



MAX20815 PMBus Command Set User Guide

UG2175; Rev 0; 5/24

Abstract

This user guide lists and describes the Power Management Bus (PMBus) commands implemented in the MAX20815 integrated step-down switching regulator. Standard commands from the PMBus specification are not described in detail unless there are deviations from the PMBus specification functionality. Analog Devices, Inc.'s manufacturer-specific commands are fully described in this document.

Table of Contents

Introduction	4
PMBus Communication Protocol	5
MAX20815 List of PMBus Commands	9
On, Off, and Margin Testing Related Commands	11
OPERATION	11
ON_OFF_CONFIG	11
Output Voltage Related Commands	12
VOUT_MODE	12
VOUT_COMMAND	12
VOUT_MAX	12
Switching Frequency and Configuration Commands	13
MFR_PINSTRAP	13
MFR_SCENARIO_0	14
MFR_SCENARIO_1	15
MFR_SCENARIO_2	16
Status Commands	17
CLEAR_FAULTS	17
STATUS_BYTE	17
STATUS_WORD	18
STATUS_VOUT	19
STATUS_IOUT	19
STATUS_INPUT	20
STATUS_TEMPERATURE	20
STATUS_CML	21
STATUS_MFR_SPECIFIC	21
Telemetry Commands	22
READ_VIN	22
READ_VOUT	22
READ_IOUT	22

READ_TEMPERATURE_1.....	22
Inventory Information and Device Identification Commands	23
CAPABILITY.....	23
IC_DEVICE_ID.....	23
IC_DEVICE_REV	23
Security Commands.....	24
WRITE_PROTECT	24

Introduction

This document lists and describes the PMBus™ commands implemented in the MAX20815 integrated step-down switching regulator. The MAX20815 implements a subset of PMBus Application Profile commands for DC-DC point of loads. Standard commands from the PMBus specification are not described in detail unless there are deviations from the PMBus specification functionality. Analog Devices manufacturer-specific commands are fully described in this document.

The MAX20815's command functionality is based on the Revision 1.3 PMBus specifications, which are therefore referenced throughout this document. The PMBus specifications can be found on the PMBus and SMBus™ organization websites.

<https://pmbus.org/current-specifications/>

<http://smbus.org/specs/>


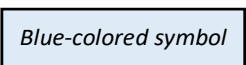







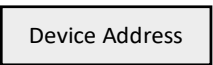
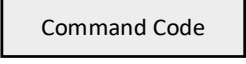
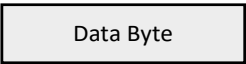
The commands in this document are presented in the following format:

<COMMAND_NAME>			
Reference:	<"Standard Command" or "Analog Devices Specific">		
Command Code:	<Hex value>	Format:	<Data format>
Data Bytes:	<Byte count>	Units:	<Unit of measure>
Transfer:	<SMBus transaction type>	Factory Value:	<Factory setting>
Description/Notes:	<Command definition if "Analog Devices Specific"; or notes on command functionality where it differs from the PMBus specification.>		

PMBus Communication Protocol

This section describes the protocol and command packet formats required for executing PMBus transactions on the MAX20815. This has been implemented in compliance with Revision 1.3 of the PMBus Specification (Part II).

Bit and Byte Symbols Legend

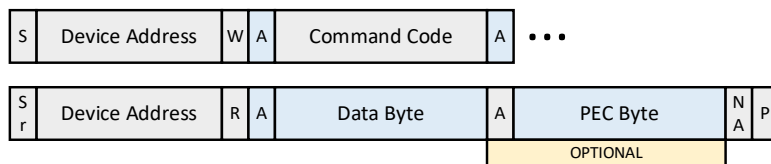
BIT/BYTE SYMBOL	NO. OF BITS	DESCRIPTION
	Various	The host is asserting the SDA signal, and therefore the bit or byte is sent from the host to the MAX20815 device.
	Various	The MAX20815 device is asserting the SDA signal, and therefore the bit or byte is sent from the device to the host.
	0	START condition: SCL and SDA lines are initially high; SDA transitions low while SCL is high; SCL transitions low thereafter. This indicates the start of a transaction.
	0	REPEATED START condition: Behaves the same as a standard START condition except that it is sent after a START condition without a STOP condition in between.
	0	STOP condition: SCL and SDA lines are initially low; SCL transitions high while SDA is low; SDA transitions high thereafter. This indicates the completion of a transaction.
	1	Read bit: logic-high
	1	Write bit: logic-low
	1	ACK (Acknowledge): If a byte transaction is successful, the receiver sends an ACK by pulling SDA low for the next SCL pulse.
	1	NACK (Not Acknowledge): If the receiver sends a NACK by leaving SDA high for the next SCL pulse, this indicates either a fatal condition or the end of a transaction.
	7	Each MAX20815 device's 7-bit address can be configured using the PGM0 resistor. The host sends this address at the start of a transaction to select the device it wishes to communicate with. The device address must always be followed by either a Read or Write bit to complete the byte and indicate the type of transaction.
	8	All supported PMBus commands have an associated command code to indicate which command the host wishes to execute.
	8	Depending on the command's transaction type, a varying number of data bytes may be included (Send Byte: 0, Read/Write Byte: 1, Read/Write Word: 2, Read/Write Block: 2+).

