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		Communication Protocol		Pages: 8
Product Type	Finger Pulse Oximeter/Module	Product Model	AM801	

Finger Pulse Oximeter AM801 Communication Protocol

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Version History

Version	Author	Date	Description
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AM806 Finger Pulse Oximeter Communication Protocol

1、Overview

1.1 Scope of Application

This communication protocol applies to the high-sampling-rate finger pulse oximeters developed and customized by MedLinket Corporation.

1.2 Communication Interface Description

The device or module can communicate with external devices such as computers (or tablets, mobile phones) via serial port (or Bluetooth). The AM801 developer version additionally supports direct USB connection communication. For details, please refer to the specification of the device or module.

1.3 Serial Port Parameter Settings

AM-801 Model: Baud Rate **230400**, 8Data Bits, None Parity, 1Stop Bit.

2、General Data Packet Format

head 1	head 2	length	check sum	device ID	CMD ID	DATA
0xFF	0xFE	LL	CS	0x23	CMD	DATA

Data Packet Description:

- 1)The header of the data packet consists of 2 bytes: 0xFF and 0xFE respectively.
- 2) Total length of the packet excluding the header, i.e., total packet bytes - 2.
- 3) The sum of all bytes except the header and length, reserved as a single byte, truncated if exceeding 1 byte.

Example: CS = (LL+0x23+0x95+sum(Data)) & 0xFF

- 4) Indicates the device type; 0x23 stands for pulse oximeter/oximeter module.
- 5)Indicates the command type of the data packet, with the corresponding relationship as follows:

CMD	Command Type
0x95	Measurement Result Packet
0x96	PPG Waveform Packet
0x97	HRV Data Packet
0x99	Battery Level Packet
0x85	Raw Data Packet
0x1D	UID Transmission Command
0xB0	Device Control Command

DATA: Consists of 0 or more bytes for transmitting data information, whose meaning is related to CMD.

Example: When CMD=0x95, DATA contains the information of blood oxygen and pulse rate.

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3、Data Packet Description

3.1 Measurement Result 0x95

(head 1)	(head 2)	(length)	(check sum)	(device ID)	(CMD ID)	DATA
0xFF	0xFE	0x0C	CS	0x23	0x95	(8 Bytes)

0x95 data packet: Probe status information, SpO₂ value, pulse rate, temperature (where applicable), perfusion index (PI), respiratory rate (where applicable), etc.
Transmission frequency: 1 Hz
The details are as follows::

	SP02 & PR Result Data								Notes
	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	
byte0	(1) sync bit/ (1)		(no pulse flag: 1: no pulse, 0: normal)	(searching flag)	Probe state: 0: normal, 1: sensor not connected 2: current overload, 3: sensor error, 4: no finger, 5: physiological alarm				bit4=1, Checking for a pulse
byte1	(PR.bit7~bit0)								Pulse rate:25-300,herein only bit7~bit0,the bit8 is in byte2
byte2	(pulse rate) PR.bit8	SP02: 0-100 (N/A if > 100)						The range is 0 - 127 (0x00 - 0x7f), but currently only 0 - 100 (0x00 - 0x64) is used.	
byte3	integer part of temperature								byte3=0:NA, byte3=0x7f:NA, byte3=1~99: integer part of temperature byte4:decimal part of temperature
byte4	decimal part of temperature								
byte5	integer part of PI (perfusion index) 0-20, 0x7F:NA								PI integer: (0 - 20); 0x7f is invalid PI decimal: (0 - 99); 0x7f is invalid
byte6	decimal part of PI (perfusion index) (0-99:0.00-0.99, 0x7F:NA)								
byte7	respiration rate								respiration rate (4~70, 0: NA)

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3.2、PPG Waveform (Photoplethysmography) 0x96

(head 1)	(head 2)	(length)	(check sum)	(device ID)	(CMD ID)	DATA
0xFF	0xFE	0x18	CS	0x23	0x96	(20 Bytes)

0x96 packet: PPG waveform, bar graph, pulse sound
Transmission frequency: 5 Hz. Each packet contains 10 data points of the PPG waveform, which is sampled at 50 points per second.
The details are as follows::

PPG data						
byte0	byte1	byte2	byte3	...	byte18	byte19
STRUCT0		STRUCT1		...	STRUCT9	

In particular, STRUCTx consists of 2 bytes:

	STRUCT Structure								Description
	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	
byte0	Sync bit(0)	Pulse-wave photoplethysmogram PPG:Photoplethysmography 0-127							Wave range: 0-127 (0x00-0x7f)
byte1	Sync bit(0)			Breath sounds 1: emit a pulsating sound pulse beep 1: beep flag	Pulse Bar Chart (0 - 15) pulse BAR graph				

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3.3、HRV Data (Heart Rate Variability) 0x97

(head 1)	(head 2)	(length)	(check sum)	(device ID)	(CMD ID)	DATA
0xFF	0xFE	0x18	CS	0x23	0x97	(20 Bytes)

Packet 0x97: Contains HRV data, representing the time interval between heartbeats, measured in milliseconds (ms).
Transmission frequency: HRV data is transmitted in packets every 10 heartbeat waveforms; each HRV data packet consists of 2 bytes.

The detailed description is as follows::

HRV data							Explanation
byte0	byte1	byte2	byte3	...	byte18	byte19	HRV data: interval of 2 beats, units: ms 2bytes, 0-2000,
HRV0		HRV1		...	HRV9		

3.4、Battery Level 0x99

(battery level Packet)						
(head 1)	(head 2)	(length)	(check sum)	(device ID)	(CMD ID)	DATA
0xFF	0xFE	0x05	CS	0x23	0x99	(1Byte) 0-3: level 0-3

Packet 0x99: Battery level information.
Transmission Frequency: 1Hz

3.5、Raw Data Packet 0x85

(Raw Data)						
(head 1)	(head 2)	(length)	(check sum)	(device ID)	(CMD ID)	DATA
0xFF	0xFE	0x0D	CS	0x23	0x85	(9Byte)

Packet 0x85: Transmits raw data, including red light, infrared light and background light data.
Transmission Frequency: 400Hz

The raw data is described in detail as follows:

Raw DATA			
byte0	byte1	byte2	Red = byte0*65536 + byte1*256 + byte2
byte3	byte4	byte5	IRD = byte3*65536 + byte4*256 + byte5
byte6	byte7	byte8	BCK = byte6*65536 + byte7*256 + byte8

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3.6、UID Query and Transmission Command 0x1D

Host Query Command: The host queries the device’s Unique ID (UID) by sending this command, and the device transmits the UID information upon receiving the command.

(Query the unique ID)						
(head 1)	(head 2)	(length)	(check sum)	(device ID)	(CMD ID)	/
0xFF	0xFE	0x04	CS	0x23	0x1D	/

Device UID Information Transmission Packet:

(Send the unique ID)						
(head 1)	(head 2)	(length)	(check sum)	(device ID)	(CMD ID)	UID DATA
0xFF	0xFE	0x14	CS	0x23	0x1D	(16Bytes)

3.7、Data Transmission Control Command 0xB0

(Control the device to send data)						
(head 1)	(head 2)	(length)	(check sum)	(device ID)	(CMD ID)	DATA
0xFF	0xFE	0x05	CS	0x23	0xB0	(1Bytes) 0: (Stop) , 1: (Start)

Command 0xB0: Host controls the device to start/stop data transmission to the host via this command, device executes it after reception.
Default setting: Data transmission enabled.