

PLD-PS

SHORT PULSE LASER DIODE DRIVER



Key Features

- Special Design for 10/14 pin Butterfly Laser Diode
- Output current up to 2000 mA
- Compliance voltage up to 3 V
- Extra short 50 ps pulse width
- Repetition rate up to 30 MHz
- External trigger option
- USB, RS-232, CAN, UART interfaces
- LabView and Python libraries
- On-Board TEC Controller
- 5Vdc Input Power
- Integrated heatsink
- Compact size 85 × 60 × 21 mm

PLD-PS CAN Protocol Description

Introduction

This document describes how data is received and transmitted via CAN addressed systems. This document is based on firmware version PLD-PS.

CAN frame format

The device uses CAN 2.0A with 11-bit identifiers. The baud rate is 500 kBit/s.

Identifiers

Each CAN message has an identifier (ID). A base ID can be set as a parameter (default is 0x001). User can change the base ID using microUSB connection in cases when the information about base ID is lost for example. The host ID is always 0x22.

Message format

Message length is always 8 bytes, unless declared differently in the description. Message byte and bit numbering is zero based.

Table 1. Message format example

CAN format	ID	DLC	B[0]	B[1]	B[2]	B[3]	B[4]	B[5]	B[6]	B[7]
Formal description	Base ID	Data size	CMD	Sender ID	0	0	Value byte	Value byte	Value byte	Value byte
Example	0x001	0x08	0x11	0x22	0x00	0x00	0x00	0x00	0x00	0x64

Response description

Most of the commands has two types. The SET type and GET type. GET type forms from SET type CMD byte plus 0x80.

For example, if SET type CMD=0x10, then same GET type CMD+0x80 = 0x90.

If device received SET command type CMD it will send ACK response with the same CMD byte with empty value bytes.

If device received GET command type CMD+0x80, it will send ANSWER response with the same CMD+0x80 with corresponding value bytes

Command list

ALL device commands are listed in Table 2.