BIT/BYTE SYMBOL	NO. OF BITS	DESCRIPTION
<div>PEC Byte</div>	8	Packet Error Check (PEC) Byte: Optional byte that is sent at the end of the transaction to protect against data corruption; calculated using a CRC-8 checksum.

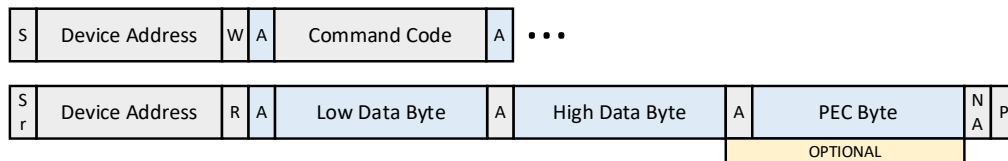
Read Transaction Protocol

There are three main types of read transactions that are used by this part: Read Byte, Read Word and Read Block. The command packet format for a read transaction is dependent on the specific transaction type, which varies with respect to each PMBus command. The appropriate read transaction type for each command is specified in its designated section within this document.

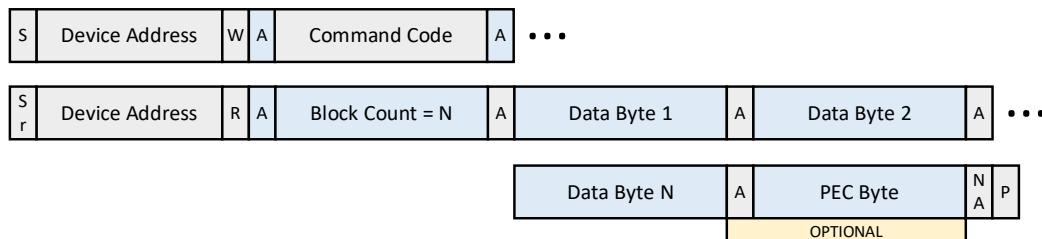
The following command packet format should be used for a **Read Byte** operation:



The following command packet format should be used for a **Read Word** operation:



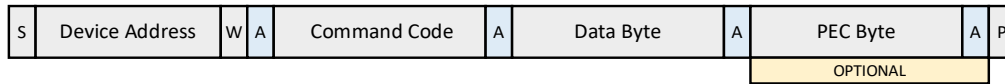
The following command packet format should be used for a **Read Block** operation:



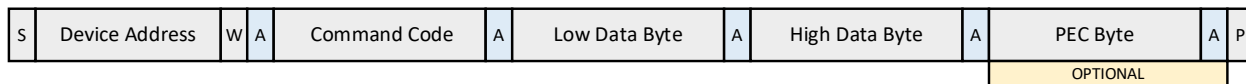
Write Transaction Protocol

There are two main types of write transactions that are used by this part: Write Byte and Write Word. The command packet format for a write transaction is dependent on the specific transaction type, which varies with respect to each PMBus command. The appropriate write transaction type for each command is specified in its designated section within this document.

The following command packet format should be used for a **Write Byte** operation:

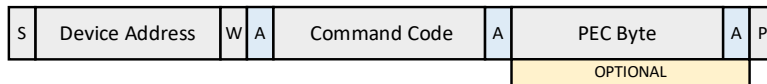


The following command packet format should be used for a **Write Word** operation:



