# Changing NMEA2000 instances

# 1. Introduction

Instances are used in an NMEA2000 network to identify multiple similar products connected on the same network.

As an example, take a system with two battery monitors (one for the main battery bank, and another for the hydraulic-thruster bank) and also a Quattro inverter/charger. All three of those devices will send their battery voltage measurements out on the canbus.

For the displays to show these values at the right place, they need to know which voltage belongs to what battery.

Before going ahead and change instances, please make sure to first study the NMEA2000-out chapter in the GX manual.

#### How can I change the instances?

This document describes three options:

- 1. Use Actisense software & hardware. Can change both the device- and data-instances
- 2. Use Maretron software & hardware. Can change device instance only.
- 3. From the commandline of a GX device. Note that this is a software developer trick. Not for any day use. Allows changing device instances as well as data instances.

#### Device instance, data instances and other instances

There various types of instances, and for marine systems are two that matter in most cases: the Device instance as well as the Data instance. Please make sure to study the NMEA2000-out chapter in the GX manual before continuing. It also links to specific instructions for Raymarine, Garmin, Furuno, Simrad, B&G and Lowrance MFDs.

#### **Related information**

For more detailed information, see also the FAQ in our Data communication whitepaper.

And the main NMEA2000 integration guide.

### 2. Changing the device instance with Actisense

Note: make sure to use a recent Actisense driver. Otherwise the instance might not 'stick'.

Requires the Actisense NGT-1.

Changing a device instance:

- 1. Open Actisense NMEA Reader
- 2. Select the network view (tab selection is at the bottom left)
- 3. Select the product whose device instance you want to change
- 4. Select the properties tab at the bottom right and change the device instance

NB NMEA Reader - [COM15: Actisense NGT]										
NB Ei	le <u>E</u> dit <u>V</u> iew <u>W</u> in	dow <u>H</u> elp		_ B ×						
۲	3 🖌 сом	MEA 2000 Bus Load (1%)								
	PC Receive Load (0%)									
SRC	Manufacturer	Device Function	Property	Value						
35	Victron	Battery (170)	Source Address	35						
254	Actisense	Gateway (130)	Industry Group	4						
			System Instance	0						
			Device Class	Electrical Generation (35)						
			Device Function	Battery (170)						
			Device Instance	1						
			Manufacturer ID	Victron (358)						
			Unique ID	0						
			N2K Database Version	1.301						
			N2K Certification Level	1						
			Load Equiv. Number	50 mA (1)						
			Manu. Product ID	1963						
			Manu. Model ID	BMV						
			Manu. Software ID	1.06						
			Manu. Hardware ID	1.0						
			Manu. Serial ID	0000000						
			Installation Details 1							
			Installation Details 2							
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14 4	► ► Data View λ Ne	etwork View / Hardware C	nfig	ties / Log /						
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COM 1	5 115200 Open	Transfer Receive All		***						

# 3. Changing a data instance with Actisense

Requires the Actisense NGT-1.

Changing a data instance:

- 1. Open Actisense NMEA Reader
- 2. Select data view (tab selection is at the bottom left)
- 3. Right click on the PGN number. Note that this will only work on PGNs that allow changing their data instance:

NTEA Reader - [COM15: Actisense NGT]											
NB File	File Edit View Window Help     _ & ×										
۲	0 月	CC	0M15: Acti	sense NGT	•	115200	•	] 🍳		NMEA 2000	Bus Load (0%)
	PC Receive	Load (19	6)								
Line 1 2 3 4 5 6 7	PGN 60928 127508 127501 61184 127508	SRC 35 35 35 35 35 35 35 35 35	DST 255 255 255 255 255 255 255 255 255	Name ISO Address Claim Battery Status Binary Switch Bank Sta Manu. Proprietary single ance formation Battery Status	tus e-fra	ume addressed		IMEA 2000 Pr Name: DC Source = 3 Priority = ( Number C Field 1: SIE Field 2: DC Field 3: DC Field 3: DC Field 4: Sta Field 5: Sta Field 6: Tir Field 7: Rip	GN: 1 Clotal GR: 2 GR: 2 GR: 2 Clotal GR: 2 GR:	127506 (0x1F2) ailed Status estination = 2: ength = 9 elds = 7 3 tance = 2 be = 0 (Battery f Charge = 100 f Health = Nor temaining = 14 Voltage = Not	12) 55 ) D Percent t Available 4400 Minutes : Available
4											
H 4 F	▶ \Data	View	Network \	View / Hardware Config /			- 14	- • • V	Deta	ils Propertie	s / Log /
COM 15	115200	Open	Transfe	r Receive All							

