Laser Dust Sensor Control Protocol
V1.3

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Catalog

Support model: SDS011
Support firmware Version: after 2015.7.20

1、Protocol Configuration

Serial Port: 5V TTL, 9600bps with 8 data bit, no parity, one stop bit
Data Packet（19bytes）：Head+Command ID+Data(15bytes)+checksum+Tail
Checksum: Low 8bit of the sum result of Data Bytes（not including packet head, tail and Command ID）.

2、Device ID Instruction

Need all sensor response： Set the ID bytes to FF FF in the command
Only need to specify sensor response： Set the ID bytes to the Sensor ID

3、Command

The command bytes in the instruction are hexadecimal byte data

1) Set data reporting mode

The setting is still effective after power off 【Factory default is active reporting】

Byte	Direction	PC->Sensor	Sensor->PC
	Command Name	Set data reporting mode	Reply
0	**Head**	AA	AA
1	**Command ID**	B4	C5
2	**Data byte 1**	2	2
3	**Data byte 2**	0：query the current mode 1：set reporting mode	0：query the current mode 1：set reporting mode
4	**Data byte 3**	0：report active mode 1：Report query mode	0：report active mode 1：Report query mode
5	**Data byte 4**	0(reserved)	0(reserved)
6	**Data byte 5**	0(reserved)	Device ID byte 1

7	**Data byte 6**	0(reserved)	Device ID byte 2
8	**Data byte 7**	0(reserved)	Checksum byte
9	**Data byte 8**	0(reserved)	AB
10	**Data byte 9**	0(reserved)	
11	**Data byte 10**	0(reserved)	
12	**Data byte 11**	0(reserved)	
13	**Data byte 12**	0(reserved)	
14	**Data byte 13**	0(reserved)	
15	**Data byte 14**	FF ： all sensor response Device ID byte 1： unique sensor in this ID response	
16	**Data byte 15**	FF ： all sensor response Device ID byte 2： unique sensor in this ID response	
17	**Checksum**	Checksum byte	
18	**Tail**	AB	

Notes:

Report query mode： Sensor received query data command to report a measurement data.

Report active mode： Sensor automatically reports a measurement data in a work period.

Example:

PC sends command, query the current working mode:

AA B4 02 00 00 00 00 00 00 00 00 00 00 00 FF FF 00 AB

Sensor with ID A160 response:

AA C5 02 00 00 00 A1 60 03 AB Show the sensor is in report active mode.

AA C5 02 00 01 00 A1 60 04 AB Show the sensor is in report query mode.

PC sends command, set the sensor with ID A160 to report query mode:

AA B4 02 01 01 00 00 00 00 00 00 00 00 00 A1 60 05 AB

Sensor with ID A160 response:

AA C5 02 01 01 00 A1 60 05 AB Show the sensor is set to report query mode.

2) Query data command

Sensor received query data command to report a measurement data, recommended query interval of not less than 3 seconds

Byte	**Direction**	PC->Sensor	Sensor->PC

	Command Name	Query data	Reply
0	Head	AA	AA
1	Command ID	B4	C0
2	Data byte 1	4	PM2.5 low byte
3	Data byte 2	0(reserved)	PM2.5 high byte
4	Data byte 3	0(reserved)	PM10 low byte
5	Data byte 4	0(reserved)	PM10 high byte
6	Data byte 5	0(reserved)	Device ID byte 1
7	Data byte 6	0(reserved)	Device ID byte 2
8	Data byte 7	0(reserved)	Checksum byte
9	Data byte 8	0(reserved)	AB
10	Data byte 9	0(reserved)	
11	Data byte 10	0(reserved)	
12	Data byte 11	0(reserved)	
13	Data byte 12	0(reserved)	
14	Data byte 13	0(reserved)	
15	Data byte 14	FF ： all sensor response Device ID byte 1： unique sensor in this ID response	
16	Data byte 15	FF ： all sensor response Device ID byte 2： unique sensor in this ID response	
17	Checksum	Checksum byte	
18	Tail	AB	

Example：

1）Needs all sensor response:

Send command:

AA B4 04 00 00 00 00 00 00 00 00 00 00 00 FF FF 02 AB

Sensor with ID A160 Reply:

AA C0 D4 04 3A 0A A1 60 1D AB

Show PM2.5 data is 04D4, convert it to a decimal 1236,then it show PM2.5 to 123.6 μg/m^3,PM10

data is 0A3A, convert it to a decimal 2618, then it show PM10 to 261.8 μg/m^3.