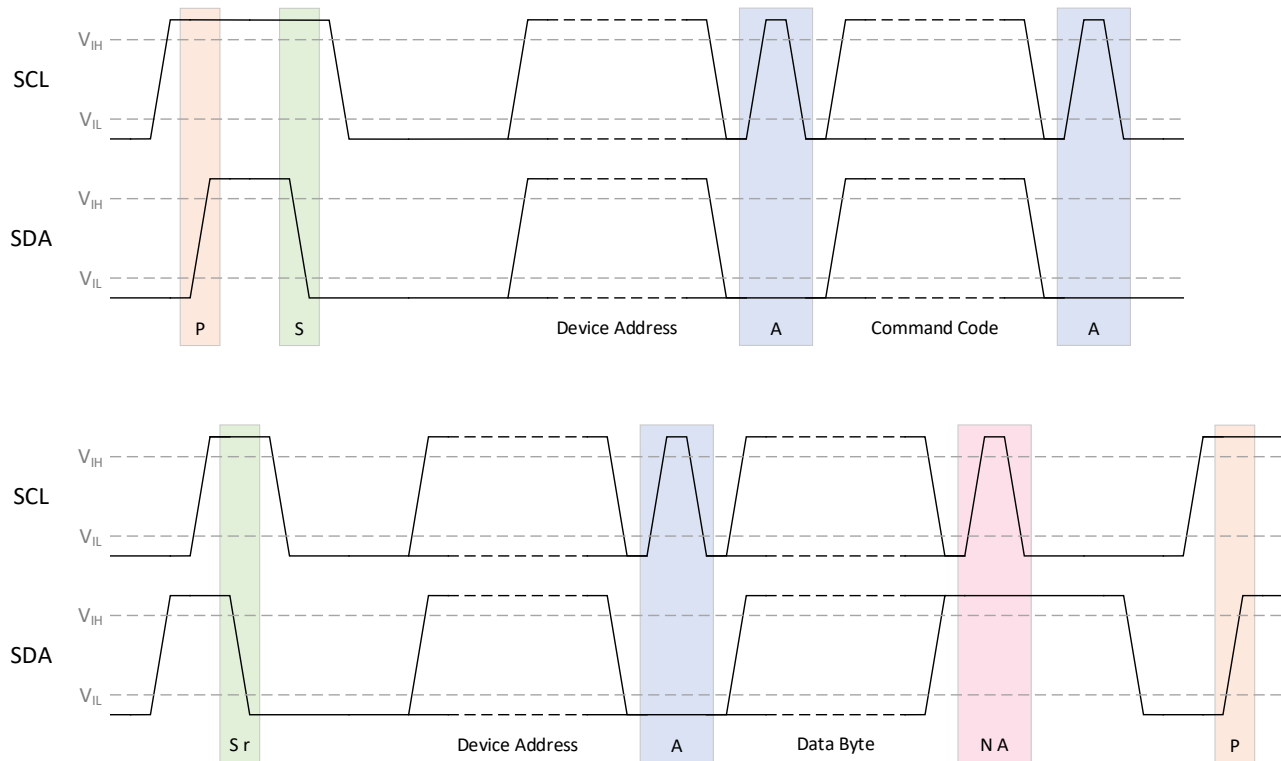
Send Byte Transaction Protocol

The following command packet format should be used for a **Send Byte** operation:



PMBus Timing Diagram

The timing diagrams below illustrate the transaction protocol for the two parts of a Read Byte transaction as an example—starting from the STOP condition of the previous transaction and leading up to the STOP condition of the Read Byte transaction itself.



MAX20815 List of PMBus Commands

The table lists and summarizes the PMBus commands that are supported by the MAX20815, providing a brief description of each command as well as its command code, transaction type, data format, and factory value, where applicable.

COMMAND CODE	COMMAND NAME	DESCRIPTION	TYPE	DATA FORMAT	FACTORY VALUE
0x01	OPERATION	Output enable/disable.	R/W Byte	Bit Field	0x80
0x02	ON_OFF_CONFIG	EN pin and PMBus OPERATION command setting.	R/W Byte	Bit Field	0x1F
0x03	CLEAR_FAULTS	Clears any fault bits that have been set.	Send Byte	N/A	N/A
0x10	WRITE_PROTECT	Level of protection provided by the device against accidental changes.	R/W Byte	Bit Field	0x20
0x19	CAPABILITY	Summary of PMBus optional communication protocols supported by this device.	R Byte	Bit Field	0xA0
0x20	VOUT_MODE	Output voltage data format and mantissa exponent.	R Byte	Bit Field	0x17
0x21	VOUT_COMMAND	Feedback reference voltage setpoint.	R/W Word	ULINEAR16	0x0100
0x24	VOUT_MAX	Upper limit of reference voltage setpoint.	R/W Word	ULINEAR16	0x019A
0x78	STATUS_BYTE	1-byte summary of the unit's fault condition.	R Byte	Bit Field	N/A
0x79	STATUS_WORD	2-byte summary of the unit's fault condition.	R Word	Bit Field	N/A
0x7A	STATUS_VOUT	Output voltage fault and warning status.	R Byte	Bit Field	N/A
0x7B	STATUS_IOUT	Output current fault and warning status.	R Byte	Bit Field	N/A
0x7C	STATUS_INPUT	Input voltage fault and warning status.	R Byte	Bit Field	N/A
0x7D	STATUS_TEMPERATURE	IC junction temperature fault and warning status.	R Byte	Bit Field	N/A
0x7E	STATUS_CML	Communication fault and warning status.	R Byte	Bit Field	N/A
0x80	STATUS_MFR_SPECIFIC	Manufacture specific fault and warning status.	R Byte	Bit Field	N/A
0x88	READ_VIN	Input voltage telemetry.	R Word	LINEAR11	N/A
0x8B	READ_VOUT	Feedback voltage telemetry.	R Word	ULINEAR16	N/A
0x8C	READ_IOUT	Output current telemetry.	R Word	LINEAR11	N/A
0x8D	READ_TEMPERATURE_1	IC junction temperature telemetry.	R Word	LINEAR11	N/A
0xAD	IC_DEVICE_ID	Device root part number.	R Block	ASCII	"MAX20815"
0xAE	IC_DEVICE_REV	Device revision code.	R Block	ASCII	Various
0xD0	MFR_PINSTRAP	Manufactures specific device operating configurations.	R/W Byte	Bit Field	PGM0/1 Dependent
0xD1	MFR_SCENARIO_0	Manufactures specific device operating configurations.	R/W Byte	Bit Field	PGM1 Dependent
0xD2	MFR_SCENARIO_1	Manufactures specific device operating configurations.	R/W Byte	Bit Field	PGM1 Dependent

