

RS-485 Communications Manual

MultiLite Digital Temperature Scanner Indicator



PMD-MXT Series

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1.0 General

1.0.1 Command Termination

All commands for the PMD-MXT Temperature Scanner are ASCII based and terminated <trm> with <cr> or <lf>.

1.0.2 Command Delimiters

Read commands = #, Get commands = \$, Set commands = %

Successful commands are followed by an = or !.

Unsuccessful commands are followed by an ?.

1.0.3 Instrument Address and Baud Rate

Instrument Address and Baud Rate must be set using the front panel key pad.

For additional instructions, please refer to the *PMD-MXT MultiLite Digital Temperature Scanner Indicator Instruction Manual*

1.0.4 RS-485 Wiring

RS-485	PMD-MXT (Terminal #)
D +	A + (17)
D -	B - (18)

2.0 Read Commands

2.0.1 Read Measured Value Commands

#	AA	BB	CC	<trm>
	Instrument Address	Starting Channel	Ending Channel	Terminator

Example 1: Read Instrument 1, Measured Value of Channel 1 Only

Command: #0101

Response: =+0435.@

(Channel 1 value is +435, Channel 1 is not in an active Alarm state)

Example 2: Read Instrument 1, Measured Value of Channel 1 thru Channel 8

Command: #010108

Response: =+0435.@=+0435.@=+0435.@=+0435.@=+0435.@=+0435.@=+0600.A=-0020.B

(Channel 1 thru Channel 8 values, Channel 7 and Channel 8 are in an active Alarm state)

NOTE: The @ symbol means the channel is not in Alarm. If a letter from "A" to "O" is present, this means that that particular channel is in an active Alarm state. The letter "A" to "O" defines which of the 4 Alarms are active based upon the chart below.

Alarm #	1	2	3	4	Result
	OFF	OFF	OFF	OFF	@
	ON	OFF	OFF	OFF	A
	OFF	ON	OFF	OFF	B
	ON	ON	OFF	OFF	C
	OFF	OFF	ON	OFF	D
	ON	OFF	ON	OFF	E
	OFF	ON	ON	OFF	F
	ON	ON	ON	OFF	G
	OFF	OFF	OFF	ON	H
	ON	OFF	OFF	ON	I
	OFF	ON	OFF	ON	J
	ON	ON	OFF	ON	K
	OFF	OFF	ON	ON	L
	ON	OFF	ON	ON	M
	OFF	ON	ON	ON	N
	ON	ON	ON	ON	O

2.0.2 Read Alarm Group Status Commands

#	AA	BB	CC	<trm>
	Instrument Address	00	01	Terminator

This command is used for reading the alarm state of Channel 1 to Channel 40. Results are given as groups of 4, in 10 blocks.

The Response is given as: =@@@@@@@@@@@@

=	@	@	@	@	@	@	@	@	@	@
(Channels)	1 to 4	5 to 8	9 to 12	13 to 16	17 to 20	21 to 24	25 to 28	29 to 32	33 to 36	37 to 40

Group Channel #	1	2	3	4	Result
	OFF	OFF	OFF	OFF	@
	ON	OFF	OFF	OFF	A
	OFF	ON	OFF	OFF	B
	ON	ON	OFF	OFF	C
	OFF	OFF	ON	OFF	D
	ON	OFF	ON	OFF	E
	OFF	ON	ON	OFF	F
	ON	ON	ON	OFF	G
	OFF	OFF	OFF	ON	H
	ON	OFF	OFF	ON	I
	OFF	ON	OFF	ON	J
	ON	ON	OFF	ON	K
	OFF	OFF	ON	ON	L
	ON	OFF	ON	ON	M
	OFF	ON	ON	ON	N
	ON	ON	ON	ON	O

Example 1: Read Instrument 1, Alarm Status

Command: #010001

Response: =F@@@@@@@@@@@@

(Channel 2 and 3 are in an active Alarm state)

