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'.

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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

		Actisense NGT]		
NR <u>F</u> ile	e <u>E</u> dit <u>V</u> iew <u>W</u> in	dow <u>H</u> elp		_ 8 ×
0	🔇 🖌 Сом	115: Actisense NGT	▼ 115200	MMEA 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	Victren (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	000000
			Installation Details 1	
			Installation Details 2	
•			Manu. Information	
H 4 >	► Data View Ne	twork View / Hardware	Config II I I I Details Proper	ties / Log /
COM 15	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:

	A Reader -			-		
	e Edit Vi		ndow F M15: Actis		115200	
	PC Receive	Load (1%))			
Line 1 2 3 4 5 6 7	PGN 60928 127508 127501 61184 127508 127508	Modify [DST 255 255 255 255 255 255 255 255 255	iu status	ne addressed	NMEA 2000 PGN: 127506 (0x1F212) Name: DC Detailed Status Source = 35, Destination = 255 Priority = 6, Length = 9 Number Of Fields = 7 Field 1: SID = 73 Field 2: DC Instance = 2 Field 3: DC Type = 0 (Battery) Field 4: State of Charge = 100 Percent Field 5: State of Health = Not Available Field 6: Time Remaining = 14400 Minutes Field 7: Ripple Voltage = Not Available
< 	N Data		II Network V	/iew 🖌 Hardware Config /	•	I I I I Details / Properties / Log /
COM 15	115200	Open	Transfer	Receive All		

4. And change the value:

	EA Reader -	[COM15	5: Actisen	se NGT]
NR File	e Edit V	iew Wi	indow H	Help
0	③ 📙	СО	M15: Actis	sense NGT
	PC Receive	Load (0%	6)	
Line	PGN	SRC	DST	Name NMEA 2000 PGN: 127506 (0x1F212) Name: DC Detailed Status
1	60928	35	255	ISO Address Claim Source = 35, Destination = 255
2	127508	35	255	Battery Status Priority = 6, Length = 9
3	127501		255	Binary Switch Bank Status Number Of Fields = 7
4	61184	35	255	Manu. Proprietary single-frame addressed Field 1: SID = 121
5	127506	35	255	DC Detailed Statue
6	126996	35	255	Produce Hind A: DC Type = 0 (Battery)
7	127508	35	255	Batter Modify Data Instance in PGN: 127506 Add: 35 Field No. Instance 2 2 Modify Cancel
	▶ \Data		III Network \	/iew / Hardware Config / II II Details / Properties / Log /
	115200	Open		r Receive All

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.

Setu	p Analyze	Update Co	nfigure Web Help												
-	Software Upo	date Directory	<u> </u>	1		Unique I	Instance	Column							
	Configure Ge Units	erenten Sonorten	es on Startup	10	Mfg Model Version		Unique Instance	Label	Current Software	Available Software	Installation Description #1	Device Instance	NMEA 2000 Version	NMEA 2000 Certification Level	1
100	Listen Only	itinale opua	its on startup		44-162-1-02.	11002103			4.000,4.001	100	Sea water temp	6	1.300	188	
	Recover Devi				Rev D	327681	64		1.11	1.0	AC Panel Load Sh	64	1.200	8	2
	Show Tips or			E	Rev F	131120	32		1.5		DC breakers 16x30		1.200	8	5
1	Save Device I	to a construction	tfiles				1		V01.0.1			1	1.200	A	7
-	Columns			5	Expand			1	2.40			3	1.210	8	3
-	08	CONTRACTO		1	Node Addres				1.0.0 \$03653	132		5	0.001	8	1
	29	Maretron	VDR1	1000	Manufacture			ondary Data Recor	2.0.0.4	3.0.3.1	Connected Aft Bus	1	2.000	A	4
	CA	Maretron	DSM	-	Mfg Model I			k Display	1.4.17.5	1.6.6.3		1	2.000	A	13
	BF	Maretron	ACM	1000	Mfg Model \			Bus	1.0.8.2	1.0.9.2	Main A/C Bus A	0	1.301	A	1
	A0	Maretron	12K10	-	Mfg Serial N			Maker	1.0.13.2	1.2.1.1		0	1.301	A	3
	90	Maretron	SSC2		Course	2000		nary Heading Sens	5.0.3	5.0.4.1	Midship	0	1.210	A	3
	30	Maretron	GP	-	Unique Insta	nce		0	1.6.130	2.3.0.1	Backup 1	2	1.210	A	3
	7C	Maretron	TLM	-	Laber		_	thoard Water	1,1.6	1.1.8.3		0	1.301	в	2
	74	Maretron	TLM	1	Current Soft	ware		oline Tank	1,1.6	1.1.8.3	Tender Gasoline T	0	1.301	В	2
	86	Maretron	wso	4	Available Sof	tware		d Sensor	2.0.13	2.0.13		0	1.210	A	3
	72	Maretron	DST1	4	Installation E	escription #	1		1.003,1.022	•	Port Sounder	0	1.300	в	4
	71	Maretron	ALM	-	Installation D	escription #	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	ion		Tank	1,1,6	1.1.8.3		0	1.301	в	2
	đΑ	Maretron	USB1	4	Device Instan	ice			1.8,561	1.8.6.2	Connected to Hel	1	1.210	Α.	3
	cc	Maretron	TMP	-	System Insta	nce		in Temperatures	1.1.1	1.1.2.7	Ship's Inside Tem	0	1.210	A	1
	Hardware	Channel	Source	~	NMEA 2000	/ersion									
- ()		Inside Temperature	¥.	NMEA 2000	Certification	Level								
			Inside Temperature		Mfg Product	Code									
	1		Inside Temperature	4	LEN										
	6		Inside Temperature	_	3	Electronic	cs Room	_							
	ł.		Inside Temperature		4	Mess									
	E		User Defined #140	-	8	Unused									
	CE	Maretron	TMP	100	1.0	1489901		Engine Room	13.1	1.1.2.7	Engine room Rear	0	1,210	A	1
	14	Maretron	ALM	100	1.0	1460041	0	Deck Alarm	1.0.6	1.0.6	Located Above Po	0	1.301	A	2
	na	Manetron	CIMI	00	1.0	14209072	3	Smake Detectors	111	1777		n	1 210	۵	3

