



LoRaWAN[®] Solenoid Valve Controller

UC51x Series

Communication Protocol



Revision History

Date	Doc Version	Description
Feb. 23, 2021	V 1.0	Initial version
Dec. 1, 2021	V 1.1	Valve control sequence supports 00

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1. Overview

UC51x Series use the standard Milesight IoT payload format based on IPSO. All data are based on following format:

Channel1	Type1	Data1	Channel2	Type2	Data2	Channel 3	...
1 Byte	1 Byte	N Bytes	1 Byte	1 Byte	M Bytes	1 Byte	...

Channel	Description
01	Battery
03	Valve 1
04	Pulse 1
05	Valve 2
06	Pulse 2
ff	Device information/Control package

Note:

- 1) All explanations and examples in this document are based on HEX format.
- 2) For all Milesight IoT decoder examples please find files on <https://github.com/Milesight-IoT/SensorDecoders>

2. Uplink Payload

Uplink payloads of UC51x Series are made up of device information and sensor data.

2.1 Device Information

UC51x series report basic device information of device everytime joining the network.

Channel	Type	Data Size/Byte	Description
ff	01(Protocol Version)	1	01=>V1
	09 (Hardware Version)	2	02 10=>V2.1
	0a(Software Version)	2	01 01=>V1.1
	0b (Power On)	1	Device is on
	0f(Device Type)	1	00=Class A, 01=Class B, 02=Class C
	16 (Device SN)	8	16 digits

Examples:

ff 0b ff ff 01 01 ff 16 64 15 a5 15 85 07 00 20 ff 09 01 00 ff 0a 01 08 ff 0f 00					
Channel	Type	Value	Channel	Type	Value
ff	0b (Power On)	ff (reserved)	ff	01 (Protocol Version)	01(V1)
Channel	Type	Value	Channel	Type	Value
ff	16 (Device SN)	64 15 a5 15 85 07 00 20	ff	09 (Hardware version)	0100 (V1.0)
Channel	Type	Value	Channel	Type	Value
ff	0a (Software version)	0108 (V1.8)	ff	0f (Device Type)	00 (Class A)

2.2 Sensor Data

UC51x series report sensor data according to reporting interval (10min by default).

Battery level is reported every 6 hours for UC511 and 12 hours for UC512.

Channel	Type	Data Size/Byte	Description
01	75(Battery Level)	1	Unit: %
03(Valve 1)	01(Valve)	1	00=close, 01=open
04(Pulse 1)	c8(Counter)	4	Unsigned

05(Valve 2)	01(Valve)	1	00=close, 01=open
06(Pulse 2)	c8(Counter)	4	Unsigned

Examples:

01 75 64 03 01 01 04 c8 06 00 00 00 05 01 00 06 c8 00 00 00 00					
Channel	Type	Value	Channel	Type	Value
01	75 (Battery)	64 => 100%	03(Valve 1)	01 (Valve)	01=>Open
Channel	Type	Value	Channel	Type	Value
04 (Pulse 1)	c8(Pulse Counter)	06 00 00 00=>00 00 00 06=6	05(Valve 2)	01 (Valve)	00=>Close
Channel	Type	Value			
06 (Pulse 2)	c8(Pulse Counter)	06 00 00 00=>00 00 00 00=0			

3. Downlink Payload

Downlink is used for controlling the UC51x via network server remotely. Downlink port (Application port) is 85 by default and can be configured via ToolBox.

3.1 Valve Control

Basic format:

Channel	Type	Control Field	Sequence	Time Control (Option)	Flow Control (Option)
ff	1d	1 Byte	1 Byte (01 to ff or 00)	3 Bytes (Unit: s)	4 Bytes

Control Field:

Bit	7	6	5	4-2	1-0
Description	0: Disable time control 1: Enable time control	0: Disable flow control 1: Enable flow control	0: Valve close 1: Valve open	Reserved	0: Valve 1 1: Valve 2

Examples:

Command	Description
ff 1d 20 00	Valve 1 open
ff 1d 00 00	Valve 1 close
ff 1d 21 00	Valve 2 open
ff 1d 01 00	Valve 2 close
ff 1d a0 00 3c 00 00	Valve 1 open for 60 seconds
ff 1d 80 00 3c 00 00	Valve 1 close for 60 seconds
ff 1d a1 00 3c 00 00	Valve 2 open for 60 seconds
ff 1d 81 00 3c 00 00	Valve 2 close for 60 seconds
ff 1d 60 00 06 00 00 00	Valve 1 open until pulse 1 is 6
ff 1d 61 00 10 00 00 00	Valve 2 open until pulse 2 is 16
ff 1d e0 00 3c 00 00 06 00 00 00	Valve 1 open for 60 seconds or until pulse 1 is 6
ff 1d e1 00 3c 00 00 10 00 00 00	Valve 2 open for 60 seconds or until pulse 2 is 16

Note:

1) If you set the sequence as 01 to ff, the sequence should be increased after it has been used in one command sent to devices. For example, if you use command ff 1d 20 01 (sequence 01) to control the valve successfully, the next command should be ff 1d 20 02 (sequence 02). Wrong sequence will cause command invalid.

2) If the sequence is up to ff(255), please use sequence beginning as 01.

3) There are different replies when sending invalid or valid commands. For example, if you send command ff 1d 21 01,

Valid reply: fe 1d 21 01+ 05 01 01 06 c8 00 00 00 00

Invalid reply: fe 1d 21 01

3.2 Reporting Interval Control

Channel	Type	Description
ff	03 (Set Reporting Interval)	2 Bytes, unit: s

Example:

ff 03 b0 04		
Channel	Type	Value
ff	03(Set Reporting Interval)	b0 04 => 04 b0 = 1200s=20 minutes

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