Example 2: Read Instrument 1, Alarm Status

Command: #010001

Response: =@@B@@HA@@@@

(Channel 10, Channel 24, and Channel 25 are in an active Alarm state)

3.0 Get Value Commands

3.0.1 Get Alarm Set Point Parameter Value Commands

\$	AA	BB	CC	<trm>
	Instrument Address	Channel	Parameter 00 = Alarm 1 Set Point 01 = Alarm 2 Set Point 02 = Alarm 3 Set Point 03 = Alarm 4 Set Point	Terminator

Example 1: Get Instrument 1, Channel 1, Alarm 1 Set Point Value

Command: \$010100

Response: !+0500.

(Instrument 1, Channel 1, Alarm 1, Set point value is +500 degrees)

3.0.2 Get Zero Offset Correction Parameter Value Commands

\$	AA	BB	CC	<trm>
	Instrument Address	Channel	Parameter 04 = Zero Offset Value	Terminator

Example 1: Get Instrument 1, Channel 1, Zero Offset Correction Value

Command: \$010104

Response: !+0000.

(Instrument 1, Channel 1, Zero Off Set Value is 0)

3.0.3 Get Multiplier Offset Correction Parameter Value Commands

\$	AA	BB	CC	<trm>
	Instrument Address	Channel	Parameter 05 = Multiplier Offset Value	Terminator

Example 1: Get Instrument 1, Channel 1, Multiplier Offset Correction Value

Command: \$010105

Response: !+1.000

(Instrument 1, Channel 1, Multiplier Offset Value is 1.0)

3.0.4 Get Input Signal Type Parameter Value Commands

\$	AA	BB	CC	<trm>
	Instrument Address	Channel	Parameter 06 = Input Type	Terminator

Example 1: Get Instrument 1, Channel 1, Input Signal Type

Command: \$010106

Response: !+0007.

(Instrument 1, Channel 1, Input Type is Thermocouple Type K)

NOTE:

- 0 = Off
- 1 = RTD PT100
- 2 = RTD Cu100
- 3 = RTD Cu50
- 4 = RTD BA1
- 5 = RTD BA2
- 6 = RTD G53
- 7 = Thermocouple Type K
- 8 = Thermocouple Type S
- 9 = Thermocouple Type R
- 10 = Thermocouple Type B
- 11 = Thermocouple Type N
- 12 = Thermocouple Type E
- 13 = Thermocouple Type J
- 14 = Thermocouple Type T

3.0.5 Get Decimal Point Position Parameter Value Commands

\$	AA	BB	CC	<trm>
	Instrument Address	Channel	Parameter 07 = Decimal Point Position	Terminator

Example 1: Get Instrument 1, Channel 1, Decimal Point Position

Command: \$010107

Response: !+0002.

(Instrument 1, Channel 1, Decimal Point Position is 000.0)

NOTE:

- 0.000 = 0
- 00.00 = 1
- 000.0 = 2
- 0000 = 3

3.0.6 Get Digital Filtering Time Coefficient Parameter Value Commands

\$	AA	BB	CC	<trm>
	Instrument Address	Channel	Parameter 0B = Digital Filtering Time	Terminator

Example 1: Get Instrument 1, Channel 1, Digital Filtering Time Coefficient

Command: \$01010B

Response: !+0001.

(Channel 1, Digital Filtering Time Coefficient is 1)

NOTE: Default is 1

3.0.7 Get Indicator Security Code Parameter Value Commands

\$	AA	BB	CC	<trm>
	Instrument Address	00	Parameter 10 = Security Code	Terminator

Example 1: Get Instrument 1, Security Code

Command: \$010010

Response: !+0000.

