have NEON OS. It does not support uploading CZone configuration via ZCF file but supports standard NMEA2000 Digital Switching.

To configure MFD to display your switches on a side panel, you need to create XML file with your DS system configuration and upload it to the plotter using a microSD card.

In this example we will show you how to integrate our YDCC-04 unit to Simrad NSX MFD with NEON Operating System with build number 1.9.211.

Please, note that this document is not an official Simrad/Navico guide. Also it may not reflect any changes implemented on later NEON Operating System updates.

II. XML Configuration File format

Digital Switching system on NSX unit requires you to make and upload Digital Switching system configuration file.

Configuration file is of standard XML format and has the following structure (only one DS channel is shown for clarity):

```
<config>
  <caption>YDCC-04</caption>
  <loadControllers>
    <loadController>
      <n2kName>C03C8C5C59A3FA53</n2kName>
      <loads>
        <load>
          <caption>Load1</caption>
          <monitor>
            <pgn>127501</pgn>
            <instance>1</instance>
            <subInstance>0</subInstance>
          </monitor>
          <command>
            <pgn>127502</pgn>
            <instance>1</instance>
            <subInstance>0</subInstance>
          </command>
        </load>
        <load>
          .....
        </load>
      </loads>
    </loadController>
  </loadControllers>
  <ui>
    <title>YDCC-04</title>
    <caption>YDCC-04</caption>
    <switches>
      <switch>
```

```

<caption>LOAD1 NAME</caption>
<indicators>
  <indicator>
    <load>Load1</load>
  </indicator>
</indicators>
<type>multistate</type>
<states>
  <state>
    <caption/>
    <loadCommands>
      <loadCommand>
        <load>Load1</load>
        <state>0</state>
      </loadCommand>
    </loadCommands>
  </state>
  <state>
    <caption/>
    <loadCommands>
      <loadCommand>
        <load>Load1</load>
        <state>1</state>
      </loadCommand>
    </loadCommands>.....
  </state>
</states>
</switch>
<switch>
  .....
</switch>
</switches>
</ui>
</config>

```

The <n2kName> tag in <loadController> section contains target device's NMEA 2000 "NAME" (64-bit unique ID) field in a hexadecimal string format. This string can be found in our CAN Log Viewer software or in NMEA2000 Device List of the NSX plotter.

```
<n2kName>C03C8C5C59A3FA53</n2kName>
```

For each DS unit you need to make a separate <loadController> section.

The <caption> section has a "load name" which will be used later to tie each <load> to the "actions" it can perform in the NSX Graphical User Interface (GUI).

The <loads> section describes the PGNs that are used to exchange data, and also specifies the instances of banks and channels:

<instance> tag should correspond to target DS device's "Binary Device Bank Instance".

<subInstance> tag means "Status" channel number minus one (per Standard, Digital Switching channels numbering starts with 1, but NSX sub-Instances numbering starts with 0 for some reason).

For example, you have YDCC-04 with "Binary Device Bank Instance" set to 5 and you want to monitor its channel 4 ON/OFF status, add the following <load> section:

```
<load>
  <caption>Load4</caption>
  <monitor>
    <pgn>127501</pgn>
    <instance>5</instance>
    <subInstance>3</subInstance>
  </monitor>
</load>
```

And if you also need to be able to toggle that switch (and turn YDCC-04 channels ON/OFF) add the <command> section:

```
<load>
  <caption>Load4</caption>
  <monitor>
    <pgn>127501</pgn>
    <instance>5</instance>
    <subInstance>3</subInstance>
  </monitor>
```

```

    <command>
      <pgn>127502</pgn>
      <instance>5</instance>
      <subInstance>3</subInstance>
    </command>
  </load>

```

OK, we have figured out how to tell NSX which devices, loads and channels it should monitor and control through which PGNs, but now we need to set up the Graphical User Interface (GUI). Digital Switching GUI is decoupled from the load Controller, which is a good design choice.

The <ui> section describes User Interface.

The <title> tag defines the title of the button panel.

Each switch has its own <switch> section

The <caption> tag defines button name for the switch and laod specified in this section.

