



Date: July 15, 2011

Ref: February 2011 Standards Committee Meeting: Parameter Group Request Changes

National Marine Electronics Association Technical Corrigendum Number 2-2011

1. This corrigendum addresses issues with large NMEA 2000® installations reported at the February 2010 Standards Committee meeting, which were determined to be primarily caused by unrestrained requests for information obtained from the Address Claim (PGN 060928) and Product information (PGN 126996) parameter groups.
2. This corrigendum implements requirements that place limitations on the method and frequency that selected NMEA 2000 parameter groups, including the problem parameter groups identified above and others with similar function and size, may be requested by any specific ECU.

Documents Affected

- NMEA 2000 Main Document Version 1.2, Sections 1.4 and 8.3.
- Appendix B Version 1.300 through 1.301 (selected parameter groups as identified).
- Appendix D Version 1.2, Section D.5.13

Changes to NMEA 2000 Main Document

Replace selected pages from the document as instructed in the NMEA 2000 Main Document Change Page package which accompanies this document.

Changes to NMEA 2000 Appendix B

Replace the following parameter group definitions with those accompanying this document:

PGN	Parameter Group Name
060928	ISO Address Claim
126464	PGN List
126996	Product Information
126998	Configuration Information

Changes to NMEA 2000 Appendix D

Replace selected pages from the document as instructed in the NMEA 2000 Appendix D Change Page package which accompanies this document.

NATIONAL MARINE ELECTRONICS ASSOCIATION

NMEA 2000 ®

STANDARD FOR SERIAL-DATA NETWORKING OF
MARINE ELECTRONIC DEVICES

Main Document

Change Pages to Version 1.200
October 2004

Corrigendum Published
July 2011

The following pages implement Corrigendum 2-2011 to the NMEA 2000 standard for Serial Data Networking of Marine Electronic Devices. The original corrigendum is available at <http://standards.nmea.org/corrigenda/nmea-2000/>. The applicable changes to the Main Document are indicated by a vertical bar in the right hand margin. The remaining material incorporates changes to maintain sequential section and page numbering that do not materially affect the standard.

Instructions:

- 1) Remove or strike-out pages 10 through 12 and replace them with the accompanying pages 10 through 12.
- 2) Remove or strike-out pages 54 through 55 and replace them with the accompanying pages 54 through 55a.
- 3) Insert this page behind the cover and before the Table of contents as a record of this change.

This Page Intentionally Blank

1.4 Definitions

Common terms are defined in Appendix A, Data Dictionary, of this standard. Certain terms unique to this standard are defined below.

- 1.4.1 *bit*. The smallest element of information on the communication channel. Bits are grouped into bit fields of one or more bits. A bit is of constant time duration set by the signaling rate specified in this standard and has one of two logical values, dominant or recessive. When dominant and recessive levels are impressed on the communications channel at the same time the resulting level is dominant.
- 1.4.2 *bridge*. A device that joins two network segments using the same network protocol and address space. Data rate and physical media may differ on the two sides of a *bridge*. A *bridge* may perform message filtering.
- 1.4.3 *byte*. Is made up of eight bits.
- 1.4.4 *CAN frame*. A series of bits transmitted on the communications channel conveying the following types of information:
- data frame. Carries data from a transmitter to the receivers.
 - error frame. Transmitted by a unit detecting a bus error.
 - overload frame. Transmitted to provide a delay between preceding and succeeding data frames.
- The *CAN data frame* has defined start of frame and end of frame bit fields and are separated from preceding fields by an *interframe space*. *CAN error* and *overload frames*, when used, are appended directly to the preceding frame without an *interframe space*.
- 1.4.5 *default operation*. The operation or settings that exist when standard equipment is first shipped from the manufacturer.
- 1.4.6 *device*. Is a Product or Equipment, which through a node is connected to a NMEA 2000 network. Can be logical devices where multiple addresses can be contained within a single node.
- 1.4.7 *gateway*. A device that joins a network to another network or system.
- 1.4.8 *heartbeat*. A message that can be transmitted to identify that the node is present and functioning. Heartbeat messages are typically sent on a periodic basis from the originator's start-up until the originator's shutdown.
- 1.4.9 *interframe space*. A bit field that separates data frames from preceding frames.
- 1.4.10 *keepalive*. A variant of a *heartbeat* where any message, including routine data messages, sent by one node can be transmitted to verify that the originating node is communicating on the backbone.
- 1.4.10 *may*. The NMEA 2000 standard observes the following convention for the use of word *may* relating to network requirements: Alternatives and optional items that are allowed