COMMAND CODE	COMMAND NAME	DESCRIPTION	TYPE	DATA FORMAT	FACTORY VALUE
0xD3	MFR_SCENARIO_2	Manufactures specific device operating configurations.	R/W Byte	Bit Field	PGM1 Dependent

On, Off, and Margin Testing Related Commands

OPERATION			
Reference:	Standard Command		
Command Code:	0x01	Format:	Bit Field
Data Bytes:	1	Units:	N/A
Transfer:	Read/Write Byte	Factory Value:	0x80
Description/Notes:	See <i>Section 12.1</i> of the PMBus Specification Part II.		
	This device supports two settings for the OPERATION command. Invalid data bytes trigger an “Invalid or Unsupported Data” response per <i>Section 10.9.3</i> of the PMBus specification.		
	Supported values for the OPERATION command:		
		</	

ON_OFF_CONFIG

Reference:	Standard Command										
Command Code:	0x02	Format:	Bit Field								
Data Bytes:	1	Units:	N/A								
Transfer:	Read/Write Byte	Factory Value:	0x1F								
Description/Notes:	<p>See <i>Section 12.2</i> of the PMBus Specification Part II.</p> <p>This device supports three settings for the ON_OFF_CONFIG command. Invalid data bytes trigger an “Invalid or Unsupported Data” response per <i>Section 10.9.3</i> of the PMBus specification.</p> <p>Supported Values for the ON_OFF_CONFIG command:</p> <table><tr><th>DATA BYTE VALUE</th><th>MEANING</th></tr><tr><td>0x17</td><td>Ignore OPERATION setting; require EN high for regulation; immediate-off on loss of EN</td></tr><tr><td>0x1B</td><td>Require OPERATION = 0x80 for regulation; ignore EN; immediate-off if OPERATION = 0x00</td></tr><tr><td>0x1F</td><td>Require both OPERATION = 0x80 and EN high for regulation; immediate-off on loss of EN or OPERATION = 0x00</td></tr></table>			DATA BYTE VALUE	MEANING	0x17	Ignore OPERATION setting; require EN high for regulation; immediate-off on loss of EN	0x1B	Require OPERATION = 0x80 for regulation; ignore EN; immediate-off if OPERATION = 0x00	0x1F	Require both OPERATION = 0x80 and EN high for regulation; immediate-off on loss of EN or OPERATION = 0x00
DATA BYTE VALUE	MEANING										
0x17	Ignore OPERATION setting; require EN high for regulation; immediate-off on loss of EN										
0x1B	Require OPERATION = 0x80 for regulation; ignore EN; immediate-off if OPERATION = 0x00										
0x1F	Require both OPERATION = 0x80 and EN high for regulation; immediate-off on loss of EN or OPERATION = 0x00										

Output Voltage Related Commands

VOUT_MODE			
Reference:	Standard Command		
Command Code:	0x20	Format:	Bit Field
Data Bytes:	1	Units:	N/A
Transfer:	Read Byte	Factory Value:	0x17 (N = -9)
Description/Notes: See <i>Section 13.1</i> of the PMBus Specification Part II. This device supports the PMBus ULINEAR16 format for the values of output voltage related commands. These commands return and receive 2-byte data which serve as the integer mantissa in the ULINEAR16 format. The read-only VOUT_MODE command has a value of 0x17, which indicates a ULINEAR16 exponent of N = -9.			

VOUT_COMMAND			
Reference:	Standard Command		
Command Code:	0x21	Format:	ULINEAR16
Data Bytes:	2	Units:	V
Transfer:	Read/Write Word	Factory Value:	0x0100 (0.5V)
Description/Notes: See <i>Section 13.2</i> of the PMBus Specification Part II. The device can receive PMBus ULINEAR16 values. VOUT_COMMAND data sent to and from the device is divided by 512 to determine the actual output voltage value, with an LSB size of 1.95mV. VOUT_COMMAND accepts values from 0x00CD (+400.4mV) to 0x019A (+800.8mV), provided that the VOUT_MAX value is not being exceeded. Output voltages higher than +800.8mV must be adjusted by means of an external resistive voltage divider.			

VOUT_MAX			
Reference:	Standard Command		
Command Code:	0x24	Format:	ULINEAR16
Data Bytes:	2	Units:	V
Transfer:	Read/Write Word	Factory Value:	0x019A (0.8V)
Description/Notes: See <i>Section 13.5</i> of the PMBus Specification Part II. VOUT_MAX accepts values from 0 to +800.8mV. The output must be disabled before writing to this command.			

