LTM4739

Supported PMBus and Manufacturer-Specific Command Set Definitions

ABSTRACT

This user reference manual describes the power management bus (PMBus) commands implemented in the LTM4739 power µModule® (micromodule) integrated step-down switching regulator. The standard commands from the PMBus specification are not described in detail unless there are deviations from the PMBus specification's functionality. The Analog Devices manufacturer-specific commands are fully described in this user reference manual.

INTRODUCTION

This user reference manual describes the PMBus commands implemented in the LTM4739 (module). The module implements a subset of the PMBus application profile commands for DC-to-DC point of loads.

The module command's functionality is based on the PMBus Specification Rev. 1.3 (Part II) and the system management bus (SMBus) Specification Rev. 2.0, which are therefore referenced throughout this user reference manual. The PMBus/SMBus specifications can be found on their respective organizations' websites. Refer to the *PMBus* or the *SMBus* websites and use the browser search button to find the archived PMBus Specification Rev. 1.3 (Part II) or the SMBus Specification Rev. 2.0 related documentation.

OVERVIEW

The module is a single-phase point-of-load (POL) buck regulator with a PMBus interface. It provides a precisely regulated output voltage programmable through two external resistors from 0.4V to 5.5V.

The module features a selectable Advanced modulation scheme (AMS) to provide improved performance during fast-load transients. Operation settings and configurable features can be selected by connecting pin-strap resistors from the PGMn pins to ground or using the PMBus commands.

LTM4739 MAJOR FEATURES

- Forced continuous mode (FCM) and discontinuous-conduction mode (DCM) operation.
- Fixed frequency control loop.
- Configurable and programmable frequency from 500kHz to 2MHz.
- Selectable advanced modulation scheme (AMS) to improve transient response.
- High efficiency with an optional external bias input supply.
- Pin-strap programmability.
- PMBus telemetry of output current, output/input voltage, and junction temperature.
- PMBus adaptive voltage scaling (AVS) of 0.4V to 0.8V reference range.
- PMBus fault or warning monitoring for input/output undervoltage (UV), overvoltage (OV), overcurrent (OC), overpower, and communication, memory, or logic (CML) faults.

LTM4739 RELATED FILES

FILE	DESCRIPTION
LTM®4739	Data sheet
EVAL-LTM4739-AZ	Evaluation (demo) board

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TABLE OF CONTENTS

Abstract 1
Introduction 1
Overview 1
LTM4739 Major Features 1
LTM4739 Related Files 1
Commands Format 3
COMMAND_NAME 3
PMBus Communication Protocol 3
Read Transaction Protocol 4
Write Transaction Protocol 5
Send Byte Transaction Protocol 5
PMBus Timing Diagrams 6
PMBus Supported Commands 7
On, Off, and Margin Testing Related Commands 9
OPERATION Command 9
Supported OPERATION Data Byte Definitions 9
ON_OFF_CONFIG Command 10
Supported ON_OFF_CONFIG Data Byte Definitions 10
Output Voltage Related Commands 11
VOUT_MODE Command 11
VOUT_COMMAND 11
VOUT_MAX Command 12
Switching Frequency and Configuration Commands 13
MFR_PINSTRAP Command 13
MFR_PINSTRAP Values Detail 13
MFR_SCENARIO_0 Command 14
MFR_SCENARIO_0 Values Detail 14
MFR_SCENARIO_1 Command 15
MFR_SCENARIO_1 Values Detail 15
MFR_SCENARIO_2 Command 16
MFR_SCENARIO_2 Values Detail 16
Status Commands 17
CLEAR_FAULTS Command 17
STATUS_BYTE Command 17
Supported STATUS_BYTE Bits Definitions 17
STATUS_WORD Command 18
Supported STATUS_WORD Bit Definitions 18
STATUS_VOUT Command 19
Supported STATUS_VOUT Bit Definitions 19
STATUS_IOUT Command 20
Supported STATUS_IOUT Bit Definitions 20
STATUS_INPUT Command 21
Supported STATUS_INPUT Bit Definitions 21
STATUS_TEMPERATURE Command 22
Supported STATUS_TEMPERATURE Bit Definitions 22
STATUS_CML Command 23
Supported STATUS_CML Bit Definitions 23
STATUS_MFR_SPECIFIC Command 24
Supported STATUS_MFR_SPECIFIC Bit Definitions 24
Telemetry Commands 25
READ_VIN Command 25
READ_VOUT Command 25
READ_IOUT Command 25
READ_TEMPERATURE_1 Command 26
Inventory Information and Device Identification Commands 26
CAPABILITY Command 26
IC_DEVICE_ID 27
IC_DEVICE_REV Command 27
Security Commands 28
WRITE_PROTECT Command 28
WRITE_PROTECT Supported Data Byte Definitions 28
Revision History 29

COMMANDS FORMAT

The commands in this user reference manual are presented in the following format.