Table 2. Commands list

CMD	CMD description	Read/Write																																								
0x12	<p>Laser diode temperature command</p> <p>Value: integer value bytes multiplied with 10</p> <p>Example: Command to SET temperature value 25.2, Value = $25.2 \cdot 10 = 252$:</p> <table border="1"> <tr> <td>0x001</td><td>0x08</td><td>0x12</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0xFC</td> </tr> </table> <p>Response ANSWER:</p> <table border="1"> <tr> <td>0x001</td><td>0x08</td><td>0x12</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Command to GET temperature value:</p> <table border="1"> <tr> <td>0x001</td><td>0x08</td><td>0x92</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Response ANSWER:</p> <table border="1"> <tr> <td>0x001</td><td>0x08</td><td>0x92</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0xFC</td> </tr> </table> <p>Value = (0x00FC) = $252/10 = 25.2$ °C</p>	0x001	0x08	0x12	0x00	0x00	0x00	0x00	0x00	0x00	0xFC	0x001	0x08	0x12	0x01	0x00	0x00	0x00	0x00	0x00	0x00	0x001	0x08	0x92	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x001	0x08	0x92	0x01	0x00	0x00	0x00	0x00	0x00	0xFC	R/W
0x001	0x08	0x12	0x00	0x00	0x00	0x00	0x00	0x00	0xFC																																	
0x001	0x08	0x12	0x01	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x001	0x08	0x92	0x00	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x001	0x08	0x92	0x01	0x00	0x00	0x00	0x00	0x00	0xFC																																	
0x15	<p>Thermistor beta command</p> <p>Value: integer value of thermistor beta</p> <p>Example: Command to SET beta value of thermistor 3984 (0x0F90):</p> <table border="1"> <tr> <td>0x001</td><td>0x08</td><td>0x15</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x0F</td><td>0x90</td> </tr> </table> <p>Response ACK:</p> <table border="1"> <tr> <td>0x022</td><td>0x08</td><td>0x15</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Command to GET beta value of thermistor:</p> <table border="1"> <tr> <td>0x001</td><td>0x08</td><td>0x95</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Response ANSWER:</p> <table border="1"> <tr> <td>0x022</td><td>0x08</td><td>0x95</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x0F</td><td>0x90</td> </tr> </table> <p>Value = (0x0F90) = 3984;</p>	0x001	0x08	0x15	0x00	0x00	0x00	0x00	0x00	0x0F	0x90	0x022	0x08	0x15	0x01	0x00	0x00	0x00	0x00	0x00	0x00	0x001	0x08	0x95	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x022	0x08	0x95	0x01	0x00	0x00	0x00	0x00	0x0F	0x90	R/W
0x001	0x08	0x15	0x00	0x00	0x00	0x00	0x00	0x0F	0x90																																	
0x022	0x08	0x15	0x01	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x001	0x08	0x95	0x00	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x022	0x08	0x95	0x01	0x00	0x00	0x00	0x00	0x0F	0x90																																	
0x16	<p>Thermistor resistance command</p> <p>Value: integer value of thermistor resistance at 25°C</p> <p>Example: Command to SET thermistor resistance value 10000Ohm (0x2710):</p> <table border="1"> <tr> <td>0x001</td><td>0x08</td><td>0x16</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x27</td><td>0x10</td> </tr> </table> <p>Response ACK:</p> <table border="1"> <tr> <td>0x022</td><td>0x08</td><td>0x16</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Command to GET thermistor resistance value:</p> <table border="1"> <tr> <td>0x001</td><td>0x08</td><td>0x96</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Response ANSWER:</p> <table border="1"> <tr> <td>0x022</td><td>0x08</td><td>0x96</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x27</td><td>0x10</td> </tr> </table> <p>Value = (0x2710) = 10000Ohm;</p>	0x001	0x08	0x16	0x00	0x00	0x00	0x00	0x00	0x27	0x10	0x022	0x08	0x16	0x01	0x00	0x00	0x00	0x00	0x00	0x00	0x001	0x08	0x96	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x022	0x08	0x96	0x01	0x00	0x00	0x00	0x00	0x27	0x10	R/W
0x001	0x08	0x16	0x00	0x00	0x00	0x00	0x00	0x27	0x10																																	
0x022	0x08	0x16	0x01	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x001	0x08	0x96	0x00	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x022	0x08	0x96	0x01	0x00	0x00	0x00	0x00	0x27	0x10																																	
0x18	<p>Laser voltage command</p> <p>Value: integer value bytes multiplied with 10</p> <p>Example: Command to SET voltage value 17 V, Value = $17 \cdot 10 = 170$ (0xAA):</p> <table border="1"> <tr> <td>0x001</td><td>0x08</td><td>0x18</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0xAA</td> </tr> </table> <p>Response ANSWER:</p> <table border="1"> <tr> <td>0x001</td><td>0x08</td><td>0x18</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Command to GET voltage value:</p> <table border="1"> <tr> <td>0x001</td><td>0x08</td><td>0x98</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Response ANSWER:</p> <table border="1"> <tr> <td>0x001</td><td>0x08</td><td>0x98</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0xAA</td> </tr> </table> <p>Value = (0x00AA) = $170/10 = 17$ V</p>	0x001	0x08	0x18	0x00	0x00	0x00	0x00	0x00	0x00	0xAA	0x001	0x08	0x18	0x01	0x00	0x00	0x00	0x00	0x00	0x00	0x001	0x08	0x98	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x001	0x08	0x98	0x01	0x00	0x00	0x00	0x00	0x00	0xAA	R/W
0x001	0x08	0x18	0x00	0x00	0x00	0x00	0x00	0x00	0xAA																																	
0x001	0x08	0x18	0x01	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x001	0x08	0x98	0x00	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x001	0x08	0x98	0x01	0x00	0x00	0x00	0x00	0x00	0xAA																																	