- in an NMEA 2000 network. An implementation that does not include an alternative shall be prepared to tolerate another implementation that does.
- 1.4.11 *message*. A *message* consists of one or more *data frames*, as specified in this standard, that contain the Parameter Group information to be communicated from a *network address*. A message contains the message priority code, *Parameter Group number*, destination *network address*, source *network address*, and data fields. The destination *network address* may be a specific address or global.
- 1.4.12 *network address*. The location of a functional entity on the network.
- 1.4.13 *network load*. A unit of measure defined as 50mA. Is used to determine loading of network. See 2.4.7.6
- 1.4.14 *node*. The attachment of the physical layer implementation of a transmitter/receiver to the signaling channel. A *node* may represent more than one *network address*.
- 1.4.15 *node power*. Is the power supplied from the NMEA2000 Network
- 1.4.16 *Parameter Group*. A set of associated variables, commands, status, or other information to be transmitted on the network. Certain *Parameter Groups*, such as network management messages (e.g., Address Claim message), are defined in the Data Link Layer, Section 3.0, or Network Management, Section 8.0, of this standard. Application related *Parameter Groups* (e.g., GPS data) are defined in the Application Layer section. See Appendix A.
- 1.4.17 *parameter group number*. An 8-bit or 16-bit number that identifies each parameter group. The *Parameter Group Number* (PGN) is analogous to the three-character sentence formatter in the NMEA 0183 standard. By definition *Parameter Groups* identified by 16-bit *Parameter Group Numbers* are broadcast to all addresses on the network. *Parameter Groups* identified by 8-bit *Parameter Group numbers* may be used to direct data for use by a specific address. See Section 3.0 Data Link Layer.
- 1.4.18 *receiver*. A receiver is the recipient of a message if the bus is not idle and the device is not a transmitter.
- 1.4.19 *router*. A device that joins two network segments with the same network protocol. On each side of a router address space, data rate and physical media may differ.
- 1.4.20 *shall*. The NMEA 2000 standard observes the following convention for the use of word *shall* when relating to network requirements: Items that are required in an NMEA 2000 network.
- 1.4.21 *shall not*. The NMEA 2000 standard observes the following convention for the use of word *shall not* when relating to network requirements: Items that are prohibited in an NMEA 2000 network.
- 1.4.22 *should*. The NMEA 2000 standard observes the following convention for the use of word *should* when relating to network requirements: A recommendation that if followed could ease development or improve the operation of the network in some manner.
- 1.4.23 *transmitter*. A transmitter is the originator of a message. The unit remains a transmitter until it loses arbitration or until the bus becomes idle.

- 1.4.24 *Listen Only Device.* Is a device on the network that receives messages and will not respond or make requests to the network.

1.5 Normative References

- 1.5.1 ISO-11898 - Road Vehicles - Interchange of Digital Information - Controller Area Network (CAN) for High-speed Communications, First Edition November 1993, Amendment 1 April 1994. International Organization for Standardization, Case Postale 56, CH-1211 Genève 20, Switzerland. (Available from ANSI, 11 West 42nd Street, New York, NY 10036.)
- 1.5.2 Interface Control Document, Navstar GPS Space Segment/Navigation User Interface, Rockwell International Corporation Document No. ICD GPS 200 Revision B (November 30, 1987).
- 1.5.3 Special Publication No. 60, User's Handbook On Datum Transformations Involving WGS84, First Edition, June 1994. International Hydrographic Bureau, 7 avenue President J.F. Kennedy, B.P. 445, MC 98011 Monaco Cedex.
- 1.5.4 Institute of Electrical and Electronic Engineers (IEEE): 754-1985 IEEE Standard for Binary Floating-Point Arithmetic, IEEE Standards, 445 Hoes Lane, PO Box 1331, Piscataway, NJ 08855-1331 USA.
- 1.5.5 ISO/IEC 10646-1 (1993-05), The Unicode Standard, Version 2.0, ISBN 0-201-48345-9, Author: The Unicode Consortium, Publisher: Addison-Wesley. This is equivalent to the standard as to Unicode values and tables.
- 1.5.6 IEC 60945, Marine Navigational Equipment, General Requirements, Third Edition, November 1996. International Electrotechnical Commission, 3, rue de Varembe, PO Box 131, 1211 Genève 20, Switzerland.
- 1.5.7 ISO 11783-3. Part 3 Data Link Layer - Tractors and Machinery for Agricultural and Forestry – Serial Control and Communications Data Network, International Organization for Standardization, Case Postale 56, CH-1211 Genève 20, Switzerland. (Available from ANSI, 11 West 42nd Street, New York, NY 10036.)
- 1.5.8 ISO 11783-5, Part 5 Network Management - Tractors and Machinery for Agricultural and Forestry – Serial Control and Communications Data Network, International Organization for Standardization, Case Postale 56, CH-1211 Genève 20, Switzerland. (Available from ANSI, 11 West 42nd Street, New York, NY 10036.)