COMMAND_NAME

Reference	<Standard command or Analog Devices manufacturer-specific command>
Command Code	<Hex Value>
Data Bytes	<Byte Count>
Transfer	<SMBus Transaction Type>
Format	<Data Format>
Units	<Unit of Measure>
Factory Value	<Factory Setting>
Description/Notes	<Command definition if “Analog Devices manufacturer-specific”; or Notes on command functionality where it differs from the PMBus specification.>

PMBus COMMUNICATION PROTOCOL

Table 1 describes the protocol and command packet formats required for executing the PMBus transactions on the module. The PMBus communication protocol has been implemented in compliance with the PMBus Specification Rev. 1.3 (Part II).

Table 1. Bit and Byte Symbols Legend

SYMBOL	DESCRIPTION
S	Start condition. This indicates the start of a transaction. The SCL and SDA lines are initially high; SDA transitions are low while SCL is high, and SCL transitions are low thereafter.
Sr	Repeated start condition. It behaves similarly to the standard start condition, except it is sent after a start condition without there being a stop condition in between.
Rd	Read. Bit Value of 1.
Wr	Write. Bit Value of 0.
A	Acknowledge. This bit position may be 0 for an acknowledge. If a byte transaction is successful, the receiver sends an acknowledge by pulling SDA low for the next SCL pulse.
NA	No-Acknowledge (NACK). This bit position may be 1 for a NACK. 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.
P	Stop condition. This indicates the completion of a transaction. The SCL and SDA lines are initially low, SCL transitions are high, while the SDA is low, and the SDA transitions are high thereafter.
PEC	Packet error code. An optional byte that is sent at the end of the transaction to protect against data corruption is calculated using a CRC-8 checksum.

SYMBOL	DESCRIPTION
DEVICE ADDRESS (MAIN/SUBORDINATE)	The module's 7-bit address can be configured using the PGM0 resistor. The main device 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 to indicate the type of transaction.
• • •	Protocol continuation.
COMMAND CODE	All the supported PMBus commands have an associated command code to indicate which command the main device wishes to execute.
DATA BYTE	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+).

READ TRANSACTION PROTOCOL

The read byte, read word, and read block are the main types of reading transactions that are supported by the module. See *Figure 1* for a bit and byte symbols legend.

The command packet format for a read transaction is dependent on the specific transaction type, which varies with respect to each PMBus command (see *Figure 2* through *Figure 4*). The appropriate read transaction type for each command is specified in its designated section within this user reference guide.