CMD	CMD description	Read/Write																																								
0x19	<p>Output frequency for internal generation command</p> <p>Value: integer value in Hz Note: the frequency should be set in increments corresponding to the following ranges</p> <ul style="list-style-type: none"> • 1 Hz increment for frequencies from range 1...1000 Hz • 1000 Hz increment for frequencies from range 1kHz ... 1MHz • 100000 Hz increment for frequencies from range 1MHz ... 30MHz <p>Example: Command to SET frequency value 20.1MH, Value = 20100000</p> <table border="1" data-bbox="300 573 1075 602"> <tr> <td>0x001</td><td>0x08</td><td>0x19</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x01</td><td>0x32</td><td>0xB3</td><td>0xA0</td> </tr> </table> <p>Response ANSWER:</p> <table border="1" data-bbox="300 622 1075 651"> <tr> <td>0x001</td><td>0x08</td><td>0x19</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Command to GET voltage value:</p> <table border="1" data-bbox="300 701 1075 730"> <tr> <td>0x001</td><td>0x08</td><td>0x99</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Response ANSWER:</p> <table border="1" data-bbox="300 750 1075 779"> <tr> <td>0x001</td><td>0x08</td><td>0x99</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x01</td><td>0x32</td><td>0xB3</td><td>0xA0</td> </tr> </table> <p>Value = (0x0132B3A0) = 20100000 Hz</p>	0x001	0x08	0x19	0x00	0x00	0x00	0x01	0x32	0xB3	0xA0	0x001	0x08	0x19	0x01	0x00	0x00	0x00	0x00	0x00	0x00	0x001	0x08	0x99	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x001	0x08	0x99	0x01	0x00	0x00	0x01	0x32	0xB3	0xA0	R/W
0x001	0x08	0x19	0x00	0x00	0x00	0x01	0x32	0xB3	0xA0																																	
0x001	0x08	0x19	0x01	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x001	0x08	0x99	0x00	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x001	0x08	0x99	0x01	0x00	0x00	0x01	0x32	0xB3	0xA0																																	
0x20	<p>Laser diode voltage On/Off command</p> <p>Value: 0 – turn laser diode voltage off 1 – turn laser diode voltage on</p> <p>Example: Command to turn laser diode voltage on</p> <table border="1" data-bbox="300 1021 1075 1050"> <tr> <td>0x001</td><td>0x08</td><td>0x20</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x01</td> </tr> </table> <p>Response ACK:</p> <table border="1" data-bbox="300 1070 1075 1099"> <tr> <td>0x001</td><td>0x08</td><td>0x20</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Command to GET diode voltage on/off state,</p> <table border="1" data-bbox="300 1149 1075 1178"> <tr> <td>0x001</td><td>0x08</td><td>0xA0</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Response ANSWER:</p> <table border="1" data-bbox="300 1198 1075 1227"> <tr> <td>0x001</td><td>0x08</td><td>0xA0</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x03</td><td>0x01</td> </tr> </table> <p>Value = 1;</p>	0x001	0x08	0x20	0x00	0x00	0x00	0x00	0x00	0x00	0x01	0x001	0x08	0x20	0x01	0x00	0x00	0x00	0x00	0x00	0x00	0x001	0x08	0xA0	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x001	0x08	0xA0	0x01	0x00	0x00	0x00	0x00	0x03	0x01	R/W
0x001	0x08	0x20	0x00	0x00	0x00	0x00	0x00	0x00	0x01																																	
0x001	0x08	0x20	0x01	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x001	0x08	0xA0	0x00	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x001	0x08	0xA0	0x01	0x00	0x00	0x00	0x00	0x03	0x01																																	
0x21	<p>TEC On/Off command</p> <p>Value: 0 – turn TEC off 1 – turn TEC on</p> <p>Example: Command to SET TEC on:</p> <table border="1" data-bbox="300 1469 1075 1498"> <tr> <td>0x001</td><td>0x08</td><td>0x21</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x01</td> </tr> </table> <p>Response ACK:</p> <table border="1" data-bbox="300 1518 1075 1547"> <tr> <td>0x001</td><td>0x08</td><td>0x21</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Command to GET TEC on/off state:</p> <table border="1" data-bbox="300 1597 1075 1626"> <tr> <td>0x001</td><td>0x08</td><td>0xA1</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Response ANSWER:</p> <table border="1" data-bbox="300 1646 1075 1675"> <tr> <td>0x022</td><td>0x08</td><td>0xA1</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x01</td> </tr> </table> <p>Value = 1;</p>	0x001	0x08	0x21	0x00	0x00	0x00	0x00	0x00	0x00	0x01	0x001	0x08	0x21	0x01	0x00	0x00	0x00	0x00	0x00	0x00	0x001	0x08	0xA1	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x022	0x08	0xA1	0x01	0x00	0x00	0x00	0x00	0x00	0x01	R/W
0x001	0x08	0x21	0x00	0x00	0x00	0x00	0x00	0x00	0x01																																	
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0x001	0x08	0xA1	0x00	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x022	0x08	0xA1	0x01	0x00	0x00	0x00	0x00	0x00	0x01																																	