2） Needs unique sensor response(e.g. A160**):**

Send command:

AA B4 04 00 00 00 00 00 00 00 00 00 00 00 A1 60 05 AB

Only the sensor with ID A160 response:

AA C0 D4 04 3A 0A A1 60 1D AB

3) Set Device ID

The setting is still effective after power off【Factory default has set a unique ID】

Byte	Direction	PC->Sensor	Sensor->PC
	Command Name	Set device ID	Reply
0	**Head**	AA	AA
1	**Command ID**	B4	C5
2	**Data byte 1**	5	5
3	**Data byte 2**	0(reserved)	0(reserved)
4	**Data byte 3**	0(reserved)	0(reserved)
5	**Data byte 4**	0(reserved)	0(reserved)
6	**Data byte 5**	0(reserved)	New Device ID byte 1
7	**Data byte 6**	0(reserved)	New Device ID byte 2
8	**Data byte 7**	0(reserved)	Checksum byte
9	**Data byte 8**	0(reserved)	AB
10	**Data byte 9**	0(reserved)	
11	**Data byte 10**	0(reserved)	
12	**Data byte 11**	0(reserved)	
13	**Data byte 12**	New Device ID byte 1	
14	**Data byte 13**	New Device ID byte 2	

15	**Data byte 14**	FF ： all sensor response Device ID byte 1： unique sensor in this ID response	
16	**Data byte 15**	FF ： all sensor response Device ID byte 2： unique sensor in this ID response	
17	**Checksum**	Checksum byte	
18	**Tail**	AB	

Example:

Send command, set the device ID from A160 to A001:

AA B4 05 00 00 00 00 00 00 00 00 00 A0 01 A1 60 A7 AB

Sensor with ID A160 response:

AA C5 05 00 00 00 A001A6 AB

4) Set sleep and work

The setting is **not** effective after power off【stay work state after power on】

Byte	**Direction**	PC->Sensor	Sensor->PC
	Command Name	Set sleep and work	Reply
0	**Head**	AA	AA
1	**Command ID**	B4	C5
2	**Data byte 1**	6	6
3	**Data byte 2**	0: query the current mode 1: set mode	0: query the current mode 1: set mode
4	**Data byte 3**	0: sleep 1: work	0: sleep 1: work
5	**Data byte 4**	0(reserved)	0(reserved)
6	**Data byte 5**	0(reserved)	Device ID byte 1
7	**Data byte 6**	0(reserved)	Device ID byte 2
8	**Data byte 7**	0(reserved)	Checksum byte
9	**Data byte 8**	0(reserved)	AB
10	**Data byte 9**	0(reserved)	

11	**Data byte 10**	0(reserved)	
12	**Data byte 11**	0(reserved)	
13	**Data byte 12**	0(reserved)	
14	**Data byte 13**	0(reserved)	
15	**Data byte 14**	FF ： all sensor response Device ID byte 1： unique sensor in this ID response	
16	**Data byte 15**	FF ： all sensor response Device ID byte 2： unique sensor in this ID response	
17	**Checksum**	Checksum byte	
18	**Tail**	AB	

Example:

(1) Send command, set the sensor with ID A160 to sleep:

AA B4 06 01 00 00 00 00 00 00 00 00 00 00 A1 60 08 AB

Sensor with ID A160 response:

AA C5 06 01 00 00 A1 60 08 AB

(2) Send command, set the sensor with ID A160 to work:

AA B4 06 01 01 00 00 00 00 00 00 00 00 00 A1 60 09 AB

Sensor with ID A160 response:

AA C5 06 01 01 00 A1 60 09 AB

(3) Send command, query the working mode of the sensor with ID A160:

AA B4 06 00 00 00 00 00 00 00 00 00 00 00 A1 60 07 AB

Sensor with ID A160 response, show it is in working mode:

AA C5 06 00 01 00 A1 60 08 AB

Or reply：

AA C5 06 00 00 00 A1 60 07 AB show it is in working mode:

Notes: The data is stable when the sensor works after 30 seconds;

The fan and laser stop working in sleeping mode.