4. And change the value:

	EA Reader -	[COM15	5: Actisen	se NGT]
			M15: Acti	sense NGT
	PC Receive	Load (0%	6)	
Line 1 2 3 4 5 6 7	PGN 60928 127508 127501 61184 127506 126996 127508	SRC 35 35 35 35 35 35 35	DST 255 255 255 255 255 255 255	Name         ISO Address Claim         Battery Status         Binary Switch Bank Status         Manu. Proprietary single-frame addressed         DC Detailed Statue         Produc         NMEA Reader         Battery         Modify Data Instance in PGN: 127506 Add: 35         Field No.         Instance         Modify         Cancel
	Data	View (	Network	View / Hardware Config / II    II    II    Details / Properties / Log /

Notes for BMVs, Lynx Shunt and the Lynx Ion + Shunt:

- The Battery Instance and the DC Detailed instance are the same value. Changing one of them, will also change the other one.
- Since the BMV sends out two voltages, the main voltage and the aux- or starter-voltage, it comes preconfigured with two battery instances: 0 and 1. When you want to change that to 1 and 2, change the 1 into 2 first, and then the 0 into 1, as they cannot be the same.

## 4. Changing Instance Using Maretron N2KAnalyzer

Maretron uses a term called "Unique Instance" where the N2KAnalyzer software tool automatically determines if a particular device uses device or data instances.

WARNING: At Victron we do not understand what and how the Maretron software works with regards to this. We advise to use another tool, not Maretron, so that you know what you are doing, ie know what instance you are changing. So far, we have not been able to use Maretron software to change a data instance. And changing the other instance, the device instance can also be done straight from the Victron GX device its user interface. To change a data instance, for example to fix instance conflicts as reported by the Maretron software, we recommend to use Actisense. Not Maretron.

This procedure requires a Maretron USB adapter.

Open N2KAnalyzer and make sure that the "Unique Instance" column is turned on (i.e. checked) using

#### the Setup>Columns menu item.

							Maretro	n N2KAnalyzer, Ver	sion 2.4.4.1 - Mar	retron				- 1	= ×			
File Se	Software	ze Update Co Update Director	onfigure Web Help	1		Unique Instance Column												
Exps	Configure Gateway Units Download Software Updates on Startup				ID Mfg Model Mfg Seria Unique Version Number Instance			Label	Current Software	Available Software	Installation Description #1	Device Instance	NMEA 2000 Version	NMEA 2000 Certification Level	LEI ^			
	Listen Or	nly.			44-162-1-02	11002103	2.		4.000,4.001	6	Sea water temp	2	1.300	8	1			
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	29	Maretron	VDR1	1	Manufacture	er.		ondary Data Recor	2.0.0.4	3.0.3.1	Connected Aft Bus	1	2.000	A	4			
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•	A0	Maretron J2K10			Mfg Serial N	umber		Maker	1.0.13.2	1.2.1.1		0	1.301	A	3			
	90	9C Maretron SSC			Generat			hary Heading Sens	5.0.3	5.0.4.1	Midship	0	1.210	A	3			
	30	Maretron	GPD	-	Unique Instance				1.6.130	2.3.0.1	Backup 1	2	1.210	A	3			
	7C	Maretron TLMT		-	Laber		_	Board Water	1.1.6	1.1.8.3		0	1.301	в	2			
	74	Maretron	TLM	1	Current Software			oline Tank	1.1.6	1.1.8.3	Tender Gasoline T	0	1.301	в	2			
	86	Maretron	wso	4	Available Software			d Sensor	2.0.13	2.0.13		0	1.210	A	3			
	72	Maretron	DST1	-	Installation Description #1				1.003,1.022	•	Port Sounder	0	1.300	в	4			
	71	Maretron	ALM	-	Installation D	Installation Description #2		ine Room	1.0.6	1.0.6	Engine Room	6	1.301	A	2			
	2D	Maretron	GP52		Mfg informa	tion		nary	3.5	3.7.1.1	Primary GPS Ante	0	1.301	A	3			
	CF	Maretron	DCM		Device Class			(power	1.0.4	1.0.5.2	System Power	2	1.210	A	1			
	73	Maretron	TLM		Device Funct	Device Function		Tank	1.1.6	1.1.8.3		0	1.301	в	2			
	0A	Maretron	USB1	5	Device Instance				1.8.5b1	1.8.6.2	Connected to Hel	1	1.210	A	3			
D	cc	Maretron	TMP	-	System Insta	nce		in Temperatures	1.1.1	1.1.2.7	Ship's Inside Tem	0	1.210	A	1			
	Hardw	are Channel	Source	~	NMEA 2000	Version					All second second second	140		nious.	()			
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Within the N2KAnalyzer main window, any cell with a white background can be edited by clicking in the cell and typing in the desired value. You can see from the following screen shot that a few parameters have a white background including Label and Installation Description #1. To change a devices instance, click in the Unique Instance cell for the device you want to change and type the new number followed by a carriage return. If the particular products accepts the instance change, you will see the new instance number reflected in the cell. You can also use a tool within N2KAnalyzer to check that all products on the network are uniquely instanced. Use the Analyze>Instancing menu to verify correct overall system instancing.