CMD	CMD description	Read/Write																																								
0x22	<p>On/Off laser pulse emitting command</p> <p>Value: 0 – turn laser pulse emitting off 1 – turn laser pulse emitting on</p> <p>Example: Command to turn laser pulse emitting on: <table border="1" data-bbox="300 461 1070 490"> <tr> <td>0x001</td><td>0x08</td><td>0x22</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x01</td> </tr> </table> Response ACK: <table border="1" data-bbox="300 517 1070 546"> <tr> <td>0x001</td><td>0x08</td><td>0x22</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> Command to GET laser pulse emitting on/off state: <table border="1" data-bbox="300 589 1070 618"> <tr> <td>0x001</td><td>0x08</td><td>0xA2</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> Response ANSWER: <table border="1" data-bbox="300 645 1070 674"> <tr> <td>0x022</td><td>0x08</td><td>0xA2</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x01</td> </tr> </table> Value = 1;</p>	0x001	0x08	0x22	0x00	0x00	0x00	0x00	0x00	0x00	0x01	0x001	0x08	0x22	0x01	0x00	0x00	0x00	0x00	0x00	0x00	0x001	0x08	0xA2	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x022	0x08	0xA2	0x01	0x00	0x00	0x00	0x00	0x00	0x01	R/W
0x001	0x08	0x22	0x00	0x00	0x00	0x00	0x00	0x00	0x01																																	
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0x001	0x08	0xA2	0x00	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x022	0x08	0xA2	0x01	0x00	0x00	0x00	0x00	0x00	0x01																																	
0x24	<p>Emitting mode command</p> <p>Value: 0x00 – Internal generation 0x01 – Pulse on demand mode 0x02 – External generation mode</p> <p>Example: Command to SET pulse on demand mode: <table border="1" data-bbox="300 987 1070 1016"> <tr> <td>0x001</td><td>0x08</td><td>0x24</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x01</td> </tr> </table> Response ACK: <table border="1" data-bbox="300 1043 1070 1072"> <tr> <td>0x001</td><td>0x08</td><td>0x24</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> Command to GET pulse on demand mode value: <table border="1" data-bbox="300 1115 1070 1144"> <tr> <td>0x001</td><td>0x08</td><td>0xA4</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> Response ANSWER: <table border="1" data-bbox="300 1171 1070 1200"> <tr> <td>0x022</td><td>0x08</td><td>0xA4</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x01</td> </tr> </table> Value = (0x01) = Pulse on demand mode;</p>	0x001	0x08	0x24	0x00	0x00	0x00	0x00	0x00	0x00	0x01	0x001	0x08	0x24	0x01	0x00	0x00	0x00	0x00	0x00	0x00	0x001	0x08	0xA4	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x022	0x08	0xA4	0x01	0x00	0x00	0x00	0x00	0x00	0x01	R/W
0x001	0x08	0x24	0x00	0x00	0x00	0x00	0x00	0x00	0x01																																	
0x001	0x08	0x24	0x01	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x001	0x08	0xA4	0x00	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x022	0x08	0xA4	0x01	0x00	0x00	0x00	0x00	0x00	0x01																																	
0x25	<p>Maximum voltage command</p> <p>Value: integer value multiplied with 10</p> <p>Example: Command to SET maximum voltage 30V, Value = 30 * 10 = 300 (0x012C): <table border="1" data-bbox="300 1417 1070 1447"> <tr> <td>0x001</td><td>0x08</td><td>0x25</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x01</td><td>0x2C</td> </tr> </table> Response ACK: <table border="1" data-bbox="300 1473 1070 1503"> <tr> <td>0x022</td><td>0x08</td><td>0x25</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> Command to GET maximum voltage value: <table border="1" data-bbox="300 1545 1070 1574"> <tr> <td>0x001</td><td>0x08</td><td>0xA5</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> Response ANSWER: <table border="1" data-bbox="300 1601 1070 1630"> <tr> <td>0x022</td><td>0x08</td><td>0xA5</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x01</td><td>0x2C</td> </tr> </table> Value = (0x012C) = 300 / 10 = 30V;</p>	0x001	0x08	0x25	0x00	0x00	0x00	0x00	0x00	0x01	0x2C	0x022	0x08	0x25	0x01	0x00	0x00	0x00	0x00	0x00	0x00	0x001	0x08	0xA5	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x022	0x08	0xA5	0x01	0x00	0x00	0x00	0x00	0x01	0x2C	R/W
0x001	0x08	0x25	0x00	0x00	0x00	0x00	0x00	0x01	0x2C																																	
0x022	0x08	0x25	0x01	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x001	0x08	0xA5	0x00	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x022	0x08	0xA5	0x01	0x00	0x00	0x00	0x00	0x01	0x2C																																	
0x26	<p>Minimum voltage command</p> <p>Value: integer value multiplied with 10</p> <p>Example: Command to SET minimum voltage 2V, Value = 2 * 10 = 20 (0x14): <table border="1" data-bbox="300 1843 1070 1872"> <tr> <td>0x001</td><td>0x08</td><td>0x26</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x14</td> </tr> </table> Response ACK: <table border="1" data-bbox="300 1899 1070 1928"> <tr> <td>0x022</td><td>0x08</td><td>0x26</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> Command to GET minimum voltage value: <table border="1" data-bbox="300 1971 1070 2000"> <tr> <td>0x001</td><td>0x08</td><td>0xA6</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> Response ANSWER: <table border="1" data-bbox="300 2027 1070 2056"> <tr> <td>0x022</td><td>0x08</td><td>0xA6</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x14</td> </tr> </table> Value = (0x14) = 20 / 10 = 2V;</p>	0x001	0x08	0x26	0x00	0x00	0x00	0x00	0x00	0x00	0x14	0x022	0x08	0x26	0x01	0x00	0x00	0x00	0x00	0x00	0x00	0x001	0x08	0xA6	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x022	0x08	0xA6	0x01	0x00	0x00	0x00	0x00	0x00	0x14	R/W
0x001	0x08	0x26	0x00	0x00	0x00	0x00	0x00	0x00	0x14																																	
0x022	0x08	0x26	0x01	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x001	0x08	0xA6	0x00	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x022	0x08	0xA6	0x01	0x00	0x00	0x00	0x00	0x00	0x14																																	