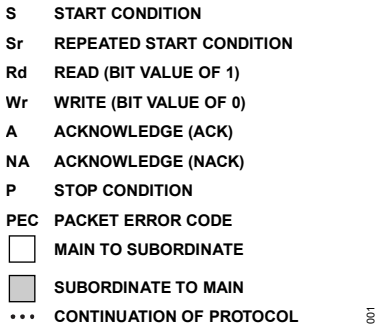

Figure 1. Bit and Byte Symbols Legend

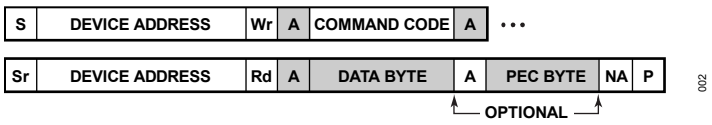

Figure 2. Packet Format for a Read Byte Operation

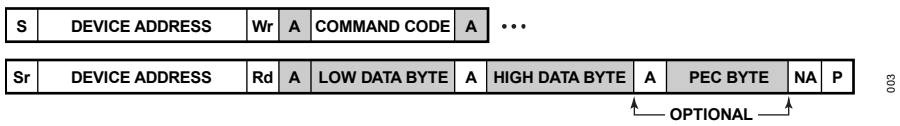

Figure 3. Packet Format for a Read Word Operation

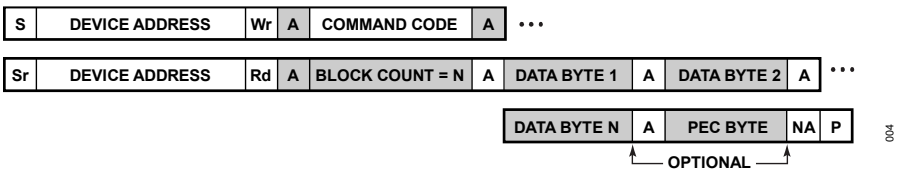

Figure 4. Packet Format for a Read Block Operation

WRITE TRANSACTION PROTOCOL

The write byte and write word are the two main types of writing commands supported by the module. See *Figure 5* through *Figure 6* for more details.

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 user reference guide.

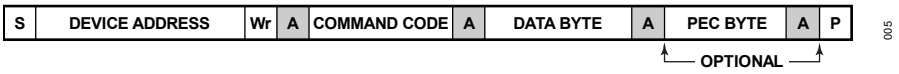

Figure 5. Packet Format for a Write Byte Operation

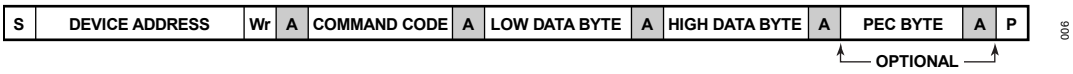

Figure 6. Packet Format for a Write Word Operation

SEND BYTE TRANSACTION PROTOCOL

The command packet format, *Figure 7*, should be used for a send byte operation.

Figure 7. Packet Format for a Send Byte Operation

PMBus TIMING DIAGRAMS

Figure 8 and *Figure 9* 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.

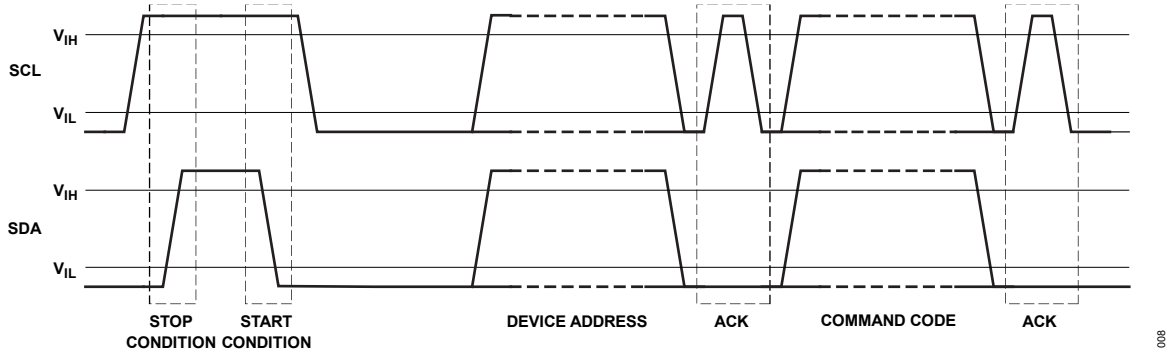

Figure 8. Read Byte First Transaction PMBus Timing Diagram

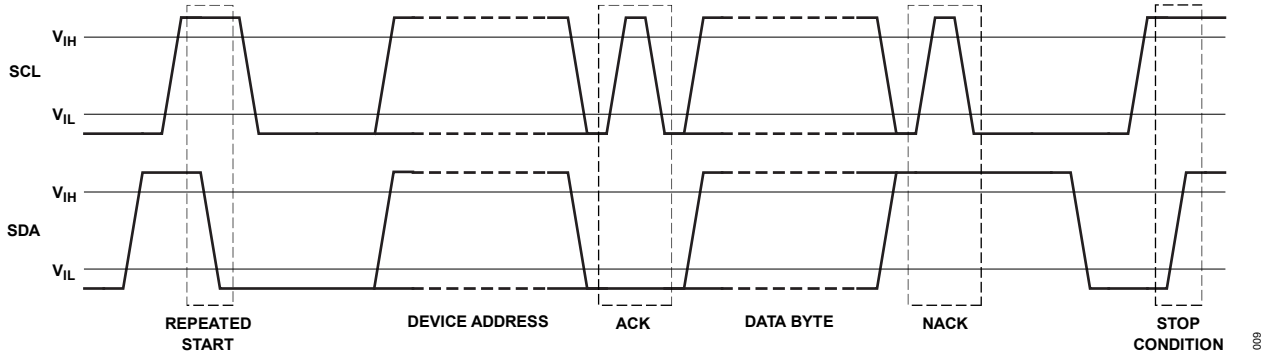

Figure 9. Read Byte Second Transaction PMBus Timing Diagram

PMBus SUPPORTED COMMANDS

Table 2 summarizes the supported PMBus commands by the module. *Table 2* provides a brief description of each command and its command code, transaction type, data format, and factory value, where applicable.

