EmpirBus Application Specific PGN

NMEA2000 Proprietary PGN 65280 – Single Frame, Destination Address Global

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PGN / CAN Frame Details

CAN ID

Complete 29Bit Identifier = 0x1CFF00XX, where XX is SA of 3rd party device.

Priority	EDP	DP	PF	PS (Group Extention)	Source Adress
0x07	**0**	**0**	**0xFE**	**0x04**	**[0-252]**

Frame Data Contents

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
EmpirBus 0x30	EmpirBus 0x99	Instance 0-49	USERDATA	USERDATA	USERDATA	USERDATA	USERDATA

Byte 0 & 1 - Required by NMEA2000 Protocol to contain IdentifierTag defined by Manufacturer Code.

Byte 2 - Unique Instance Field to distinguish / route the data.

The contents of Byte 3-Byte7 - 5 databytes contains Application Specific Data (ASD) and the definition is application specific.

Reception Restrictions

Decoding of a received message is handled "asap" by the scheduler. The programmer of the 3rd party product sending PGN must ensure/be aware of the following condition:

- **If the actual application implemented requires that each PGN 65280 transmission - with a specific instance X - are processed one-by-one, an interspacing time of 50ms between the transmissions are required.**
  Note: The above only applies to consecutive transmissions **of the same instance** of the PGN. Hence, transmitting multiple PGN65280 with **different** instances are not affected. Regardless if the transmitters sends the same instance multiple times quicker or slower than 100ms, **the end result** is always the **last received command.**

Property: Transmission Control

When NXT is set to transmit an Instance, transmission can be selected to be triggered by logic (Transmission Pin), or to automatically transmit when there is a change in Data. Transmission is hence always "event based".

Default Setting: Transmit On Change.

Note: Due to NMEA2000 restrictions, transmissions are limited to maximum 50 transmissions/second on average.

Property: Data Model

5 Data Models can be used for the ASD. Dataplacement follows NMEA2000 standard data placement. See Appendix A for details.

Default Setting: Data Model 1

PROPERTY: Output Function

Most commonly, BIT control signals are used to Set/Reset or Toggle a state in the logix. To simplify the schematic design, the BIT control outputs when in receive instance mode, will go “high” only at the moment when a “1” is received and then go “low” in the next lap. This can be changed by selecting “steady outputs” in this property instead. With that setting, the bits will keep the last received command value for the bit until next received command.

Default Setting: Pulse Outputs

ISO REQUEST

An ISO request may be done to PGN 65280 on poweron for “easy sync”. The ISO request will result in the NXT transmitting all configured instances of PGN 65280, allowing a 3rd party product to “sync in” when it is powered up.
PGN 059904

ISO REQUEST: CAN ID
Complete 29Bit Identifier = 0x1CEAFFXX, where XX is SA of 3rd party device.

Priority	EDP	DP	PF	PS (DA)	Source Adress
0x07	**0**	**0**	**0xEA**	**255 (Global)**	**[0-252]**

Frame Data Contents

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
0x00	0xFF	0x00	0xFF	0xFF	0xFF	0xFF	0xFF

SYSTEM STARTUP SYNC

When NXT system is powered on, the Master Unit will transmit all instances once, to make sure all 3rd party products that are already on sees the startup state and can synchronize their data registers.

Appendix A – Data Models

Data Model 1

Field	DataType / Size	Can Frame Data Placement	Data Range
User Data Byte 1	Unsigned Byte	Byte 3	0-255
User Data Byte 2	Unsigned Byte	Byte 4	0-255
User Data Byte 3	Unsigned Byte	Byte 5	0-255
User Data Byte 4	Unsigned Byte	Byte 6	0-255
User Data Bit 5:1	Bit	Bit 0, Byte 7	0-1
User Data Bit 5:2	Bit	Bit 1, Byte 7	0-1
User Data Bit 5:3	Bit	Bit 2, Byte 7	0-1
User Data Bit 5:4	Bit	Bit 3, Byte 7	0-1
User Data Bit 5:5	Bit	Bit 4, Byte 7	0-1
User Data Bit 5:6	Bit	Bit 5, Byte 7	0-1
User Data Bit 5:7	Bit	Bit 6, Byte 7	0-1
User Data Bit 5:8	Bit	Bit 7, Byte 7	0-1

Data Model 2

Field	DataType / Size	Can Frame Data Placement	Data range
User Data Word 1	Unsigned Word	Byte 3 & 4. Word LSB is Byte 3, Word MSB is Byte 4.	0-65535
User Data Word 2	Unsigned Word	Byte 5 & 6. Word LSB is Byte 5, Word MSB is Byte 6.	0-65535
User Data Bit 5:1	Bit	Bit 0, Byte 7	0-1
User Data Bit 5:2	Bit	Bit 1, Byte 7	0-1
User Data Bit 5:3	Bit	Bit 2, Byte 7	0-1
User Data Bit 5:4	Bit	Bit 3, Byte 7	0-1
User Data Bit 5:5	Bit	Bit 4, Byte 7	0-1
User Data Bit 5:6	Bit	Bit 5, Byte 7	0-1
User Data Bit 5:7	Bit	Bit 6, Byte 7	0-1
User Data Bit 5:8	Bit	Bit 7, Byte 7	0-1

Data Model 3

Field	DataType / Size	Can Frame Data Placement	Data Range
User Data SByte 1	Signed Byte	Byte 3	-128 - +127
User Data SByte 2	Signed Byte	Byte 4	-128 - +127
User Data SByte 3	Signed Byte	Byte 5	-128 - +127