This Page Intentionally Blank

8.3.1 Field Programmability of the Instance Fields

NMEA 2000 devices, capable of transmitting on the network, shall support field programmability of all the instance fields used in the NAME entity. This standard does not specify the means for implementing field programmability of the NAME Instance field(s). NMEA 2000 networks are expected to support many instances of duplicate and or similar devices on the same network. This may include devices such as compasses, engine controllers, navigation receivers, smoke detectors, displays, and more.

The Unique Number is a 21-bit field in the NAME assigned by the device manufacturer. The Unique Number is necessary in circumstances where it is possible that the NAME would not otherwise be unique (i.e. could be identical). This field should be unique and non-varying with removal of power. This field is necessary to resolve any address contention. It is the manufacturer's responsibility to provide this uniqueness among its products through the use of a unique identity number, serial number, or data/ time code. Manufacturers of NMEA 2000 devices shall ensure the uniqueness of this number across multiple products of the same function by the same manufacturer.

NMEA 2000 requires that when changes are made to the contents of any field or fields within the NAME entity of a NMEA 2000 device, that this device, shall, through manual or automatic means, reclaim it's address with the new NAME. NMEA 2000 devices shall maintain their modified NAME fields in non-volatile memory. The primary reason for this is so they use the modified NAME upon subsequent power ups of the device in the future.

8.3.2 Address to NAME Association Tables

To ensure consistent and reliable data, the source address must be validated against the source device's NAME to determine the scope and purpose of the received parameter group. If only the parameter group number is used to validate data, misinterpretations will occur when multiple nodes are transmitting the same parameter group.

The ISO Address Claim parameter group (NMEA 2000 PGN 060928) provides the necessary information to associate a Source Address with the node's NAME. However, periodic or frequent random requests for the ISO Address Claim parameter group results in excessive traffic. Therefore, such behavior is prohibited in NMEA 2000.

In practice, a table may be used to store associations between specific functions and specific addresses. A node starts to build this table during the address claim process. The table may be completed after successfully claiming an address by a single global request for the ISO Address Claim parameter group. The node keeps the table updated by monitoring ISO Address Claim parameter group activity. This maintained table provides the means to associate a parameter group with a specific node even though the node's address may change at any time. By using the information in this table, the node will correctly interpret the scope of a received parameter group – even when the parameter group is provided by multiple nodes.

8.3.2.1 A global request for ISO Address Claim parameter group (NMEA 2000 PGN 060928) shall only be made by a node when either of the following is true:

- Before the node starts the address claim process after power on using the null address (254) as the source address in accordance with ISO 11783-5, “Request-for-address-claimed-message”, or
- The node successfully claims an initial address on the bus, and a global request for ISO Address Claim parameter group (NMEA 2000 PGN 060928) has **not** been received since the node started the address claim process.

8.3.2.2 All other requests for the ISO Address Claim parameter group (NMEA 2000 PGN 060928) shall use a specific destination address to solicit a response from the associated node.

For example, if a node detects a transmission from a source address that does not have a corresponding entry in the address to NAME table, the node may send an ISO Request (NMEA 2000 PGN 059904) for ISO Address Claim parameter group (NMEA 2000 PGN 060928) to that specific destination address to obtain the node’s NAME and enter the NAME in the address to NAME table.