Suppose in our example above, YDCC-04 channel 4 toggles bilge pump ON/OFF. We will name this channel “Bilge Pump” and add new <switch> section:

```

<switch>
  <caption>Bilge Pump</caption>
  <indicators>
    <indicator>
      <load>Load4</load>
    </indicator>
  </indicators>
  <type>multistate</type>
  <states>
    <state>
      <caption/>
      <loadCommands>
        <loadCommand>
          <load>Load4</load>
          <state>0</state>
        </loadCommand>

```

```
        </loadCommands>
    </state>
    <state>
        <caption/>
        <loadCommands>
            <loadCommand>
                <load>Load4</load>
                <state>1</state>
            </loadCommand>
        </loadCommands>
    </state>
</states>
</switch>
```

Observe each <load> section has the same name as in <loadController> (**Load4** in our example). To our knowledge, this name should be unique for each <switch> and corresponding <loadController> section.

III. Configuring the MFD

After the configuration file is created, copy it to microSD card and put it into NSX.

Go to Settings => Boat Network => Add Device => Add Digital Switch:

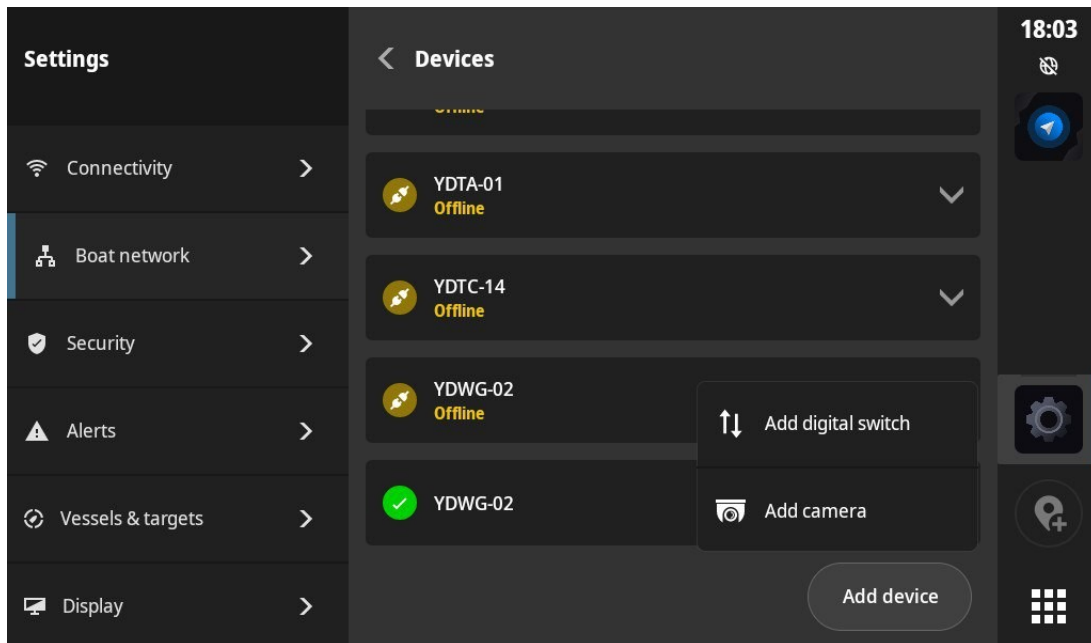


Fig. 1. NSX menu diving.

In Configuration window select your XML file twice: firstly in "Removable media" list, then in "Available Configurations" list:

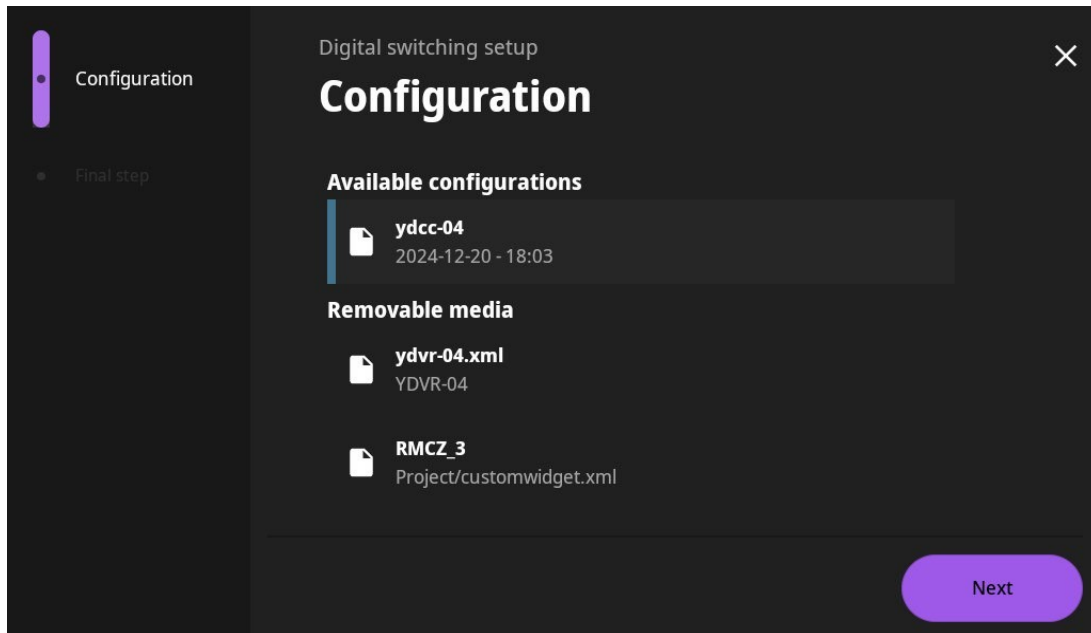


Fig. 2. Selecting the configuration file.

Click Next, Next, Finish.

After that, you should get Digital Switching side panel on the left:

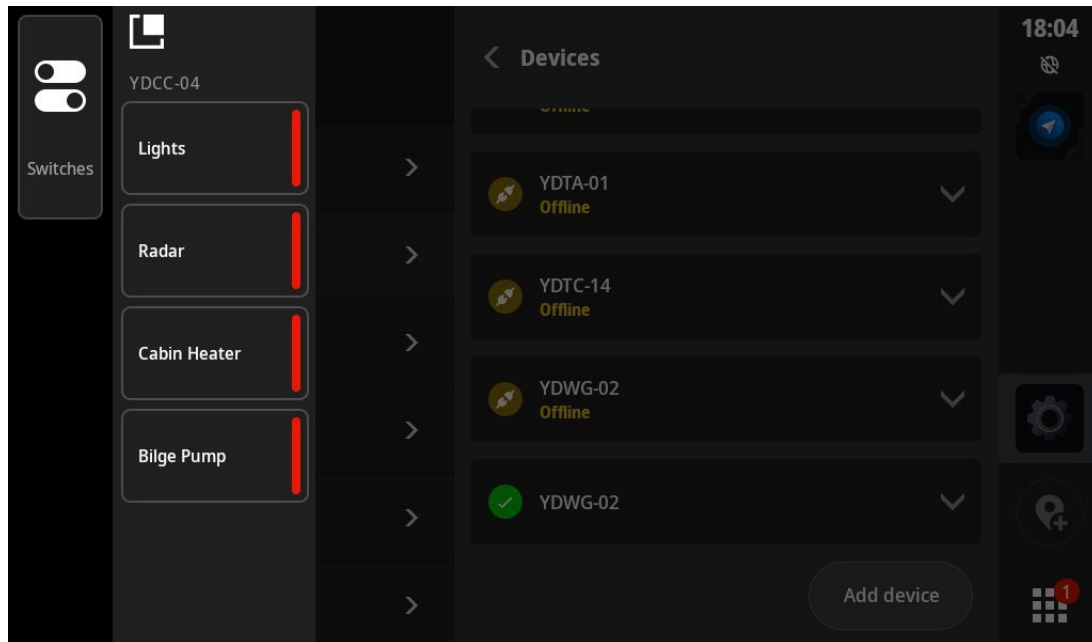


Fig. 3. DS Side Panel is now active.