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

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.

Last							
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	tup (An	alyze Update Configure Web	Help											
	8	Treceived PGNs												_
and	Ne	Transmitted PGNs	Mfg	Mfg Model	Mfg Serial		Label	Current Software	Available Software	Installation	Device	NMEA 2000	NMEA 2000	
		Device Properties	Model ID	Version	Number	instance				Description #1	Instance	Version	Certification Level	
	C	Instancing									-	101000		-
	23	DSM250 Viewing	HT200	44-162-1-02,		2		4.000,4.001	•	Sea water temp	2	1.300	8	1
	2F	EEPROM Contents	AC08	Rev D	327681	64		1.11	•	AC Panel Load Sh		1.200	B	2
	10	Carling Technologies	DC16	Rev F	131120	32		1.5		DC breakers 16x30	32	1.200	B	1
	11	Floscan Instrument Co., I	-			1		V01.0.1	•		1	1.200	A	1
	BA	Garmin	GPS17x		and the second second	3		2.40	•		3	1.210	8	3
	08	Lowrance Electronics	EP-DDS	1.0.0	316	5		1.0.0 \$03653	-		5	0.001	8	1
	29	Maretron	VDR100	1.0	1760015	1	Secondary Data Recor	2.0.0.4	3.0.3.1	Connected Aft Bus	1	2.000	A	4
	CA	Maretron	DSM250	1.0	1300176	1	Deck Display	1.4.17.5	1.6.6.3		1	2.000	A	13
	BF	Maretron	ACM100	1.0	1389904	0	A/C Bus	1.0.8.2	1.0.9.2	Main A/C Bus A	0	1.301	A	1
	A0	Maretron	J2K100	1.0		0	ICE Maker	1.0.13.2	1.2.1.1		0	1.301	A	3
	9C	Maretron	SSC200	2.0		0	Primary Heading Sens	5.0.3	5.0.4.1	Midship	0	1.210	A	3
	30	Maretron	GPS100	1.1	1140232	2		1.6.130	2.3.0.1	Backup 1	2	1.210	A	3
	7C	Maretron	TLM100	1.0		0	Starboard Water	1.1.6	1.1.8,3		0	1.301	8	2
	74	Maretron	TLM150	1.0		0	Gasoline Tank	1,1,6	1.1.8.3	Tender Gasoline T	0	1.301	8	2
	86	Maretron	WSO100	2.0	1201734		Wind Sensor	2.0.13	2.0.13		0	1.210	A	3
	72	Maretron	DST110	D235-S1-TS		0		1.003, 1.022	-	Port Sounder	0	1.300	В	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	GPS200	2.0	15266	0	Primary	3.5	3.7.1.1	Primary GPS Ante	0	1.301	A	3
	CF	Maretron	DCM100	1.0	1400040	1	N2Kpower	3.0.4	1.0.5.2	System Power	2	1,210	A	1
	73	Maretron	TLM200	1.0	1540111	2	Day Tank	1,1,5	1.1.8.3		0	1.301	8	2
	0A	Maretron	US8100	1.0	1160258	1		1.8.5b1	1.8.6.2	Connected to Hel	1	1.210	A	3
	cc	Maretron	TMP100	1.0	1480009		Cabin Temperatures	1.1.1	1.1.2.7	Ship's Inside Tem	0	1.210	A	1
	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
	A3	Maretron	J2K100	1.0	1241755	0	Main Ships HVAC	1.0.13.2	1.2.1.1	Dometic Converter	0	1.301	A	3
	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	USB100	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	DSM250	3.0	1329901	4	Crew Ouarters	1.4.16.5	1.6.6.3		4	2.000	A	13
	DI	Maretron	RIM100	1.0	1459902	1	Fire Suppression Syst	1,1,3	1.2.2.2		19	1.301	A	1
	C3	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
	6A	Maretron	FFM100	1.0	1679904		Main Engine	1.1.2.1	1.2.2.1	Main Engine Fuel	0	1.301	A	2
-	40	Manetron	008100	20	170072	n	Linhting Control	1114	1123		0	2.000	۵	5

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.

<pre># dbus -y com.victronenergy.vecan.can0 / GetValue value = {</pre>
•
'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.

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Settings/Vecan/can0/Forward/battery/256/BatteryInstance0	Θ	<-
Data instance for main voltage measurement		
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		
<pre>Settings/Vecan/can0/Forward/solarcharger/0/IdentityNumber</pre>	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		
<pre>Settings/Vecan/can0/Forward/solarcharger/1/DcDataInstance1</pre>	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). di1 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
/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
```

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Device instance changed successful!

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Last update: 2020-06-28 21:36