CMD	CMD description	Read/Write																																								
0x34	<p>Gated pulses for burst generation command</p> <p>Value: integer count of gated pulses</p> <p>Example: Command to SET 10 gated pulses (0x0A):</p> <table border="1" data-bbox="300 434 1070 463"> <tr> <td>0x001</td><td>0x08</td><td>0x34</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x0A</td> </tr> </table> <p>Response ACK:</p> <table border="1" data-bbox="300 486 1070 515"> <tr> <td>0x001</td><td>0x08</td><td>0x34</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Command to GET gated pulses value:</p> <table border="1" data-bbox="300 560 1070 589"> <tr> <td>0x001</td><td>0x08</td><td>0xB4</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Response ANSWER:</p> <table border="1" data-bbox="300 611 1070 640"> <tr> <td>0x022</td><td>0x08</td><td>0xB4</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x0A</td> </tr> </table> <p>Value = (0x0A) = 10;</p>	0x001	0x08	0x34	0x00	0x00	0x00	0x00	0x00	0x00	0x0A	0x001	0x08	0x34	0x01	0x00	0x00	0x00	0x00	0x00	0x00	0x001	0x08	0xB4	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x022	0x08	0xB4	0x01	0x00	0x00	0x00	0x00	0x00	0x0A	R/W
0x001	0x08	0x34	0x00	0x00	0x00	0x00	0x00	0x00	0x0A																																	
0x001	0x08	0x34	0x01	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x001	0x08	0xB4	0x00	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x022	0x08	0xB4	0x01	0x00	0x00	0x00	0x00	0x00	0x0A																																	
0x35	<p>Blocked pulses for burst generation command</p> <p>Value: integer count of blocked pulses</p> <p>Example: Command to SET 15 gated blocked pulses (0x0F):</p> <table border="1" data-bbox="300 797 1070 826"> <tr> <td>0x001</td><td>0x08</td><td>0x35</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x0F</td> </tr> </table> <p>Response ACK:</p> <table border="1" data-bbox="300 848 1070 878"> <tr> <td>0x022</td><td>0x08</td><td>0x35</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Command to GET gated blocked pulses value:</p> <table border="1" data-bbox="300 922 1070 952"> <tr> <td>0x001</td><td>0x08</td><td>0xB5</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Response ANSWER:</p> <table border="1" data-bbox="300 974 1070 1003"> <tr> <td>0x022</td><td>0x08</td><td>0xB5</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x0F</td> </tr> </table> <p>Value = (0x0F) = 15;</p>	0x001	0x08	0x35	0x00	0x00	0x00	0x00	0x00	0x00	0x0F	0x022	0x08	0x35	0x01	0x00	0x00	0x00	0x00	0x00	0x00	0x001	0x08	0xB5	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x022	0x08	0xB5	0x01	0x00	0x00	0x00	0x00	0x00	0x0F	R/W
0x001	0x08	0x35	0x00	0x00	0x00	0x00	0x00	0x00	0x0F																																	
0x022	0x08	0x35	0x01	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x001	0x08	0xB5	0x00	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x022	0x08	0xB5	0x01	0x00	0x00	0x00	0x00	0x00	0x0F																																	