8.3.3 Product Information

The Product Information parameter group (PGN 126996) includes:

- NMEA 2000 Database Version
- NMEA Manufacturer’s Product Code
- Manufacturer’s Model ID
- Manufacturer’s Software Version
- Manufacturer’s Model Version
- Manufacturer’s Serial Number
- Certification Level
- Load Equivalency

8.3.3.1 All NMEA 2000 devices (except the Listen Only Device) shall support the Product Information message containing at a minimum the “NMEA 2000 Version Supported”, “Manufacturer’s Product Code”, “NMEA 2000 Certification Level”. and “Load Equivalency Number”.

8.3.4 Configuration Information

The Configuration Information parameter group (PGN 126998) includes:

- Free-form field describing the installation location of the device.
- Free-form field providing field notes.

8.4 Transmitted/Received PGN List Group Function

A feature of NMEA 2000 network management is the ability of a device to compile a list of both transmitted and received Parameter Groups that are supported by other devices. The Transmitted/Received PGN List Group Function (PGN 126464) is a Group Function parameter group that utilizes the first data field of the message to indicate the function of the message. Two functions are provided:

- a) Transmit PGN List providing a list of all parameter groups transmitted by a device,
- b) Received PGN List providing a list of all parameter groups received by a device.

8.4.1 Transmitted PGN List

The Transmitted PGN List PGN includes:

- Group Function code set to 0x0 indicating this message is a Transmitted PGN List message.
- Multiple field list of all PGNs that this device is capable of transmitting.

8.4.1.1 All NMEA 2000 devices (Certified to Level A) shall support the Transmitted PGN List message containing all transmitted messages supported by the device, including Data Link and Network Management messages.

8.4.1.2 The Transmitted PGN List message shall be implemented as described in Appendix B.4 – PGN Report

8.4.2 Received PGN List

The Received PGN List parameter group includes:

- Group Function code set to 0x1 indicating this message is a Received PGN List message.
- Multiple field list of all PGNs that this device is capable of receiving.

This Page Intentionally Blank

This network management message is used to claim a network address and to respond with device information (NAME) requested by the ISO Request (PGN 059904) or Complex Request Group Function (PGN 126208). This parameter group is always transmitted with a destination address global.

This PGN contains several fields that are Request Parameters. These Request Parameters can be used independently or in any combination.

A node receiving an ISO Request (PGN 059904) for this PGN shall respond by providing this PGN.

If a Complex Request Group Function (PGN 126208) requesting this PGN is received, the receiving node shall respond in the following manner:

- If no Request Parameter fields have been specified with the Complex Request, then the response is to return this PGN, just like responding to the ISO Request (PGN 59904) described above.
- If the Complex Request (PGN 126208) specifies one or more Request Parameter fields, then the response shall be filtered by the one or more fields and field values contained within the request. For example, if the Complex Request for this PGN contained a value for field 2, the Manufacturer's Code, then the device would respond with this PGN, if and only if the device's Manufacturer Code matched the value requested. If the device's Manufacturer code did not match the value requested, then the response would depend on whether the request was global or addressed. A global request containing one or more requested field values that do not match requires no response, while an addressed request containing requested field values, in which one or more do not match, requires a response with the Acknowledge Group PGN (126208), containing the appropriate error codes for each of the requested fields, such as "0x3 = Request or command parameter out-of-range", for the fields that did not match.

ISO Requests for Address Claim parameter group are restricted in address mode and request frequency by the Main NMEA 2000 document, section 8.3.2, "Address to NAME Association Tables".

The ISO Address Claim parameter group is not to be used as a heartbeat message.

Single Frame: **Yes** Priority Default: **6** Default Update Rate: **NA** milliseconds Frequency: **NA** cycles per second
 Destination: **Address** Query Support: **Req'd** Command Support: **Refer to Section 6.4 of ISO 11783-5** ACK Rqmnts: **Refer to Section 6.4 of ISO 11783-5**

Field # Field Name Original Reference ID # 63

Field #	Field Name	Byte Field Size:	Bit Field Size:	Request Parameter	Command Parameter:
1	Unique Number (ISO Identity Number)		21	No	
	DD173 NMEA 2000 Unique Number				
	DF52 Bit field	bit(n) Range: Variable		Resolution: 1	Used to construct bit fields
2	Manufacturer Code		11	Yes	
	DD172 NMEA 2000 Manufacturer Code				Assigned by NMEA 2000 Committee
	DF52 Bit field	bit(n) Range: Variable		Resolution: 1	Used to construct bit fields
3	Device Instance Lower (ISO ECU Instance)		3	Yes	
	DD201 Generic instance 2 (3-bit)				0x0 to 0x7 = instance 0 to 7
	DF52 Bit field	bit(n) Range: Variable		Resolution: 1	Used to construct bit fields