5) Set working period

The setting is still effective after power off【factory default is continuous measurement】

The sensor works periodically and reports the latest data.

Byte	**Direction**	PC->Sensor	Sensor->PC
	Command Name	Set working period	Reply

0	**Head**	AA	AA
1	**Command ID**	B4	C5
2	**Data byte 1**	8	8
3	**Data byte 2**	0: query the current mode 1: set mode	0: query the current mode 1: set mode
4	**Data byte 3**	0：continuous(default) 1-30minute：【work 30 seconds and sleep n*60-30 seconds】	0：continuous(default) 1-30minute：【work 30 seconds and sleep n*60-30 seconds】
5	**Data byte 4**	0(reserved)	0(reserved)
6	**Data byte 5**	0(reserved)	Device ID byte 1
7	**Data byte 6**	0(reserved)	Device ID byte 2
8	**Data byte 7**	0(reserved)	Checksum byte
9	**Data byte 8**	0(reserved)	AB
10	**Data byte 9**	0(reserved)	
11	**Data byte 10**	0(reserved)	
12	**Data byte 11**	0(reserved)	
13	**Data byte 12**	0(reserved)	
14	**Data byte 13**	0(reserved)	
15	**Data byte 14**	FF ： all sensor response Device ID byte 1：unique sensor in this ID response	
16	**Data byte 15**	FF ： all sensor response Device ID byte 2：unique sensor in this ID response	
17	**Checksum**	Checksum byte	
18	**Tail**	AB	

Example:

(1) Send command to set the working period of sensor with ID A160 to 1 minute:

AA B4 08 01 01 00 00 00 00 00 00 00 00 00 A1 60 0B AB

Sensor with ID A160 response:

AA C5 08 01 01 00 A1 60 0B AB Show the sensor will update data in 1 minute.

(2) Send command to set the working period of sensor with ID A160 to 0,it will work

continuously:

AA B4 08 01 00 00 00 00 00 00 00 00 00 00 A1 60 0A AB

Sensor with ID A160 response:

AA C5 08 01 00 00 A1 60 0A AB

(3) Send command to query the working period of the sensor with ID A160:

AA B4 08 00 00 00 00 00 00 00 00 00 00 00 A1 60 09 AB

Sensor with ID A160 response:

AA C5 08 00 02 00 A1 60 0B AB Show its working period is 2 minute; it will update data every 2 minute.

6) Check firmware version

Byte	Direction	PC->Sensor	Sensor->PC
	Command Name	Check firmware version	Reply
0	**Head**	AA	AA
1	**Command ID**	B4	C5
2	**Data byte 1**	7	7
3	**Data byte 2**	0(reserved)	Firmware version byte 1: year
4	**Data byte 3**	0(reserved)	Firmware version byte 2: month
5	**Data byte 4**	0(reserved)	Firmware version byte 3: day
6	**Data byte 5**	0(reserved)	Device ID byte 1
7	**Data byte 6**	0(reserved)	Device ID byte 2
8	**Data byte 7**	0(reserved)	Checksum byte
9	**Data byte 8**	0(reserved)	AB
10	**Data byte 9**	0(reserved)	
11	**Data byte 10**	0(reserved)	
12	**Data byte 11**	0(reserved)	
13	**Data byte 12**	0(reserved)	
14	**Data byte 13**	0(reserved)	

15	**Data byte 14**	FF ： all sensor response Device ID byte 1： unique sensor in this ID response	
16	**Data byte 15**	FF ： all sensor response Device ID byte 2： unique sensor in this ID response	
17	**Checksum**	Checksum byte	
18	**Tail**	AB	

Example:

Send command to get the firmware version of the sensor with ID A160:

AA B4 07 00 00 00 00 00 00 00 00 00 00 00 A1 60 08 AB

Sensor with ID A160 response:

AA C5 07 0F 07 0A A1 60 28 AB Show its firmware version is 0F070A(15-7-10).

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