0x36	<p>Minimum temperature command</p> <p>Value: integer value multiplied with 10</p> <p>Example: Command to SET minimum temperature 20,0°C, Value = 20,0 * 10 = 200 (0xC8):</p> <table border="1" data-bbox="300 1207 1070 1236"> <tr> <td>0x001</td><td>0x08</td><td>0x36</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0xC8</td> </tr> </table> <p>Response ACK:</p> <table border="1" data-bbox="300 1258 1070 1288"> <tr> <td>0x022</td><td>0x08</td><td>0x36</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Command to GET minimum temperature value:</p> <table border="1" data-bbox="300 1332 1070 1361"> <tr> <td>0x001</td><td>0x08</td><td>0xB6</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Response ANSWER:</p> <table border="1" data-bbox="300 1384 1070 1413"> <tr> <td>0x022</td><td>0x08</td><td>0xB6</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0xC8</td> </tr> </table> <p>Value = (0xC8) = 200 / 10 = 20°C;</p>	0x001	0x08	0x36	0x00	0x00	0x00	0x00	0x00	0x00	0xC8	0x022	0x08	0x36	0x01	0x00	0x00	0x00	0x00	0x00	0x00	0x001	0x08	0xB6	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x022	0x08	0xB6	0x01	0x00	0x00	0x00	0x00	0x00	0xC8	R/W
0x001	0x08	0x36	0x00	0x00	0x00	0x00	0x00	0x00	0xC8																																	
0x022	0x08	0x36	0x01	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x001	0x08	0xB6	0x00	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x022	0x08	0xB6	0x01	0x00	0x00	0x00	0x00	0x00	0xC8																																	
0x37	<p>Maximum temperature command</p> <p>Value: integer value multiplied with 10</p> <p>Example: Command to SET maximum temperature 50,5°C, Value = 50,5 * 10 = 505 (0x1F9):</p> <table border="1" data-bbox="300 1624 1070 1653"> <tr> <td>0x001</td><td>0x08</td><td>0x37</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x01</td><td>0xF9</td> </tr> </table> <p>Response ACK:</p> <table border="1" data-bbox="300 1675 1070 1704"> <tr> <td>0x022</td><td>0x08</td><td>0x37</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Command to GET maximum temperature value:</p> <table border="1" data-bbox="300 1749 1070 1778"> <tr> <td>0x001</td><td>0x08</td><td>0xB7</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Response ANSWER:</p> <table border="1" data-bbox="300 1800 1070 1830"> <tr> <td>0x022</td><td>0x08</td><td>0xB7</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x01</td><td>0xF9</td> </tr> </table> <p>Value = (0x1F9) = 505 / 10 = 50,5°C;</p>	0x001	0x08	0x37	0x00	0x00	0x00	0x00	0x00	0x01	0xF9	0x022	0x08	0x37	0x01	0x00	0x00	0x00	0x00	0x00	0x00	0x001	0x08	0xB7	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x022	0x08	0xB7	0x01	0x00	0x00	0x00	0x00	0x01	0xF9	R/W
0x001	0x08	0x37	0x00	0x00	0x00	0x00	0x00	0x01	0xF9																																	
0x022	0x08	0x37	0x01	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x001	0x08	0xB7	0x00	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x022	0x08	0xB7	0x01	0x00	0x00	0x00	0x00	0x01	0xF9																																	