Switching Frequency and Configuration Commands

MFR_PINSTRAP																			
Reference:	Analog Devices Specific																		
Command Code:	0xD0	Format:	Bit Field																
Data Bytes:	1	Units:	See Description																
Transfer:	Read/Write Byte	Factory Value:	PGM0/1 Dependent																
Description/Notes:	The MFR_PINSTRAP command sets the switching frequency, DCM operation, and POCP threshold for the device. It can be read at all times, but should only be written to when the output is disabled.																		
	The default values of switching frequency and POCP are selected by pin-strap resistors connected to the PGM0 and PGM1 pins of the IC.																		
	<table><tr><th>MFR_PINSTRAP [7:5]</th><th>SWITCHING FREQUENCY</th></tr><tr><td>0x0</td><td>500kHz</td></tr><tr><td>0x1</td><td>600kHz</td></tr><tr><td>0x2</td><td>750kHz</td></tr><tr><td>0x3</td><td>1000kHz</td></tr><tr><td>0x4</td><td>1200kHz</td></tr><tr><td>0x5</td><td>1500kHz</td></tr><tr><td>0x6</td><td>2000kHz</td></tr></table>			MFR_PINSTRAP [7:5]	SWITCHING FREQUENCY	0x0	500kHz	0x1	600kHz	0x2	750kHz	0x3	1000kHz	0x4	1200kHz	0x5	1500kHz	0x6	2000kHz
	MFR_PINSTRAP [7:5]	SWITCHING FREQUENCY																	
	0x0	500kHz																	
0x1	600kHz																		
0x2	750kHz																		
0x3	1000kHz																		
0x4	1200kHz																		
0x5	1500kHz																		
0x6	2000kHz																		
<table><tr><th>MFR_PINSTRAP [4]</th><th>DCM OPTION</th></tr><tr><td>0x0</td><td>Device is always in CCM operation (default)</td></tr><tr><td>0x1</td><td>Enable DCM operation at light load</td></tr></table>			MFR_PINSTRAP [4]	DCM OPTION	0x0	Device is always in CCM operation (default)	0x1	Enable DCM operation at light load											
MFR_PINSTRAP [4]	DCM OPTION																		
0x0	Device is always in CCM operation (default)																		
0x1	Enable DCM operation at light load																		
<table><tr><th>MFR_PINSTRAP [3:2]</th><th>POCP THRESHOLD (INDUCTOR PEAK CURRENT)</th></tr><tr><td>0x0</td><td>20A</td></tr><tr><td>0x1</td><td>17.3A</td></tr><tr><td>0x2</td><td>14.6A</td></tr><tr><td>0x3</td><td>12A</td></tr></table>			MFR_PINSTRAP [3:2]	POCP THRESHOLD (INDUCTOR PEAK CURRENT)	0x0	20A	0x1	17.3A	0x2	14.6A	0x3	12A							
MFR_PINSTRAP [3:2]	POCP THRESHOLD (INDUCTOR PEAK CURRENT)																		
0x0	20A																		
0x1	17.3A																		
0x2	14.6A																		
0x3	12A																		
<table><tr><th>MFR_PINSTRAP [1:0]</th><th>RESERVED/NOT USED</th></tr><tr><td>0x0</td><td>-</td></tr></table>			MFR_PINSTRAP [1:0]	RESERVED/NOT USED	0x0	-													
MFR_PINSTRAP [1:0]	RESERVED/NOT USED																		
0x0	-																		

MFR_SCENARIO_0

Reference:	Analog Devices Specific		
Command Code:	0xD1	Format:	Bit Field
Data Bytes:	1	Units:	See Description
Transfer:	Read/Write Byte	Factory Value:	PGM1 Dependent

Description/Notes: The MFR_SCENARIO_0 command sets the advanced modulation scheme (AMS) options, slope compensation settings, and DCM threshold for the device. It can be read at all times, but should only be written when the output is disabled.

The default settings for AMS and the slope compensation are selected by pin-strap resistors connected to the PGM1 pin of the IC.

MFR_SCENARIO_0 [7:4]	ADVANCED MODULATION SCHEME OPTION
0x0	AMS is disabled
0x9	AMS is enabled

MFR_SCENARIO_0 [0]	MFR_SCENARIO_0 [3:2]	SLOPE COMPENSATION
0x0	0x0	840nA
0x0	0x1	1260nA
0x0	0x2	1680nA
0x0	0x3	2100nA
0x1	0x0	2520nA
0x1	0x1	2940nA
0x1	0x2	3360nA
0x1	0x3	3780nA

MFR_SCENARIO_0 [1]	DCM THRESHOLD
0x0	DCM threshold is default, as in data sheet Electrical Characteristics table
0x1	DCM threshold is reduced by 20%

MFR_SCENARIO_1

Reference:	Analog Devices Specific		
Command Code:	0xD2	Format:	Bit Field
Data Bytes:	1	Units:	See Description
Transfer:	Read/Write Byte	Factory Value:	PGM1 Dependent

Description/Notes: The MFR_SCENARIO_1 command sets the voltage loop gain (RVGA), the soft start-up time, and VDDH OVLO option for the device. It can be read at all times, but should only be written when the output is disabled.