The combination of fields 3 & 4 make up the 8 bit NMEA 2000 Instance. Devices 0 - 252

4	Device Instance Upper (ISO Function Instance)	<i>Byte Field Size:</i> <i>Bit Field Size:</i> <input type="text" value="5"/>	<i>Request Parameter</i> Yes <i>Command Parameter:</i>
	DD174 Generic instance (5-bit)	0x00 to 0x1F = Instance 0 to 31;	
	DF52 Bit field	bit(n) Range: Variable Resolution: 1	Used to construct bit fields
<hr/>			
5	Device Function (ISO Function)	<i>Byte Field Size:</i> <i>Bit Field Size:</i> <input type="text" value="8"/>	<i>Request Parameter</i> Yes <i>Command Parameter:</i>
	DD171 NMEA 2000 Function Code	Dependent on NMEA 2000 Device Class DD170, reference NMEA 2000, Table 8-1	
	DF52 Bit field	bit(n) Range: Variable Resolution: 1	Used to construct bit fields
<hr/>			
6	Reserved	<i>Byte Field Size:</i> <i>Bit Field Size:</i> <input type="text" value="1"/>	<i>Request Parameter</i> No <i>Command Parameter:</i>
	DD175 Dominant Bit	Set = 0	
	DF52 Bit field	bit(n) Range: Variable Resolution: 1	Used to construct bit fields
<hr/>			
7	Device Class	<i>Byte Field Size:</i> <i>Bit Field Size:</i> <input type="text" value="7"/>	<i>Request Parameter</i> Yes <i>Command Parameter:</i>
	DD170 NMEA 2000 Device Class	Dependent on Industry Group DD 168, reference NMEA 2000, Table 8-1	
	DF52 Bit field	bit(n) Range: Variable Resolution: 1	Used to construct bit fields
<hr/>			
8	System Instance (ISO Device Class Instance)	<i>Byte Field Size:</i> <i>Bit Field Size:</i> <input type="text" value="4"/>	<i>Request Parameter</i> Yes <i>Command Parameter:</i>
	DD169 Generic instance (4-bit)	0x0 to 0xF = Instance number 0 to 15;	
	DF52 Bit field	bit(n) Range: Variable Resolution: 1	Used to construct bit fields
<hr/>			
9	Industry Group	<i>Byte Field Size:</i> <i>Bit Field Size:</i> <input type="text" value="3"/>	<i>Request Parameter</i> Yes <i>Command Parameter:</i>
	DD168 Industry Group	0 = Global; 1 = On-Highway; 2 = Agricultural and Forestry; 3 = Construction; 4 = Marine; 5 = Industrial - Process Control - Stationary (Gen-Sets) 6 = Reserve for SAE 7 = Reserve for SAE	
	DF52 Bit field	bit(n) Range: Variable Resolution: 1	Used to construct bit fields
	Marine Industry Group, set = 4		
<hr/>			
10	Reserved (ISO Self Configurable)	<i>Byte Field Size:</i> <i>Bit Field Size:</i> <input type="text" value="resv"/> <input type="text" value="1"/>	<i>Request Parameter</i> No <i>Command Parameter:</i>
	DD001 Reserved field	Variable number of reserved bits, all set to logic "1"	
	DF52 Bit field	bit(n) Range: Variable Resolution: 1	Used to construct bit fields

PGN List - Received PGNs group function

PGN: 126464

hex: 1EE00

See ID 6 for description.

Single Frame: No *Priority Default:* 6 *Default Update Rate:* NA milliseconds *Frequency:* NA cycles per second
Destination: Address *Query Support:* Req'd *Command Support:* *ACK Rqmnts:* Requested data or AcknowledgementGroup Function containing error codes of reasons for non-compliance.