CMD	CMD description	Read/Write																																								
0x44	<p>Coefficient P command</p> <p>Value: integer value multiplied with 10000</p> <p>Example: Command to SET coefficient P, Value = 10000,0000 * 10000 = 100000000 (0x05F5E100):</p> <table border="1" data-bbox="304 432 1075 461"> <tr> <td>0x001</td><td>0x08</td><td>0x44</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x05</td><td>0xF5</td><td>0xE1</td><td>0x00</td> </tr> </table> <p>Response ACK:</p> <table border="1" data-bbox="304 483 1075 512"> <tr> <td>0x022</td><td>0x08</td><td>0x44</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Command to GET coefficient P value:</p> <table border="1" data-bbox="304 557 1075 586"> <tr> <td>0x001</td><td>0x08</td><td>0xC4</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Response ANSWER:</p> <table border="1" data-bbox="304 609 1075 638"> <tr> <td>0x022</td><td>0x08</td><td>0xC4</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x05</td><td>0xF5</td><td>0xE1</td><td>0x00</td> </tr> </table> <p>Value = (0x05F5E100) = 100000000 / 10000 = 10000;</p>	0x001	0x08	0x44	0x00	0x00	0x00	0x05	0xF5	0xE1	0x00	0x022	0x08	0x44	0x01	0x00	0x00	0x00	0x00	0x00	0x00	0x001	0x08	0xC4	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x022	0x08	0xC4	0x01	0x00	0x00	0x05	0xF5	0xE1	0x00	R/W
0x001	0x08	0x44	0x00	0x00	0x00	0x05	0xF5	0xE1	0x00																																	
0x022	0x08	0x44	0x01	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x001	0x08	0xC4	0x00	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x022	0x08	0xC4	0x01	0x00	0x00	0x05	0xF5	0xE1	0x00																																	
0x45	<p>Coefficient I command</p> <p>Value: integer value multiplied with 10000</p> <p>Example: Command to SET coefficient I, Value = 1000,0000*10000 = 10000000 (0x989680):</p> <table border="1" data-bbox="304 846 1075 875"> <tr> <td>0x001</td><td>0x08</td><td>0x45</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x98</td><td>0x96</td><td>0x80</td> </tr> </table> <p>Response ACK:</p> <table border="1" data-bbox="304 898 1075 927"> <tr> <td>0x022</td><td>0x08</td><td>0x45</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Command to GET coefficient I value:</p> <table border="1" data-bbox="304 972 1075 1001"> <tr> <td>0x001</td><td>0x08</td><td>0xC5</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Response ANSWER:</p> <table border="1" data-bbox="304 1023 1075 1052"> <tr> <td>0x022</td><td>0x08</td><td>0xC5</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x98</td><td>0x96</td><td>0x80</td> </tr> </table> <p>Value = (0x0989680) = 10000000 / 10000 = 1000;</p>	0x001	0x08	0x45	0x00	0x00	0x00	0x00	0x98	0x96	0x80	0x022	0x08	0x45	0x01	0x00	0x00	0x00	0x00	0x00	0x00	0x001	0x08	0xC5	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x022	0x08	0xC5	0x01	0x00	0x00	0x00	0x98	0x96	0x80	R/W
0x001	0x08	0x45	0x00	0x00	0x00	0x00	0x98	0x96	0x80																																	
0x022	0x08	0x45	0x01	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x001	0x08	0xC5	0x00	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x022	0x08	0xC5	0x01	0x00	0x00	0x00	0x98	0x96	0x80																																	
0x46	<p>Coefficient D command</p> <p>Value: integer value multiplied with 10000</p> <p>Example: Command to SET coefficient D, Value = 2000,0000*10000 = 20000000 (0x0131 2D00):</p> <table border="1" data-bbox="304 1267 1075 1296"> <tr> <td>0x001</td><td>0x08</td><td>0x46</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x01</td><td>0x31</td><td>0x2D</td><td>0x00</td> </tr> </table> <p>Response ACK:</p> <table border="1" data-bbox="304 1319 1075 1348"> <tr> <td>0x022</td><td>0x08</td><td>0x46</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Command to GET coefficient D value:</p> <table border="1" data-bbox="304 1393 1075 1422"> <tr> <td>0x001</td><td>0x08</td><td>0xC6</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Response ANSWER:</p> <table border="1" data-bbox="304 1444 1075 1473"> <tr> <td>0x022</td><td>0x08</td><td>0xC6</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x01</td><td>0x31</td><td>0x2D</td><td>0x00</td> </tr> </table> <p>Value = (0x0131 2D00) = 20000000 / 10000 = 2000;</p>	0x001	0x08	0x46	0x00	0x00	0x00	0x01	0x31	0x2D	0x00	0x022	0x08	0x46	0x01	0x00	0x00	0x00	0x00	0x00	0x00	0x001	0x08	0xC6	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x022	0x08	0xC6	0x01	0x00	0x00	0x01	0x31	0x2D	0x00	R/W
0x001	0x08	0x46	0x00	0x00	0x00	0x01	0x31	0x2D	0x00																																	
0x022	0x08	0x46	0x01	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x001	0x08	0xC6	0x00	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x022	0x08	0xC6	0x01	0x00	0x00	0x01	0x31	0x2D	0x00																																	
0x50	<p>Device type command</p> <p>Value: PLD-PS device type = 0x14</p> <p>Example: Command to GET device type:</p> <table border="1" data-bbox="304 1655 1075 1684"> <tr> <td>0x001</td><td>0x08</td><td>0xD0</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Response ANSWER:</p> <table border="1" data-bbox="304 1729 1075 1758"> <tr> <td>0x022</td><td>0x08</td><td>0xD0</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x14</td> </tr> </table> <p>Value = (0x14) = PLD-PS;</p>	0x001	0x08	0xD0	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x022	0x08	0xD0	0x01	0x00	0x00	0x00	0x00	0x00	0x14	R																				
0x001	0x08	0xD0	0x00	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x022	0x08	0xD0	0x01	0x00	0x00	0x00	0x00	0x00	0x14																																	