(Instrument 1, Security Code is 0000)

NOTE: Default is 0000

3.0.8 Get Indicator Switching Time Parameter Value Commands

\$	AA	BB	CC	<trm>
	Instrument Address	00	Parameter 11 = Switching Time	Terminator

Example 1: Get Instrument 1, Indicator Switching Time

Command: \$010011

Response: !+003.5

(Instrument 1, Indicator Switching Time is 3.5 seconds)

NOTE: Available setting range is from 0.5 to 10.0 seconds

3.0.9 Get Indicator Number of Active Channels Parameter Value Commands

\$	AA	BB	CC	<trm>
	Instrument Address	00	Parameter 12 = Channel Number	Terminator

Example 1: Get Instrument 1, Number of Active Channels

Command: \$010012

Response: !+0008.

(Number of Active Channels is 8)

NOTE: Changing this parameter allows user to activate a fewer number of channels than the Indicator is capable of.

For example, an 8-Channel Indicator can be set for 6 active channels only. The remaining 2 channels will be deactivated.

3.0.10 Get Indicator Alarm Type Parameter Value Commands

\$	AA	BB	CC	<trm>
	Instrument Address	00	Parameter 16 = Alarm 1 Type 17 = Alarm 2 Type 18 = Alarm 3 Type 19 = Alarm 4 Type	Terminator

Example 1: Get Instrument 1, Alarm 1 Type

Command: \$010016

Response: !+0000.

(Instrument 1, Alarm 1 Type is High)

NOTE: High Alarm = 0000, Low Alarm = 0001

3.0.11 Get Alarm 1 or Alarm 2 Hysteresis Parameter Value Commands

\$	AA	BB	CC	<trm>
	Instrument Address	00	Parameter 1A = Alarm 1 Hysteresis Value 1B = Alarm 2 Hysteresis Value	Terminator

Example 1: Get Instrument 1, Alarm 1 Hysteresis Value

Command: \$01001A

Response: !+0000.

(Instrument 1, Alarm Hysteresis is 0)

NOTE: Default is 0

3.0.12 Get Indicator Alarm Delay Time Parameter Value Commands

\$	AA	BB	CC	<trm>
	Instrument Address	00	Parameter 1C = Alarm Delay Time	Terminator

Example 1: Get Instrument 1, Alarm Delay Time

Command: \$01001C

Response: !+0000.

(Instrument 1, Alarm Delay Time is 0)

NOTE: Default is 0

3.0.13 Get Indicator RS-485 Communication Address Parameter Value Commands

\$	AA	BB	CC	<trm>
	Instrument Address	00	Parameter 1D = Communication Address	Terminator

Example 1: Get Instrument 1, RS-485 Communication Address

Command: \$01001D

Response: !+0001.

(Instrument 1, RS-485 Communication Address is 1)

NOTE: Default is 01

3.0.14 Get Indicator RS-485 Communication Baud Rate Parameter Value Commands

\$	AA	BB	CC	<trm>
	Instrument Address	00	Parameter 1E = Communication Baud Rate	Terminator

Example 1: Get Instrument 1, RS-485 Communication Baud Rate

Command: \$01001E

Response: !+0002.

(Instrument 1, RS-485 Communication Baud Rate is 9600)

NOTE:

2400 = 0

4800 = 1

9600 = 2 (Default)

19200 = 3

4.0 Set Value Commands

All Set Value Commands should be preceded by setting Security Code to 1111. After Value is changed, Security code should be reset to 0000.

The exception to the rule is when setting the Alarm Set Point Parameter Values (*section 4.0.1*) or Individual Set Point Parameter Values (*section 4.0.2 to 4.0.7*)

Successful command responses are preceded by an ! and then the Instrument Address (for example: ! 01). Unsuccessful command responses preceded by an ? and then the Instrument Address (for example: ? 01).