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	74	Maretron	TLM150	1.0	1529901	0	Gasoline Tank	1.1.6	1.1.8.3	Tender Gasoline T	0	1,301	8	2
1	86	Maretron	WSO100	2.0	1201734		Wind Sensor	2.0.13	2.0.13		0	1,210	A	3
	72	Maretron	DST110	D235-51-TS		0		1.003.1.022		Port Sounder	0	1.300	B	4
	71	Maretron	ALM100	1.0	1469902	5	Engine Room	1.0.6	1.0.6	Engine Room	6	1.301	A	2
	2D	Maretron	GP5200	2.0	15266	0	Primary	3.5	3.7.1.1	Primary GPS Ante	0	1,301	A	3
	CF	Maretron	DCM100	1.0	1400046	1	N2Kpower	1.0.4	1.0.5.2	System Power	2	1.210	A	1
	73	Maretron	TLM200	1.0	1540111	2	Day Tank	1.1.6	1.1.8.3		0	1.301	8	2
	0A	Maretron	US8100	1.0	1160258	1		1.8.561	1.8.6.2	Connected to Hel	1	1.210	A	3
1	-cc	Maretron	TMP100	1.0	1480009		Cabin Temperatures	1.1.1	1.1.2.7	Ship's Inside Tem	0	1.210	A	1
g	CE	Maretron	TMP100	1.0	1489901		Engine Room	1.1.1	1.1.2.7	Engine room Rear	0	1.210	A	1
	1A.	Maretron	ALM100	1.0	1460041	0	Deck Alarm	1.0.6	1.0.6	Located Above Po	0	1.301	A	2
	- D4	Maretron	SIM100	1.0	1429902	2	Smoke Detectors	1.1.1	1.2.2.2		0	1.210	A	2
	08	Maretron	IPG100	1.0	1620002	1	Secondary	3.6.0	4.0.7.6	Secondary Ship's	1	1.301	A	3
9	- A3	Maretron	J2K100	1.0	1241755	0	Main Ships HVAC	1.0.13.2	1.2.1.1	Dometic Converter	0	1.301	A	з
	28	Maretron	VDR100	1.0	1760014	0	Primary Data Recorder	2.0.0.4	3.0.3.1	Connected Fwd Bus	0	2.000	A	4
	04	Maretron	US8100	1.0	1160253	2		1.8.3	1.8.6.2	Connected to Nav	2	1.210	A	3
	94	Maretron	EMS100	2.0	1220251	0	Engine Main	1.4.2.4	1.4.3.1	12AY-W 1659HP	0	1.210	A	1
	BD	Maretron	NBE100	1.0	1240263	0	Fwd Ship's NMEA200	1.0.0	1.1.0.1		0	1.301	A	3
	88	Maretron	DSM150	1.0	1800001	0	Captain's Quarters	1,4,17,5	1.6.6.3		0	2.000	A	3
	78	Maretron	SMS100	1.0	1739904	0		1.0.1.1			0	1.301	A	2
	15	Maretron	DSM250	2.0	1340328	2	Engine Room	3.4.14.4	1.6.6.3		2	1.301	A	13
	14	Maretron	D5M250	3.0	1329901	4	Crew Ouarters	1.4.16.5	1.6.6.3		4	2.000	A	13
1	D1	Maretron	RIM100	1.0	1459902	1	Fire Suppression Syst	1.1.3	1.2.2.2		19	1.301	A	1
	<b>C3</b>	Maretron	NBE100	1.0	1240360	0	Aft Ship's NMEA2000	1.0.0	1.1.0.1		0	1.301	A	3
	80	Maretron	DSM250	1.0	1309906	3	Fly_Bridge	1.4.17.5	1.6.6.3		3	2.000	A	13
	70	Maretron	TLM100	1.0	1501234	0	Bow Holding Tank	1.1.6	1.1.8.3		0	1.301	8	2
1	6A	Maretron	FFM100	1.0	1679904		Main Engine	1.1.2.1	1.2.2.1	Main Engine Fuel	0	1.301	A	2
1	40	Maretron	008100	20	170072	n	Linkting Control	1114	1123		n	2.000	4	2