CMD	CMD description	Read/Write																																								
0x51	<p>CAN identificator command</p> <p>Value: base ID</p> <p>Example: Command to SET base ID using BROADCAST ID, Value = 1:</p> <table border="1" data-bbox="300 430 1072 456"> <tr> <td>0x001</td><td>0x08</td><td>0x51</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x01</td> </tr> </table> <p>Response ACK:</p> <table border="1" data-bbox="300 483 1072 510"> <tr> <td>0x022</td><td>0x08</td><td>0x51</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Command to GET base ID using BROADCAST ID:</p> <table border="1" data-bbox="300 560 1072 586"> <tr> <td>0x001</td><td>0x08</td><td>0xD1</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Response ANSWER:</p> <table border="1" data-bbox="300 636 1072 663"> <tr> <td>0x022</td><td>0x08</td><td>0xD1</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x01</td> </tr> </table> <p>Base ID = 0x01;</p>	0x001	0x08	0x51	0x00	0x00	0x00	0x00	0x00	0x00	0x01	0x022	0x08	0x51	0x01	0x00	0x00	0x00	0x00	0x00	0x00	0x001	0x08	0xD1	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x022	0x08	0xD1	0x01	0x00	0x00	0x00	0x00	0x00	0x01	R/W
0x001	0x08	0x51	0x00	0x00	0x00	0x00	0x00	0x00	0x01																																	
0x022	0x08	0x51	0x01	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x001	0x08	0xD1	0x00	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x022	0x08	0xD1	0x01	0x00	0x00	0x00	0x00	0x00	0x01																																	
0x52	<p>Save parameters command</p> <p>Example: Command to save parameters in FLASH memory:</p> <table border="1" data-bbox="300 792 1072 819"> <tr> <td>0x001</td><td>0x08</td><td>0x52</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table> <p>Response ACK:</p> <table border="1" data-bbox="300 869 1072 896"> <tr> <td>0x022</td><td>0x08</td><td>0x52</td><td>0x01</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td><td>0x00</td> </tr> </table>	0x001	0x08	0x52	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x022	0x08	0x52	0x01	0x00	0x00	0x00	0x00	0x00	0x00	W																				
0x001	0x08	0x52	0x00	0x00	0x00	0x00	0x00	0x00	0x00																																	
0x022	0x08	0x52	0x01	0x00	0x00	0x00	0x00	0x00	0x00																																	