Field #	Field Name		Original Reference ID #
1	Received PGN Group Function Code	<i>Byte Field Size:</i> 1 <i>Bit Field Size:</i>	<i>Request Parameter:</i> Yes <i>Command Parameter:</i>
	DD145 Group Function, Transmit and Receive PGN List	0 = Transmit PGN List Message, 1 = Receive PGN List Message	
	DF53 Integer, 8 bit unsigned	uint8 <i>Range:</i> 0 to 252 <i>Resolution:</i> 1 bit	Unit-less number
	This is the Receive Group List, set = 0x01		
2	First PGN supported	<i>Byte Field Size:</i> <i>Bit Field Size:</i> 24	<i>Request Parameter:</i> No <i>Command Parameter:</i>
	DD009 PGN	24-bit Parameter Group Number (PGN) expressed in binary, LSB is transmitted first	
	DF52 Bit field	bit(n) <i>Range:</i> Variable <i>Resolution:</i> 1	Used to construct bit fields
3	Variable Number of fields, Field number 2 repeated	<i>Byte Field Size:</i> <i>Bit Field Size:</i> 24	<i>Request Parameter:</i> No <i>Command Parameter:</i>
	DD009 PGN	24-bit Parameter Group Number (PGN) expressed in binary, LSB is transmitted first	
	DF52 Bit field	bit(n) <i>Range:</i> Variable <i>Resolution:</i> 1	Used to construct bit fields

Product Information

PGN: 126996

hex: 1F014

Provides product information onto the network that could be important for determining quality of data coming from this product. Each field must be provided if the data is typically available from such a product. At minimum the NMEA 2000 Version, NMEA Manufacturer's Product Code, and NMEA 2000 Certification Level must be provided.

All ISO Request (PGN 059904) requests for the Product Information parameter group shall be destination address specific (as opposed to global). Once a node issues an ISO Request for Product Information, the node shall not issue a subsequent ISO Request for Product Information until the full response has been received for the first request or the response has timed out in accordance with ISO 11783-3, "Controller response time and time out defaults".

All NMEA Request group function (PGN 126208) requests for the Product Information parameter group without specifying request parameters shall be destination address specific (as opposed to global). Once a node issues an NMEA Request for Product Information, the node shall not issue a subsequent NMEA Request for Product Information until the full response has been received for the first request or the response has timed out in accordance with ISO 11783-3, "Controller response time and time out defaults".

This parameter group contains static information and therefore should not be requested periodically, but may be requested as needed.

Single Frame: No Priority Default: 6 Default Update Rate: NA milliseconds Frequency: NA cycles per second

Destination: Global Query Support: Req'd Command Support: ACK Rqmnts:

Field # Field Name Original Reference ID # 4

1 NMEA 2000 Database Version Byte Field Size: 2 Request Parameter: No
Bit Field Size: Command Parameter:

DD007 Generic numeric ID, medium Number of route, waypoint, event, mark, etc.

DF54 Integer, 16 bit unsigned uint16 Range: 0 to 65,532 Resolution: 1 bit Unit-less number

Assigned by the NMEA 2000:

Decimal Number of the format AA.BBB where AA is the major release and BBB is a minor release. The decimal point position is assumed.

i.e. The first release of this standard is value 1000, which is to be referred to as Version 1.000

2 NMEA Manufacturer's Product Code Byte Field Size: 2 Request Parameter: Yes
Bit Field Size: Command Parameter:

DD007 Generic numeric ID, medium Number of route, waypoint, event, mark, etc.

DF54 Integer, 16 bit unsigned uint16 Range: 0 to 65,532 Resolution: 1 bit Unit-less number

Assigned by the NMEA 2000:

Decimal Number assigned numerically to a manufacturer's product.

If this field is not specified in the "Command Request" or an ISO Request is made of this PGN, the response will with the unit's product code. Otherwise if this field is specified only the units with a matching product code will respond with this PGN.

3 Manufacturer's Model ID Byte Field Size: char n Request Parameter: No
Bit Field Size: Command Parameter:

DD192 Generic String, ASCII, Fixed length Length specified by PGN field definition.

DF63 String, fixed char8(n) Range: 0 to 1,785 characters Resolution: 1 char 0 to 1,785 bytes. Character count not included, length is specified by application in Data Dictionary. Unused characters shall be treated as not available, and filled with [0xFF] = Data not available.

This is a n=32 character string, Format defined and documented by manufacturer. The beginning of the field should clearly define Manufacturer's Product.

4	Manufacturer's Software Version Code	<i>Byte Field Size:</i> <input type="text" value="char"/> <input type="text" value="n"/>	<i>Request Parameter</i> <input type="text" value="No"/>
		<i>Bit Field Size:</i>	<i>Command Parameter:</i>
	DD192 Generic String, ASCII, Fixed length	Length specified by PGN field definition.	
	DF63 String, fixed	char8(n) <i>Range:</i> 0 to 1,785 characters	<i>Resolution:</i> 1 char
		0 to 1,785 bytes. Character count not included, length is specified by application in Data Dictionary. Unused characters shall be treated as not available, and filled with [0xFF] = Data not available.	