User Data SByte 4	Signed Byte	Byte 6	-128 - +127
User Data Bit 5:1	Bit	Bit 0, Byte 7	0-1
User Data Bit 5:2	Bit	Bit 1, Byte 7	0-1
User Data Bit 5:3	Bit	Bit 2, Byte 7	0-1
User Data Bit 5:4	Bit	Bit 3, Byte 7	0-1
User Data Bit 5:5	Bit	Bit 4, Byte 7	0-1
User Data Bit 5:6	Bit	Bit 5, Byte 7	0-1
User Data Bit 5:7	Bit	Bit 6, Byte 7	0-1
User Data Bit 5:8	Bit	Bit 7, Byte 7	0-1

Data Model 4

Field	DataType / Size	Can Frame Data Placement	Data range
User Data SWord 1	Signed Word	Byte 3 & 4. Word LSB is Byte 3, Word MSB is Byte 4.	-32768 - +32767
User Data SWord 2	Signed Word	Byte 5 & 6. Word LSB is Byte 5, Word MSB is Byte 6.	-32768 - +32767
User Data Bit 5:1	Bit	Bit 0, Byte 7	0-1
User Data Bit 5:2	Bit	Bit 1, Byte 7	0-1
User Data Bit 5:3	Bit	Bit 2, Byte 7	0-1
User Data Bit 5:4	Bit	Bit 3, Byte 7	0-1
User Data Bit 5:5	Bit	Bit 4, Byte 7	0-1
User Data Bit 5:6	Bit	Bit 5, Byte 7	0-1
User Data Bit 5:7	Bit	Bit 6, Byte 7	0-1
User Data Bit 5:8	Bit	Bit 7, Byte 7	0-1

Data Model 5

Field	DataType / Size	Can Frame Data Placement	Data range
Channel Status #1	4 Bits	Byte 3 [3:0]	Bitfield Bit 0 = On Bit 1 = Fuse Trip Bit 2 = Undercurrent
Channel Status #2	4 Bits	Byte 3 [7:4]	Bitfield Bit 0 = On Bit 1 = Fuse Trip Bit 2 = Undercurrent

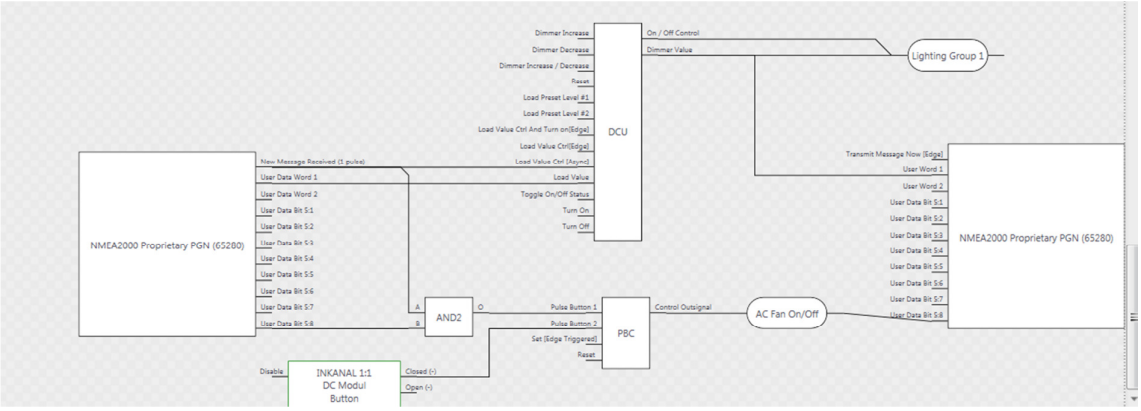
Channel Status #3	**4 Bits**	**Byte 4 [3:0]**	**Bitfield** **Bit 0 = On** **Bit 1 = Fuse Trip** **Bit 2 = Undercurrent**
Channel Status #4	**4 Bits**	**Byte 4 [7:4]**	**Bitfield** **Bit 0 = On** **Bit 1 = Fuse Trip** **Bit 2 = Undercurrent**
Channel Status #5	**4 Bits**	**Byte 5 [3:0]**	**Bitfield** **Bit 0 = On** **Bit 1 = Fuse Trip** **Bit 2 = Undercurrent**
Channel Status #6	**4 Bits**	**Byte 5 [7:4]**	**Bitfield** **Bit 0 = On** **Bit 1 = Fuse Trip** **Bit 2 = Undercurrent**
Channel Status #7	**4 Bits**	**Byte 6 [3:0]**	**Bitfield** **Bit 0 = On** **Bit 1 = Fuse Trip** **Bit 2 = Undercurrent**
Channel Status #8	**4 Bits**	**Byte 6 [7:4]**	**Bitfield** **Bit 0 = On** **Bit 1 = Fuse Trip** **Bit 2 = Undercurrent**
Channel Status #9	**4 Bits**	**Byte 7 [3:0]**	**Bitfield** **Bit 0 = On** **Bit 1 = Fuse Trip** **Bit 2 = Undercurrent**
Channel Status #10	**4 Bits**	**Byte 7 [7:4]**	**Bitfield** **Bit 0 = On** **Bit 1 = Fuse Trip** **Bit 2 = Undercurrent**

Appendix B - Example Applications

Example Application #1 – Simple Example.

Example Using Data model 2.

- **Screen transmits Dimmer Value on Instance 0, Word 1, to command illumination**
- **NXT System transmits actual dimmer value in system (feedback), on Instance 1.**
- **Screen uses same instance, instance 0, Bit 5:8 to toggle AC Fan On/Off.**
- **NXT System transmits actual AC Fan On/Off status on instance 1, User Data Bit 5:8**



In this case, the AC Fan can be commanded On/Off by screen as well as from the traditional button. The screen can see the status change on the feedback message.