The default value of RVGA is selected by pin-strap resistors connected to the PGM1 pin of the IC.

MFR_SCENARIO_1 [7:4]	VOLTAGE LOOP GAIN (RVGA)
0x0	10.1kΩ
0x1	11.1kΩ
0x2	15.7kΩ
0x3	22.7kΩ
0x4	26.8kΩ
0x5	31.3kΩ
0x6	37.3kΩ
0x7	44.8kΩ
0x8	52.9kΩ
0x9	62.3kΩ
0xA	75.0kΩ
0xE	105.1kΩ

MFR_SCENARIO_1 [3]	SOFT-STARTUP TIME
0x0	3ms
0x1	1ms (default)

MFR_SCENARIO_1 [2]	VDDH OVLO OPTION
0x0	VHDD OVLO is enabled with a rising threshold of 17.8V (typical)
0x1	VHDD OVLO is disabled (default)

MFR_SCENARIO_1 [1:0]	RESERVED/NOT USED
0x0	-

MFR_SCENARIO_2

Reference:	Analog Devices Specific	Format:	Bit Field
Command Code:	0xD3	Units:	See Description
Data Bytes:	1	Factory Value:	PGM1 Dependent
Transfer:	Read/Write Byte		

Description/Notes: The MFR_SCENARIO_2 command sets the voltage loop zero for the device. It can be read at all times, but should only be written when the output is disabled.

The default value of the voltage loop zero is selected by pin-strap resistors connected to the PGM1 pin of the IC.

MFR_SCENARIO_2 [7:5]	VOLTAGE LOOP ZERO
0x0	3.22kHz
0x1	5kHz
0x2	7.6kHz
0x3	8.85kHz
0x4	10.6kHz
0x5	12.5kHz
0x6	15.2kHz
0x7	17.7kHz

MFR_SCENARIO_2 [4:0]	RESERVED/NOT USED
0x00	-

Status Commands

CLEAR_FAULTS			
Reference:	Standard Command		
Command Code:	0x03	Format:	N/A
Data Bytes:	0	Units:	N/A
Transfer:	Send Byte	Factory Value:	N/A
Description/Notes:	<p>See <i>Section 15.1</i> of the PMBus Specification Part II.</p> <p>When received, the CLEAR_FAULTS command clears any fault bits that have been set and resets all STATUS registers.</p>		

STATUS_BYTE			
Reference:	Standard Command		
Command Code:	0x78	Format:	Bit Field
Data Bytes:	1	Units:	N/A
Transfer:	Read Byte	Factory Value:	N/A
Description/Notes:	See <i>Section 17.1</i> of the PMBus Specification Part II.		
	BIT MEANING		
	7 Busy		
	6 Off		
	5 VOUT OV Fault		
	4 IOUT OC Fault		
	3 VIN UV Fault		
	2 TEMPERATURE Faults		
	1 CML Faults		
0	NONE OF THE ABOVE: A fault or warning not listed in bits [7:1] of STATUS_BYTE has occurred.		

STATUS_WORD

Reference:	Standard Command		
Command Code:	0x79	Format:	Bit Field
Data Bytes:	2	Units:	N/A
Transfer:	Read Word	Factory Value:	N/A

Description/Notes: See *Section 17.2* of the PMBus Specification Part II.

	BIT	MEANING
High Byte	15	VOUT Fault
	14	IOUT Fault
	13	VIN Fault
	12	Manufacturer-specific faults and warnings
	11	POWER_GOOD# (Power-Good signal not asserted)
	10	—
	9	—
	8	—
Low Byte	7	Busy
	6	Off
	5	VOUT OV Fault
	4	IOUT OC Fault
	3	VIN UV Fault
	2	TEMPERATURE Faults
	1	CML Faults
	0	NONE OF THE ABOVE: A fault or warning not listed in bits [7:1] of STATUS_BYTE has occurred.

STATUS_VOUT

Reference:	Standard Command																				
Command Code:	0x7A	Format:	Bit Field																		
Data Bytes:	1	Units:	N/A																		
Transfer:	Read Byte	Factory Value:	N/A																		
Description/Notes:	See <i>Section 17.3</i> of the PMBus Specification Part II.																				
	<table><tr><th>BIT</th><th>MEANING</th></tr><tr><td>7</td><td>VOUT OV Fault</td></tr><tr><td>6</td><td>—</td></tr><tr><td>5</td><td>—</td></tr><tr><td>4</td><td>VOUT UV Fault</td></tr><tr><td>3</td><td>VOUT MAX Warnings</td></tr><tr><td>2</td><td>—</td></tr><tr><td>1</td><td>—</td></tr><tr><td>0</td><td>—</td></tr></table>			BIT	MEANING	7	VOUT OV Fault	6	—	5	—	4	VOUT UV Fault	3	VOUT MAX Warnings	2	—	1	—	0	—
	BIT	MEANING																			
	7	VOUT OV Fault																			
	6	—																			
	5	—																			
	4	VOUT UV Fault																			
	3	VOUT MAX Warnings																			
	2	—																			
	1	—																			
0	—																				