Observe, that we got channel 4 named exactly as expected, “Bilge Pump”.

Test that all buttons work and the configuration is finished.

Section IV below lists several configuration examples.

IV. Configuration file example

Example 1:

One YDCC-04 unit with NAME = C03C8C0359A3FA5B on BANK =1

Channel 1 name: Lights

Channel 2 name: Radar

Channel 3 name: Bilge Pump

Channel 4 name: Cabin Heater

XML file contents below:

```
<config>
<caption>YDCC-04</caption>
<loadControllers>
<loadController>
<n2kName>C03C8C0359A3FA5B</n2kName>
<loads>
<load>
<caption>Load1</caption>
<monitor><pgn>127501</pgn><instance>1</instance><subInstance>0</subInstance><
/monitor>
<command><pgn>127502</pgn><instance>1</instance><subInstance>0</subInstance
></command>
</load>
<load>
<caption>Load2</caption>
<monitor><pgn>127501</pgn><instance>1</instance><subInstance>1</subInstance><
/monitor>
<command><pgn>127502</pgn><instance>1</instance><subInstance>1</subInstance
></command>
</load>
<load>
<caption>Load3</caption>
<monitor><pgn>127501</pgn><instance>1</instance><subInstance>2</subInstance><
/monitor>
<command><pgn>127502</pgn><instance>1</instance><subInstance>2</subInstance
```

```
></command>
</load>
<load>
<caption>Load4</caption>
<monitor><pgn>127501</pgn><instance>1</instance><subInstance>3</subInstance><
/monitor>
<command><pgn>127502</pgn><instance>1</instance><subInstance>3</subInstance
></command>
</load>
</loads>
</loadController>
</loadControllers>
<ui>
<title>YDCC-04</title>
<caption>YDCC-04</caption>
<switches>
<switch>
<caption>Lights</caption>
<indicators>
<indicator>
<load>Load1</load>
</indicator>
</indicators>
<type>multistate</type>
<states>
<state>
<caption/>
<loadCommands>
<loadCommand>
<load>Load1</load>
<state>0</state>
</loadCommand>
</loadCommands>
</state>
<state>
<caption/>
```

```
<loadCommands>
<loadCommand>
<load>Load1</load>
<state>1</state>
</loadCommand>
</loadCommands>
</state>
</states>
</switch>
<switch>
<caption>Radar</caption>
<indicators>
<indicator>
<load>Load2</load>
</indicator>
</indicators>
<type>multistate</type>
<states>
<state>
<caption/>
<loadCommands>
<loadCommand>
<load>Load2</load>
<state>0</state>
</loadCommand>
</loadCommands>
</state>
<state>
<caption/>
<loadCommands>
<loadCommand>
<load>Load2</load>
<state>1</state>
</loadCommand>
</loadCommands>
</state>
```

```
</states>
</switch>
<switch>
<caption>Cabin Heater</caption>
<indicators>
<indicator>
<load>Load3</load>
</indicator>
</indicators>
<type>multistate</type>
<states>
<state>
<caption/>
<loadCommands>
<loadCommand>
<load>Load3</load>
<state>0</state>
</loadCommand>
</loadCommands>
</state>
<state>
<caption/>
<loadCommands>
<loadCommand>
<load>Load3</load>
<state>1</state>
</loadCommand>
</loadCommands>
</state>
</states>
</switch>
<switch>
<caption>Bilge Pump</caption>
<indicators>
<indicator>
<load>Load4</load>
```

```
</indicator>
</indicators>
<type>multistate</type>
<states>
<state>
<caption/>
<loadCommands>
<loadCommand>
<load>Load4</load>
<state>0</state>
</loadCommand>
</loadCommands>
</state>
<state>
<caption/>
<loadCommands>
<loadCommand>
<load>Load4</load>
<state>1</state>
</loadCommand>
</loadCommands>
</state>
</states>
</switch>
</switches>
</ui>
</config>
```