# 5. Changing the instances from the GX command line

### 5.1 Introduction

Instead of using Actisense or Maretron software, it is also possible to change the VE.Can aka N2K Device instance from the GX Device shell. To get root access, follow these instructions: Venus OS: Root Access.

Once logged into the shell, follow below instructions. More back ground information of the used commands such as dbus and dbus-spy is found by reading about root access document.

### 5.1 New method - changing a Device instance

All devices available on the canbus are enumerated under the com.victronenergy.vecan service. And for all devices that support the necessary can-bus commands, the Device instance can be changed. All Victron products support changing their Device instance; and most or all non-Victron products as well.

```
# dbus -y com.victronenergy.vecan.can0 / GetValue
value = {
 'Devices/00002CC001F4/DeviceInstance': 0,
 'Devices/00002CC001F4/FirmwareVersion': 'v2.60-beta-29',
 'Devices/00002CC001F4/Manufacturer': 358,
 'Devices/00002CC001F4/ModelName': 'Cerbo GX',
 'Devices/00002CC001F4/N2kUniqueNumber': 500,
 'Devices/00002CC001F4/Nad': 149,
 'Devices/00002CC001F4/Serial': '0000500',
 'Devices/00002CC005EA/CustomName': 'Hub-1',
 'Devices/00002CC005EA/DeviceInstance': 0,
 'Devices/00002CC005EA/FirmwareVersion': 'v2.60-beta-29',
 'Devices/00002CC005EA/Manufacturer': 358,
 'Devices/00002CC005EA/ModelName': 'Color Control GX',
 'Devices/00002CC005EA/N2kUniqueNumber': 1514,
 'Devices/00002CC005EA/Nad': 11,
 'Devices/00002CC005EA/Serial': '0001514',
 'Devices/00002CC005EB/CustomName': 'SmartBMV',
 [and so forth]
```

To change them, do a SetValue call to the DeviceInstace path like below. Or, perhaps easier, use the dbus-spy tool.

These lines read it, then changes it to 1, then reads it again:

```
root@ccgx:~# dbus -y com.victronenergy.vecan.can0
/Devices/00002CC005EB/DeviceInstance GetValue
value = 0
root@ccgx:~# dbus -y com.victronenergy.vecan.can0
/Devices/00002CC005EB/DeviceInstance SetValue %1
retval = 0
root@ccgx:~# dbus -y com.victronenergy.vecan.can0
/Devices/00002CC005EB/DeviceInstance GetValue
value = 1
```

[note that numbers, like can0, and 00002CC005EB can ofcourse be different on your system].