This is a n=32 character string, Format defined and documented by manufacturer.

5	Manufacturer's Model Version	<i>Byte Field Size:</i> <input type="text" value="char"/> <input type="text" value="n"/>	<i>Request Parameter</i> <input type="text" value="No"/>
		<i>Bit Field Size:</i>	<i>Command Parameter:</i>
	DD192 Generic String, ASCII, Fixed length	Length specified by PGN field definition.	
	DF63 String, fixed	char8(n) <i>Range:</i> 0 to 1,785 characters	<i>Resolution:</i> 1 char
		0 to 1,785 bytes. Character count not included, length is specified by application in Data Dictionary. Unused characters shall be treated as not available, and filled with [0xFF] = Data not available.	

This is a n=32 character string, Format defined and documented by manufacturer.

6	Manufacturer's Model Serial Code	<i>Byte Field Size:</i> <input type="text" value="char"/> <input type="text" value="n"/>	<i>Request Parameter</i> <input type="text" value="No"/>
		<i>Bit Field Size:</i>	<i>Command Parameter:</i>
	DD192 Generic String, ASCII, Fixed length	Length specified by PGN field definition.	
	DF63 String, fixed	char8(n) <i>Range:</i> 0 to 1,785 characters	<i>Resolution:</i> 1 char
		0 to 1,785 bytes. Character count not included, length is specified by application in Data Dictionary. Unused characters shall be treated as not available, and filled with [0xFF] = Data not available.	

This is a n=32 character string, Format defined and documented by manufacturer.

7	NMEA 2000 Certification Level	<i>Byte Field Size:</i> <input type="text" value="1"/>	<i>Request Parameter</i> <input type="text" value="No"/>
		<i>Bit Field Size:</i>	<i>Command Parameter:</i>
	DD226 NMEA 2000 Certification Level	0 = Level A, 1 = Level B	
	DF53 Integer, 8 bit unsigned	uint8 <i>Range:</i> 0 to 252	<i>Resolution:</i> 1 bit
		Unit-less number	

8	Load Equivalency	<i>Byte Field Size:</i> <input type="text" value="1"/>	<i>Request Parameter</i> <input type="text" value="No"/>
		<i>Bit Field Size:</i>	<i>Command Parameter:</i>
	DD257 Load Equivalency Number	The "Load Equivalency Number" is defined in the NMEA 2000 Standard's Main Document in section 2.4.7 Interface Power. Please consult this for details.	
	DF53 Integer, 8 bit unsigned	uint8 <i>Range:</i> 0 to 252	<i>Resolution:</i> 1 bit
		Unit-less number	

Configuration Information

PGN: 126998

hex: 1F016

Free-form alphanumeric fields describing the installation (e.g., starboard engine room location) of the device and installation notes (e.g., calibration data).

All ISO Request (PGN 059904) requests for the Product Information parameter group shall be destination address specific (as opposed to global). Once a node issues an ISO Request for Product Information, the node shall not issue a subsequent ISO Request for Product Information until the full response has been received for the first request or the response has timed out in accordance with ISO 11783-3, "Controller response time and time out defaults".

All NMEA Request group function (PGN 126208) requests for the Product Information parameter group without specifying request parameters shall be destination address specific (as opposed to global). Once a node issues an NMEA Request for Product Information, the node shall not issue a subsequent NMEA Request for Product Information until the full response has been received for the first request or the response has timed out in accordance with ISO 11783-3, "Controller response time and time out defaults".

This parameter group contains static information and therefore should not be requested periodically, but may be requested as needed.

Single Frame: No Priority Default: 6 Default Update Rate: NA milliseconds Frequency: NA cycles per second
Destination: Global Query Support: Opt'l Command Support: ACK Rqmnts:

Field # Field Name Original Reference ID # 5

1 Installation Description, Field 1 Byte Field Size: 8 or 16 n Request Parameter No
Bit Field Size: Command Parameter:

DD004 Generic name string, short Name of place, route, waypoint, destination, vessel, vehicle, etc.