4.0.1 Set Alarm Set Point Parameter Value Commands

%	AA	BB	CC	DDDDD	<trm>
	Instrument Address	Channel	Parameter 00 = Alarm 1 Set Point 01 = Alarm 2 Set Point 02 = Alarm 3 Set Point 03 = Alarm 4 Set Point	Value	Terminator

Example 1: Set Instrument 1, Channel 1, Alarm 1 Set Point Value to +800 degrees

Command: %010100+0800

Response: ! 01

(Instrument 1, Channel 1, Alarm 1, Set point value is set to +800 degrees)

4.0.2 Set Zero Offset Correction Parameter Value Commands

%	AA	BB	CC	DDDDD	<trm>
	Instrument Address	Channel	Parameter 04 = Zero Offset Value	Value	Terminator

Example 1: Set Instrument 1, Channel 1, Zero Offset Correction Value to +32 degrees

Command: %010104+0032

Response: ! 01

(Instrument 1, Channel 1, Zero Offset Correction value is set to +32 degrees)

4.0.3 Set Multiplier Offset Correction Parameter Value Commands

%	AA	BB	CC	DDDDD	<trm>
	Instrument Address	Channel	Parameter 05 = Multiplier Offset Value	Value	Terminator

Example 1: Set Instrument 1, Channel 1, Multiplier Offset Correction Value to +1.8

Command: %010105+1800

Response: !01

(Instrument 1, Channel 1, Multiplier Offset Correction value is set to +1.8)

4.0.4 Set Input Signal Type Parameter Value Commands

%	AA	BB	CC	DDDDD	<trm>
	Instrument Address	Channel	Parameter 06 = Input Type	Value	Terminator

Example 1: Set Instrument 1, Channel 1, Input Signal Type to Thermocouple Type K

Command: %010106+0007

Response: !01

(Instrument 1, Channel 1, Input Type is set to Thermocouple Type K)

NOTE:

- 0 = Off
- 1 = RTD PT100
- 2 = RTD Cu100
- 3 = RTD Cu50
- 4 = RTD BA1
- 5 = RTD BA2
- 6 = RTD G53
- 7 = Thermocouple Type K
- 8 = Thermocouple Type S
- 9 = Thermocouple Type R
- 10 = Thermocouple Type B
- 11 = Thermocouple Type N
- 12 = Thermocouple Type E
- 13 = Thermocouple Type J
- 14 = Thermocouple Type T

4.0.5 Set Decimal Point Position Parameter Value Commands

%	AA	BB	CC	DDDDD	<trm>
	Instrument Address	Channel	Parameter 07 = Decimal Point Position	Value	Terminator

Example 1: Set Instrument 1, Channel 1, Decimal Point Position to 000.0

Command: %010107+0002

Response: !01

(Instrument 1, Channel 1, Decimal Point Position is set to 000.0)

NOTE:

0.000 = 0

00.00 = 1

000.0 = 2

0000 = 3

4.0.6 Set Digital Filtering Time Coefficient Parameter Value Commands

%	AA	BB	CC	DDDDD	<trm>
	Instrument Address	Channel	Parameter 0B = Digital Filtering Time	Value	Terminator

Example 1: Set Instrument 1, Channel 1, Digital Filtering Time Coefficient to 1

Command: %01010B+0001

Response: !01

(Channel 1, Digital Filtering Time Coefficient is set to 1)

NOTE: Default is 1

4.0.7 Set Indicator Security Code Parameter Value Commands

%	AA	BB	CC	DDDDD	<trm>
	Instrument Address	00	Parameter 10 = Security Code	Value	Terminator

Example 1: Set Instrument 1, Security Code to 1111

Command: %010010+1111

Response: !01

(Instrument 1, Security Code set to 1111)

NOTE: Default is 0000

4.0.8 Set Indicator Switching Time Parameter Value Commands

%	AA	BB	CC	DDDDD	<trm>
	Instrument Address	00	Parameter 11 = Switching Time	Value	Terminator

Example 1: Set Instrument 1, Switching Time to 3.5 seconds

Command #1: %010010+1111

Response: !01

(Instrument 1, Set Security Code to 1111)