Table 2. Supported PMBus Commands

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	Clear any fault bits that have been set.	Send byte	N/A	N/A
0x10	WRITE_PROTECT	The 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	The upper limit of the reference voltage setpoint.	R/W word	ULINEAR16	0x019A
0x78	STATUS_BYTE	One-byte summary of the unit's fault condition.	R byte	Bit field	N/A
0x79	STATUS_WORD	Two-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	Manufacturing-specific faults and warning status.	R byte	Bit field	N/A

COMMAND CODE	COMMAND NAME	DESCRIPTION	TYPE	DATA FORMAT	FACTORY VALUE
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	“LTM4739”
0xAE	IC_DEVICE_REV	Device revision code.	R block	ASCII	N/A
0xD0	MFR_PINSTRAP	Manufacturer-specific device operating configurations.	R/W byte	Bit field	PGM0/PGM1 dependent
0xD1	MFR_SCENARIO_0	Manufacturer-specific device operating configurations.	R/W byte	Bit field	PGM1 dependent
0xD2	MFR_SCENARIO_1	Manufacturer-specific device operating configurations.	R/W byte	Bit field	PGM1 dependent
0xD3	MFR_SCENARIO_2	Manufacturer-specific device operating configurations.	R/W byte	Bit field	N/A

ON, OFF, AND MARGIN TESTING RELATED COMMANDS

OPERATION Command

Reference	Standard Command
Command Code	0x01
Data Bytes	1
Transfer	Read/Write Byte
Format	Bit Field
Units	N/A
Factory Value	0x80
Description/Notes	Refer to Section 12.1 of the PMBus Specification Part II for a full description of this command. The module supports two settings for the OPERATION command. Invalid data bytes trigger an “Invalid or Unsupported Data” response. For more details, refer to Section 10.9.3 of the PMBus specification.

Supported OPERATION Data Byte Definitions

DATA BYTE VALUE	MEANING
0x00	Immediate-off, no sequencing.
0x80	Output enabled, if allowed by the ON_OFF_CONFIG setting.

ON_OFF_CONFIG Command

Reference	Standard Command
Command Code	0x02
Data Bytes	1
Transfer	Read/Write Byte
Format	Bit Field
Units	N/A
Factory Value	0x1F
Description/Notes	Refer to Section 12.2 of the PMBus Specification Part II for a full description of this command. The module supports three settings for the ON_OFF_CONFIG command. Invalid data bytes trigger an “Invalid or Unsupported Data” response. For more details, refer to Section 10.9.3 of the PMBus specification.

Supported ON_OFF_CONFIG Data Byte Definitions

DATA BYTE VALUE	MEANING
0x17	Ignore the OPERATION setting, required EN high for regulation, immediate-off on loss of EN.
0x1B	Required OPERATION = 0x80 for regulation, ignore EN, immediate-off if OPERATION = 0x00.
0x1F	Required both OPERATION = 0x80 and EN high for regulation, immediate-off on loss of EN or OPERATION = 0x00.

OUTPUT VOLTAGE RELATED COMMANDS

VOUT_MODE Command

Reference	Standard Command
Command Code	0x20
Data Bytes	1
Transfer	Read Byte
Format	Bit Field
Units	N/A
Factory Value	0x17 (N = –9)
Description/Notes	Refer to Section 13.1 of the PMBus Specification Part II for a full description of this command. The module supports the PMBus format for the values of output voltage-related commands. These commands return and receive two-byte data, which serves 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
Data Bytes	2
Transfer	Read/Write Word
Format	ULINEAR16
Units	V
Factory Value	0x0100 (0.5V)
Description/Notes	Refer to Section 13.2 of the PMBus Specification Part II for a full description of this command. The module can receive PMBus ULINEAR16 values. The VOUT_COMMAND data sent to and from the module is divided by 512 to determine the actual output voltage value, with an LSB size of 1.95mV. The VOUT_COMMAND accepts values from 0x0CD (400.4mV) to 0x19A (800.8mV), provided that the VOUT_MAX value is not being exceeded. The output voltages higher than 800.8mV must be adjusted using an external resistive voltage divider.