STATUS_IOUT

Reference:	Standard Command																				
Command Code:	0x7B	Format:	Bit Field																		
Data Bytes:	1	Units:	N/A																		
Transfer:	Read Byte	Factory Value:	N/A																		
Description/Notes:	See <i>Section 17.4</i> of the PMBus Specification Part II.																				
	<table><tr><th>BIT</th><th>MEANING</th></tr><tr><td>7</td><td>IOUT OC Fault</td></tr><tr><td>6</td><td>—</td></tr><tr><td>5</td><td>—</td></tr><tr><td>4</td><td>—</td></tr><tr><td>3</td><td>—</td></tr><tr><td>2</td><td>—</td></tr><tr><td>1</td><td>—</td></tr><tr><td>0</td><td>—</td></tr></table>			BIT	MEANING	7	IOUT OC Fault	6	—	5	—	4	—	3	—	2	—	1	—	0	—
	BIT	MEANING																			
	7	IOUT OC Fault																			
	6	—																			
	5	—																			
	4	—																			
	3	—																			
	2	—																			
1	—																				
0	—																				

STATUS_INPUT

Reference:	Standard Command																				
Command Code:	0x7C	Format:	Bit Field																		
Data Bytes:	1	Units:	N/A																		
Transfer:	Read Byte	Factory Value:	N/A																		
Description/Notes:	See <i>Section 17.5</i> of the PMBus Specification Part II.																				
	<table><tr><th>BIT</th><th>MEANING</th></tr><tr><td>7</td><td>VIN OV Fault</td></tr><tr><td>6</td><td>—</td></tr><tr><td>5</td><td>—</td></tr><tr><td>4</td><td>VIN UV Fault</td></tr><tr><td>3</td><td>Unit Off due to Low Input Voltage</td></tr><tr><td>2</td><td>—</td></tr><tr><td>1</td><td>—</td></tr><tr><td>0</td><td>—</td></tr></table>			BIT	MEANING	7	VIN OV Fault	6	—	5	—	4	VIN UV Fault	3	Unit Off due to Low Input Voltage	2	—	1	—	0	—
	BIT	MEANING																			
	7	VIN OV Fault																			
	6	—																			
	5	—																			
	4	VIN UV Fault																			
	3	Unit Off due to Low Input Voltage																			
	2	—																			
	1	—																			
0	—																				

STATUS_TEMPERATURE

Reference:	Standard Command		
Command Code:	0x7D	Format:	Bit Field
Data Bytes:	1	Units:	N/A
Transfer:	Read Byte	Factory Value:	N/A
Description/Notes:	See <i>Section 17.6</i> of the PMBus Specification Part II.		
	BIT MEANING		
	7 OT Fault		
	6 —		
	5 —		
	4 —		
	3 —		
	2 —		
	1 —		
0 —			

STATUS_CML

Reference:	Standard Command		
Command Code:	0x7E	Format:	Bit Field
Data Bytes:	1	Units:	N/A
Transfer:	Read Byte	Factory Value:	N/A
Description/Notes:	See <i>Section 17.7</i> of the PMBus Specification Part II.		
	BIT MEANING		
	7 Invalid or Unsupported Command Received		
	6 Invalid or Unsupported Data Received		
	5 Packet Error Check Failed		
	4 —		
	3 —		
	2 — (Reserved, per PMBus specification)		
	1 A communication fault other than the ones listed in this table has occurred.		
	0 —		

STATUS_MFR_SPECIFIC

Reference:	Standard Command																				
Command Code:	0x80	Format:	Bit Field																		
Data Bytes:	1	Units:	N/A																		
Transfer:	Read Byte	Factory Value:	N/A																		
Description/Notes:	See <i>Section 17.9</i> of the PMBus Specification Part II.																				
	<table><tr><th>BIT</th><th>MEANING</th></tr><tr><td>7</td><td>Fast POCP Fault. Once triggered, cannot be cleared until power cycle.</td></tr><tr><td>6</td><td>Seal Ring Fault. Once triggered, cannot be cleared until power cycle.</td></tr><tr><td>5</td><td>—</td></tr><tr><td>4</td><td>AVDD Undervoltage</td></tr><tr><td>3</td><td>BST Undervoltage</td></tr><tr><td>2</td><td>LX Short Fault. Once triggered, cannot be cleared until power cycle.</td></tr><tr><td>1</td><td>—</td></tr><tr><td>0</td><td>—</td></tr></table>			BIT	MEANING	7	Fast POCP Fault. Once triggered, cannot be cleared until power cycle.	6	Seal Ring Fault. Once triggered, cannot be cleared until power cycle.	5	—	4	AVDD Undervoltage	3	BST Undervoltage	2	LX Short Fault. Once triggered, cannot be cleared until power cycle.	1	—	0	—
BIT	MEANING																				
7	Fast POCP Fault. Once triggered, cannot be cleared until power cycle.																				
6	Seal Ring Fault. Once triggered, cannot be cleared until power cycle.																				
5	—																				
4	AVDD Undervoltage																				
3	BST Undervoltage																				
2	LX Short Fault. Once triggered, cannot be cleared until power cycle.																				
1	—																				
0	—																				

Telemetry Commands

READ_VIN			
Reference:	Standard Command	Format:	LINEAR11
Command Code:	0x88	Units:	V
Data Bytes:	2	Factory Value:	N/A
Transfer:	Read Word		
Description/Notes:	See <i>Section 18.1</i> of the PMBus Specification Part II.		