### 5.2 New method - changing Data instance

This applies only the NMEA2000-out feature. See links on top of page for what the NMEA2000 out feature is.

The data instances used for the NMEA2000 out feature are stored in local settings. Here is a snippet of the lines, taken by using the dbus-spy tool that also allows changing entries:

The Data instances are the "Battery-", "DCDetailed-", and so forth instances.

Settings/Vecan/can0/Forward/battery/256/BatteryInstance0 0 <-Data instance for main voltage measurement Last update: 2020-06-28 ve.can:changing\_nmea2000\_instances https://www.victronenergy.com/live/ve.can:changing\_nmea2000\_instances

Settings/Vecan/can0/Forward/battery/256/BatteryInstance1	1	<-
Data instance for starter or mid-voltage measurement		
Settings/Vecan/can0/Forward/battery/256/Description2		
Settings/Vecan/can0/Forward/battery/256/IdentityNumber	15	
Settings/Vecan/can0/Forward/battery/256/Instance	1	
Settings/Vecan/can0/Forward/battery/256/Nad	233	<-
Source address - no need, also not good, to change this		
Settings/Vecan/can0/Forward/battery/256/SwitchInstance1	0	<-
Data instance for switchbank		
Settings/Vecan/can0/Forward/battery/256/SystemInstance	0	
Settings/Vecan/can0/Forward/solarcharger/0/DcDataInstance0	0	
Settings/Vecan/can0/Forward/solarcharger/0/DcDataInstance1	1	
Settings/Vecan/can0/Forward/solarcharger/0/Description2		
Settings/Vecan/can0/Forward/solarcharger/0/IdentityNumber	25	
Settings/Vecan/can0/Forward/solarcharger/0/Instance	0	
Settings/Vecan/can0/Forward/solarcharger/0/Nad	36	
Settings/Vecan/can0/Forward/solarcharger/0/SystemInsta	0	
Settings/Vecan/can0/Forward/solarcharger/1/DcDataInstance0	0	<-
Battery voltage & current		
Settings/Vecan/can0/Forward/solarcharger/1/DcDataInstance1	1	<- PV
voltage & current		
Settings/Vecan/can0/Forward/solarcharger/1/Description2		
Settings/Vecan/can0/Forward/solarcharger/1/IdentityNumber	24	
Settings/Vecan/can0/Forward/solarcharger/1/Instance	0	
Settings/Vecan/can0/Forward/solarcharger/1/Nad	36	
Settings/Vecan/can0/Forward/solarcharger/1/SystemInstance	0	
Settings/Vecan/can0/Forward/solarcharger/258/DcDataInstance0	0	
Settings/Vecan/can0/Forward/solarcharger/258/DcDataInstance1	1	
Settings/Vecan/can0/Forward/solarcharger/258/Description2		
Settings/Vecan/can0/Forward/solarcharger/258/IdentityNumber	23	
Settings/Vecan/can0/Forward/solarcharger/258/Instance	0	
Settings/Vecan/can0/Forward/solarcharger/258/Nad	36	
Settings/Vecan/can0/Forward/solarcharger/258/SystemInstance	0	

### 5.3 Old method

(Only allows changing Device instances - not data instances as used in the NMEA2000-out function)

Step 1. List the devices:

```
root@ccgx:~# dbus -y
com.victronenergy.bms.socketcan_can0_di0_uc10
com.victronenergy.charger.socketcan_can0_di1_uc12983
```

It shows a Skylla-i (the charger). dil in the name means that it is currently on DeviceInstance 1.

Step 2. Change it, for example, to 4:

root@ccgx:~# dbus -y com.victronenergy.charger.socketcan\_can0\_di0\_uc12983

```
2020-08-02 08:26
```

9/9

/DeviceInstance SetValue %4
retval = 0

Step 3. Wait a few seconds, and double check:

root@ccgx:~# dbus -y
com.victronenergy.bms.socketcan\_can0\_di0\_uc10
com.victronenergy.charger.socketcan\_can0\_di4\_uc12983

Device instance changed successful!

From: https://www.victronenergy.com/live/ - **Victron Energy** 

Permanent link: https://www.victronenergy.com/live/ve.can:changing\_nmea2000\_instances



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