VOUT_MAX Command

Reference	Standard Command
Command Code	0x24
Data Bytes	2
Transfer	Read/Write Word
Format	ULINEAR16
Units	V
Factory Value	0x19A (0.8V)
Description/Notes	Refer to Section 13.5 of the PMBus Specification Part II for a full description of this command. The VOUT_MAX command accepts values from 0V to 800.8mV.

SWITCHING FREQUENCY AND CONFIGURATION COMMANDS

MFR_PINSTRAP Command

Reference Analog Devices Manufacturer-Specific Command
Command Code 0xD0
Data Bytes 1
Transfer Read/Write Byte
Format Bit Field
Units See Description/Notes
Factory Value PGM0/1 Dependent
Description/Notes The MFR_PINSTRAP command sets the switching frequency, FCM operation, DCM operation, and the positive overcurrent (POC) protection threshold for the module. It can always be read, but it should only be written when the output is disabled.

The default values for the switching frequency and the POC protection are selected by the pin-strap resistors connected to the PGM0 and PGM1 pins of the module.

MFR_PINSTRAP Values Detail

MFR_PINSTRAP [7:5]	SWITCHING FREQUENCY
0x0	500kHz
0x1	600kHz
0x2	750kHz
0x3	1MHz
0x4	1.2MHz
0x5	1.5MHz
0x6	2MHz
MFR_PINSTRAP [4]	**FCM/DCM OPTION**
0x0	The device is always in FCM operation (default).
0x1	Enable DCM operation at light load.
MFR_PINSTRAP [3:2]	**POSITIVE OC PROTECTION THRESHOLD (INDUCTOR PEAK CURRENT)**
0x0	15A
0x1	13A
0x2	11A
0x3	9A
MFR_PINSTRAP [1:0]	**RESERVED/NOT USED**
0x0	—

MFR_SCENARIO_0 Command

Reference Analog Devices Manufacturer-Specific Command
Command Code 0xD1
Data Bytes 1
Transfer Read/Write Byte
Format Bit Field
Units See Description/Notes
Factory Value PGM1 Dependent
Description/Notes The MFR_SCENARIO_0 command sets the AMS options, slope compensation settings, and DCM threshold for the device. It can always be read but should only be written to 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 device.

MFR_SCENARIO_0 Values Detail

MFR_SCENARIO_0 [7:4]	ADVANCE MODULATION SCHEME OPTION	
0x0	AMS is disabled.	
0x9	AMS is enabled.	
MFR_SCENARIO_0 [0]	**MFR_SCENARIO_0 [3:2]**	**SLOPE COMPENSATION**
0x0	0x0	420nA
0x0	0x1	630nA
0x0	0x2	840nA
0x0	0x3	1050nA
0x1	0x0	1260nA
0x1	0x1	1470nA
0x1	0x2	1680nA
0x1	0x3	1890nA
MFR_SCENARIO_0 [1]	**FCM/DCM THRESHOLD**	
0x0	The DCM threshold is the default. Refer to the Electrical Characteristics table in the *LTM4739* datasheet.	
0x1	The DCM threshold is reduced by 20%.	

MFR_SCENARIO_1 Command

Reference	Analog Devices Manufacturer-Specific Command
Command Code	0xD2
Data Bytes	1
Transfer	Read/Write Byte
Format	Bit Field
Units	See Description/Notes
Factory Value	PGM1 Dependent
Description/Notes	The MFR_SCENARIO_1 command sets the voltage loop gain (R_{VGA}), the soft start-up time, and the V_{IN} OVLO option for the module. It can always be read but should only be written to when the output is disabled. The default value of R_{VGA} is selected by pin-strap resistors connected to the module's PGM1 pin.