Command #2: %010011+0035

Response: !01

(Instrument 1, Switching Time is set to 3.5 seconds)

Command #3: %010010+0000

Response: !01

(Instrument 1, Reset Security Code to 0000)

NOTE: Available setting range is from 0.5 to 10.0 seconds in increments of 0.5 seconds

4.0.9 Set Indicator Number of Active Channels Parameter Value Commands

%	AA	BB	CC	DDDDD	<trm>
	Instrument Address	00	Parameter 12 = Channel Number	Value	Terminator

Example 1: Set Instrument 1, Number of Active Channels to 8

Command #1: %010010+1111

Response: !01

(Instrument 1, Set Security Code to 1111)

Command #2: %010012+0008

Response: !01

(Number of Active Channels is set to 8)

Command #3: %010010+0000

Response: !01

(Instrument 1, Reset Security Code to 0000)

NOTE: Changing this parameter allows user to activate a fewer number of channels than the Indicator is capable of. For example, an 8-Channel Indicator can be set for 6 active channels only. The remaining 2 channels will be deactivated.

4.0.10 Set Indicator Alarm Type Parameter Value Commands

%	AA	BB	CC	DDDD	<trm>
	Instrument Address	00	Parameter 16 = Alarm 1 Type 17 = Alarm 2 Type 18 = Alarm 3 Type 19 = Alarm 4 Type	Value	Terminator

Example 1: Set Instrument 1, Alarm 1 Type to High Alarm

Command #1: %010010+1111

Response: ! 01

(Instrument 1, Set Security Code to 1111)

Command #2: %010016+0000

Response: ! 01

(Instrument 1, Alarm 1 Type is set to High)

Command #3: %010010+0000

Response: ! 01

(Instrument 1, Reset Security Code to 0000)

NOTE: High Alarm = 0000, Low Alarm = 0001

4.0.11 Set Alarm 1 or Alarm 2 Hysteresis Parameter Value Commands

%	AA	BB	CC	DDDD	<trm>
	Instrument Address	00	Parameter 1A = Alarm 1 Hysteresis Value 1B = Alarm 2 Hysteresis Value	Value	Terminator

Example 1: Set Instrument 1, Alarm 1 Hysteresis Value to 0

Command #1: %010010+1111

Response: ! 01

(Instrument 1, Set Security Code to 1111)

Command: #2 %01001A+0000

Response: !+0000.

(Instrument 1, Alarm Hysteresis is set to 0)

Command #3: %010010+0000

Response: ! 01

(Instrument 1, Reset Security Code to 0000)

NOTE: Default is 0

4.0.12 Set Indicator Alarm Latching or Non-Latching Value Commands

%	AA	BB	CC	DDDDD	<trm>
	Instrument Address	00	Parameter 1C = Alarm Delay Time	Value	Terminator

Example 1: Set Instrument 1, Alarm Type to 0 (Non-Latching)

Command #1: %010010+1111

Response: !01

(Instrument 1, Set Security Code to 1111)

Command #2: %01001C+0000

Response: !01

(Instrument 1, Alarm Type is set to 0 (Non-Latching))

Command #3: %010010+0000

Response: !01

(Instrument 1, Reset Security Code to 0000)

NOTE: Default is 0

0 = Non-Latching

1 to 50 = Timed-Latching

51 = Latching

4.0.13 Set Indicator RS-485 Communication Instrument Address Parameter Value Commands

%	AA	BB	CC	DDDDD	<trm>
	Instrument Address	00	Parameter 1D = Communication Address	Value	Terminator

Example 1: Get Instrument 1, RS-485 Communication Instrument Address

Command #1: %010010+1111

Response: !01

(Instrument 1, Set Security Code to 1111)

Command #2: %01001D+0001

Response: !01

(Instrument 1, RS-485 Communication Instrument Address is set to 1)

Command #3: %010010+0000

Response: !01

(Instrument 1, Reset Security Code to 0000)

NOTE: Default is 01

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