DF50 String, variable, short ch8or16(n) Range: 0 to 250 ASCII or 0 to 125 Unicode Characters Resolution: 1 ASCII or 1 Unicode Character 2 to 252 bytes. First byte in string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = 0 => Unicode characters Control byte = 1 => ASCII characters A string with no characters (total length of 2 bytes, i.e. Count = 2) is a null string.

70 ASCII or 35 Unicode characters maximum

Configuration Information

PGN: 126998

hex: 1F016

2 Installation Description, Field 2

Byte Field Size: 8 or 16 n

Request Parameter No

Bit Field Size:

Command Parameter:

DD004 Generic name string, short

Name of place, route, waypoint, destination, vessel, vehicle, etc.

DF50 String, variable, short

ch8or16(n) Range: 0 to 250 ASCII or
0 to 125 Unicode
Characters

Resolution: 1 ASCII or
1 Unicode
Character

2 to 252 bytes. First byte in string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = 0 => Unicode characters
Control byte = 1 => ASCII characters
A string with no characters (total length of 2 bytes, i.e. Count = 2) is a null string.

70 ASCII or 35 Unicode characters maximum

3 Manufacturer Information, Field 3

Byte Field Size: 8 or 16 n

Request Parameter No

Bit Field Size:

Command Parameter:

DD004 Generic name string, short

Name of place, route, waypoint, destination, vessel, vehicle, etc.

DF50 String, variable, short

ch8or16(n) Range: 0 to 250 ASCII or
0 to 125 Unicode
Characters

Resolution: 1 ASCII or
1 Unicode
Character

2 to 252 bytes. First byte in string (uint8) is the Count byte indicating the number of bytes in the string, including the Count and Control bytes. Second byte in string is the Control byte. The Control byte indicates if the string consists of ASCII characters (Char8) or Unicode characters (Char16). Control byte = 0 => Unicode characters
Control byte = 1 => ASCII characters
A string with no characters (total length of 2 bytes, i.e. Count = 2) is a null string.

70 ASCII or 35 Unicode characters maximum

NATIONAL MARINE ELECTRONICS ASSOCIATION

NMEA 2000 ®

STANDARD FOR SERIAL-DATA NETWORKING OF
MARINE ELECTRONIC DEVICES

Application Notes

Change Pages to Version 1.200
October 2004

Corrigendum Published
July 2011

The following pages implement Corrigendum 2-2011 to the NMEA 2000 Standard for Serial Data Networking of Marine Electronic Devices, Appendix D: Application Notes. The original corrigendum is available at <http://standards.nmea.org/corrigenda/nmea-2000/>. The applicable changes to Appendix D are indicated by a vertical bar in the right hand margin. The remaining material incorporates changes to maintain sequential section and page numbering that do not materially affect the standard.

Instructions: Remove or strike-out page 43 and replace it with the accompanying page 43. Insert this page behind the cover and before the Table of contents as a record of this change.

D.5.13 How can I track products that are connected or disconnected from an operational system?

Many products will find it essential to maintain a record of all other units connected to the NMEA 2000 network. This can be achieved simply by constructing a dynamic table of source addresses.

The address claim process can be used to enumerate all products at system initialization. A node may issue a single global ISO request (PGN 59904) for the Address Claim message (PGN 60928) when the node is powered up. In order to determine whether a new node has been added to the network, nodes passively monitor the network for the Address Claim messages (PGN 60928) that will be sent by any new nodes when they are added to the network.

The frequency and destination address method of ISO Requests for the Address Claim parameter group are restricted by the Main NMEA 2000 document, section 8.3.2.

D.5.14 What is the difference between Fast-packet and Multi-packet transmissions?

Transmissions that cannot be contained within a single frame either need to use the Fast-packet protocol or ISO 11783-3 Multi-packet protocol.

Fast-packet transmissions have been designed to allow the movement of data with a minimal overhead of control information. Fast-packets can be used to transmit a maximum of 223 bytes. The only timing constraint is that a 10-frame gap must exist between successive fast-packet transmissions from the same source.

Multi-packets require greater control overhead than Fast-packets. Multi-packets are designed to transmit messages containing 8 to 1785 data bytes. Flow control is required as well as an inter-frame gap of 50ms for broadcast messages using PDU2 format.

Manufacturers should avoid large Fast-packet transmissions that contain non-critical data that could otherwise be transmitted as effectively using the Multi-packet protocol.