MFR_SCENARIO_1 Values Detail

MFR_ SCENARIO_1 [7:4]	VOLTAGE LOOP GAIN (R_{VGA})
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]	**V_{IN} OVLO OPTION**
0x0	V_{IN} OVLO is enabled with a rising threshold of 17.8V (typical).
0x1	V_{IN} OVLO is disabled (default).
MFR_SCENARIO_1 [1:0]	**RESERVED/NOT USED**
0x0	—

MFR_SCENARIO_2 Command

Reference	Analog Devices Manufacturer-Specific Command
Command Code	0xD3
Data Bytes	1
Transfer	Read/Write Byte
Format	Bit Field
Units	See Description/Notes
Factory Value	N/A
Description/Notes	The MFR_SCENARIO_2 command sets the voltage loop to zero for the module. It can always be read but should only be written to when the output is disabled.

MFR_SCENARIO_2 Values Detail

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 Command

Reference	Standard Command
Command Code	0x03
Data Bytes	0
Transfer	Send Byte
Format	N/A
Units	N/A
Factory Value	N/A
Description/Notes	Refer to Section 15.1 of the PMBus Specification Part II for a full description of this command. When received, the CLEAR_FAULTS command clears any fault bits that have been set and resets all STATUS command registers.

STATUS_BYTE Command

Reference	Standard Command
Command Code	0x78
Data Bytes	1
Transfer	Read Byte
Format	Bit Field
Units	N/A
Factory Value	N/A
Description/Notes	Refer to Section 17.1 of the PMBus Specification Part II for a full description of this command.

Supported STATUS_BYTE Bits Definitions

BIT	MEANING
7	Busy
6	Off
5	V_{OUT} OV fault
4	I_{OUT} OC fault
3	V_{IN} UV fault
2	TEMPERATURE faults
1	CML faults
0	None of the above: A fault or warning not listed in bits [7:1] of the STATUS_BYTE command has occurred.

STATUS_WORD Command

Reference	Standard Command
Command Code	0x79
Data Bytes	2
Transfer	Read Word
Format	Bit field
Units	N/A
Factory Value	N/A
Description/Notes	Refer to Section 17.2 of the PMBus Specification Part II for a full description of this command.

Supported STATUS_WORD Bit Definitions

BIT	MEANING
High Byte	
15	V_{OUT} fault
14	I_{OUT} fault
13	V_{IN} fault
12	Manufacturer-specific faults and warnings
11	POWER_$\overline{GOOD}$ (power good signal not asserted)
10	—
9	—
8	—
Low Byte	
7	Busy
6	Off
5	V_{OUT} OV fault
4	I_{OUT} OC fault
3	V_{IN} UV fault
2	Temperature faults
1	CML faults
0	None of the above: A fault or warning not listed in bits [7:1] of the STATUS_BYTE command has occurred.

STATUS_VOUT Command

Reference	Standard Command
Command Code	0x7A
Data Bytes	1
Transfer	Read Byte
Format	Bit field
Units	N/A
Factory Value	N/A
Description/Notes	Refer to Section 17.3 of the PMBus Specification Part II for a full description of this command.

Supported STATUS_VOUT Bit Definitions

BIT	MEANING
7	V_{OUT} OV fault
6	—
5	—
4	V_{OUT} UV fault
3	V_{OUT} max warnings
2	—
1	—
0	—

STATUS_IOUT Command

Reference	Standard Command
Command Code	0x7B
Data Bytes	1
Transfer	Read Byte
Format	Bit Field
Units	N/A
Factory Value	N/A
Description/Notes	Refer to Section 17.4 of the PMBus Specification Part II for a full description of this command.

Supported STATUS_IOUT Bit Definitions

BIT	MEANING
7	IOUT OC fault
6	—
5	—
4	—
3	—
2	—
1	—
0	—

STATUS_INPUT Command

Reference	Standard Command
Command Code	0x7C
Data Bytes	1
Transfer	Read Byte
Format	Bit Field
Units	N/A
Factory Value	N/A
Description/Notes	Refer to Section 17.5 of the PMBus Specification Part II for a full description of this command.

Supported STATUS_INPUT Bit Definitions

BIT	MEANING
7	V_{IN} OV fault
6	—
5	—
4	V_{IN} UV fault
3	The unit is off due to low input voltage
2	—
1	—
0	—

STATUS_TEMPERATURE Command

Reference	Standard Command
Command Code	0x7D
Data Bytes	1
Transfer	Read Byte
Format	Bit Field
Units	N/A
Factory Value	N/A
Description/Notes	Refer to Section 17.6 of the PMBus Specification Part II for a full description of this command.