READ_VOUT			
Reference:	Standard Command	Format:	ULINEAR16
Command Code:	0x8B	Units:	V
Data Bytes:	2	Factory Value:	N/A
Transfer:	Read Word		
Description/Notes:	See <i>Section 18.4</i> of the PMBus Specification Part II. The READ_VOUT command returns the voltage at the feedback pin; the value is not adjusted for any external divider that might be present.		

READ_IOUT			
Reference:	Standard Command	Format:	LINEAR11
Command Code:	0x8C	Units:	A
Data Bytes:	2	Factory Value:	N/A
Transfer:	Read Word		
Description/Notes:	See <i>Section 18.5</i> of the PMBus Specification Part II.		

READ_TEMPERATURE_1			
Reference:	Standard Command	Format:	LINEAR11
Command Code:	0x8D	Units:	°C
Data Bytes:	2	Factory Value:	N/A
Transfer:	Read Word		
Description/Notes:	See <i>Section 18.6</i> of the PMBus Specification Part II.		

Inventory Information and Device Identification Commands

CAPABILITY			
Reference:	Standard Command		
Command Code:	0x19	Format:	Bit Field
Data Bytes:	1	Units:	N/A
Transfer:	Read Byte	Factory Value:	0xA0
Description/Notes:	See <i>Section 11.12</i> of the PMBus Specification Part II. The following features are supported: <ul style="list-style-type: none"> • Packet error checking • 1000kHz bus speed • LINEAR11 numeric format 		

IC_DEVICE_ID			
Reference:	Standard Command		
Command Code:	0xAD	Format:	ASCII String
Data Bytes:	8	Units:	N/A
Transfer:	Read Block	Factory Value:	"MAX20815"
Description/Notes:	See <i>Section 22.2.7</i> of the PMBus Specification Part II. The IC_DEVICE_ID is an 8-character ASCII string used to represent the part number of the IC. For this part, this command reads: "MAX20815".		

IC_DEVICE_REV			
Reference:	Standard Command		
Command Code:	0xAE	Format:	ASCII String
Data Bytes:	2	Units:	N/A
Transfer:	Read Block	Factory Value:	Device Revision (See Description)
Description/Notes:	See <i>Section 22.2.8</i> of the PMBus Specification Part II. The IC_DEVICE_REV is a 2-character ASCII string, representing a 5-bit device revision code from 00-31.		

Security Commands

WRITE_PROTECT													
Reference:	Standard Command												
Command Code:	0x10	Format:	Bit Field										
Data Bytes:	1	Units:	N/A										
Transfer:	Read/Write Byte	Factory Value:	0x20										
Description/Notes:	See <i>Section 11.1</i> of the PMBus Specification Part II.												
	Only the following values of WRITE_PROTECT are supported:												
	<table><tr><th>DATA BYTE VALUE</th><th>MEANING</th></tr><tr><td>0x80</td><td>Disable all writes except to the WRITE_PROTECT command</td></tr><tr><td>0x40</td><td>Disable all writes except to the WRITE_PROTECT and OPERATION commands</td></tr><tr><td>0x20</td><td>Disable all writes except to the WRITE_PROTECT, OPERATION, ON_OFF_CONFIG, and VOUT_COMMAND commands</td></tr><tr><td>0x00</td><td>Enable writes to all commands</td></tr></table>			DATA BYTE VALUE	MEANING	0x80	Disable all writes except to the WRITE_PROTECT command	0x40	Disable all writes except to the WRITE_PROTECT and OPERATION commands	0x20	Disable all writes except to the WRITE_PROTECT, OPERATION, ON_OFF_CONFIG, and VOUT_COMMAND commands	0x00	Enable writes to all commands
	DATA BYTE VALUE	MEANING											
	0x80	Disable all writes except to the WRITE_PROTECT command											
0x40	Disable all writes except to the WRITE_PROTECT and OPERATION commands												
0x20	Disable all writes except to the WRITE_PROTECT, OPERATION, ON_OFF_CONFIG, and VOUT_COMMAND commands												
0x00	Enable writes to all commands												
Note that despite the CLEAR_FAULTS command being a Send Byte command, this command too is protected by WRITE_PROTECT. Therefore, WRITE_PROTECT needs to be set to 0x00 in order to send a CLEAR_FAULTS command.													

Trademarks

SMBus is a trademark of SMIF, Inc.

PMBus is a trademark of SMIF, Inc.

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	5/24	Initial release	—

©2024 Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices. Trademarks and registered trademarks are the property of their respective owners.