Supported STATUS_TEMPERATURE Bit Definitions

BIT	MEANING
7	OT fault
6	—
5	—
4	—
3	—
2	—
1	—
0	—

STATUS_CML Command

Reference	Standard Command
Command Code	0x7E
Data Bytes	1
Transfer	Read Byte
Format	Bit Field
Units	N/A
Factory Value	N/A
Description/Notes	Refer to Section 17.7 of the PMBus Specification Part II for a full description of this command.

Supported STATUS_CML Bit Definitions

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 section has occurred.
0	—

STATUS_MFR_SPECIFIC Command

Reference	Standard Command
Command Code	0x80
Data Bytes	1
Transfer	Read Byte
Format	Bit Field
Units	N/A
Factory Value	N/A
Description/Notes	Refer to Section 17.9 of the PMBus Specification Rev. 1.3 (Part II).

Supported STATUS_MFR_SPECIFIC Bit Definitions

BIT	MEANING
7	Fast POC protection fault. Once triggered, it cannot be cleared until the power cycle.
6	Seal ring fault. Once triggered, it cannot be cleared until the power cycle.
5	—
4	AV_{DD} undervoltage.
3	BST undervoltage.
2	SW short fault. Once triggered, it cannot be cleared until the power cycle.
1	—
0	—

TELEMETRY COMMANDS

READ_VIN Command

Reference	Standard Command
Command Code	0x88
Data Bytes	2
Transfer	Read Word
Format	LINEAR11
Units	V
Factory Value	N/A
Description/Notes	Refer to Section 18.1 of the PMBus Specification Part II for a full description of this command.

READ_VOUT Command

Reference	Standard Command
Command Code	0x8B
Data Bytes	2
Transfer	Read Word
Format	ULINEAR16
Units	V
Factory Value	N/A
Description/Notes	Refer to Section 18.4 of the PMBus Specification Part II for a full description of this command. 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 Command

Reference	Standard Command
Command Code	0x8C
Data Bytes	2
Transfer	Read Word
Format	LINEAR11
Units	A
Factory Value	N/A
Description/Notes	Refer to Section 18.5 of the PMBus Specification Part II for a full description of this command.

READ_TEMPERATURE_1 Command

Reference	Standard Command
Command Code	0x8D
Data Bytes	2
Transfer	Read Word
Format	LINEAR11
Units	°C
Factory Value	N/A
Description/Notes	Refer to Section 18.6 of the PMBus Specification Part II for a full description of this command.

INVENTORY INFORMATION AND DEVICE IDENTIFICATION COMMANDS

CAPABILITY Command

Reference	Standard Command
Command Code	0x19
Data Bytes	1
Transfer	Read Byte
Format	Bit Field
Units	N/A
Factory Value	0xA0
Description/Notes	Refer to Section 11.12 of the PMBus Specification Part II for a full description of this command. The following features are supported by the CAPABILITY command. ▶ Packet error checking. ▶ 1MHz bus speed. ▶ LINEAR11 numeric format.

IC_DEVICE_ID

Reference	Standard Command
Command Code	0xAD
Data Bytes	9
Transfer	Read Block
Format	ASCII String
Units	N/A
Factory Value	See Description/Notes
Description/Notes	Refer to Section 22.2.7 of the PMBus Specification Part II for a full description of this command. The IC_DEVICE_ID command is a 9-character ASCII string used to represent the part number. For this module, this command reads: “LTM4739”

IC_DEVICE_REV Command

Reference	Standard Command
Command Code	0xAE
Data Bytes	2
Transfer	Read Block
Format	ASCII String
Units	N/A
Factory Value	Device Revision (see Description/Notes)
Description/Notes	Refer to Section 22.2.8 of the PMBus Specification Part II for a full description of this command. The IC_DEVICE_REV command is a 2-character ASCII string, representing a five-bit device revision code from 00−31.

SECURITY COMMANDS

WRITE_PROTECT Command

Reference	Standard Command
Command Code	0x10
Data Bytes	1
Transfer	Read/Write Byte
Format	Bit Field
Units	N/A
Factory Value	0x20
Description/Notes	Refer to Section 11.1 of the PMBus Specification Part II for a full description of this command.

WRITE_PROTECT Supported Data Byte Definitions

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 type, this command is also protected by the WRITE_PROTECT command. Therefore, the WRITE_PROTECT command must be set to 0x00 to send a CLEAR_FAULTS command.

REVISION HISTORY

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	6/25	Initial release	—