



TIANJIN

JINGFAN Technology Co., Ltd

**JFH142 Intelligent Health
Monitoring Module
Specification BOOK V1.7**

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Document Revision Records

Version	Date	Revise Contents	Author	Review
V1.2	22-04-20	Changed some descriptions in product features and added an about description of the cloud	zpda	
V1.3	22-11-03	Real-time packet number changed to 88 bytes, added HRV-related parameters.	zpda	
V1.4	23-02-24	Added a description for unlimited-time examination instruction in the examination scheduling section Added recommendations in the dormancy section Modified dormancy section of the communication flowchart Updated logo	zpda	
V1.5	23-08-09	Change connector model	zpda	
V1.6	23-09-12	Remove the section on physical examination duration settings and modify the start examination instruction. Add detailed descriptions for multiple parameters in the real-time packet explanation section. Change the last byte of the real-time packet to module status. Revise the module communication flowchart.	zpda	
V1.7	25-10-13	Standardize pin naming across the document; Standardize pin numbers across different sections; Standardize instruction descriptions across different sections; Remove CRC checksum-related descriptions.	zpda	



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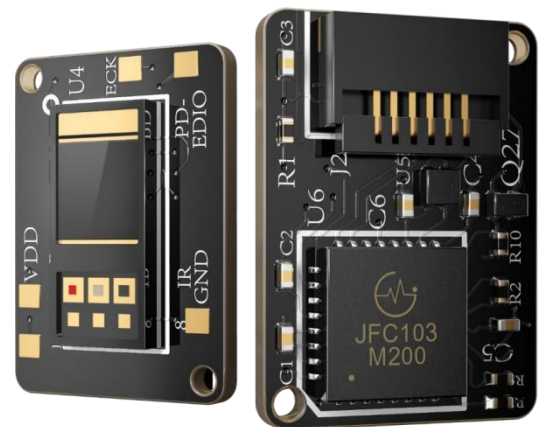
Product Overview

JFH142 is a multi-spectral physiological data measurement module developed by Jingfan Technology, which can accurately measure pulse waveform, heart rate, blood oxygen saturation, vascular microcirculation parameters and other indicators. Benefiting from the patent-protected front-end sensor technology, both the sensitivity and signal-to-noise ratio of the module have been significantly improved compared with similar products. By combining Jingfan's proprietary signal conditioning technology and algorithm, the module directly outputs pulse waveform, heart rate value, blood oxygen value and vascular microcirculation parameters, which greatly reduces system complexity. The user's system can communicate with the module via the serial port and directly obtain the measurement results. While delivering high accuracy and ease of use, the JFH142 module also features ultra-small size and ultra-low power consumption, which improves the battery life of smart wearable devices and the flexibility of appearance design.

In addition to independent operation and analysis, the JFH142 module can leverage cloud-based big data analytics to provide additional information such as blood pressure trends, respiratory rate, and heart rate variability, thereby enhancing product competitiveness.

Product Features:

- Pulse waveform, heart rate, SpO₂, vascular microcirculation, and reference blood pressure can be directly output.
- Integrated red and infrared LED for SpO₂ measurement
- Wide-spectrum, high-sensitivity optical sensor
- Ultra-compact size: 11.18mm × 8.13mm
- Extremely low operating power consumption
- Easy-to-use UART interface output
- Connected to a cloud analytics platform, additional cardiovascular health metrics such as heart rate variability (HRV), fatigue index, arrhythmia, heart rate scatter plot (for risk assessment of atrial fibrillation, premature beats, etc.), and respiratory rate can be obtained



Typical Application:

- Cardiovascular Disease Management
- Aerobic Exercise Management
- Abnormal Health Monitoring
- Smart wearable devices
- Medical diagnostic equipment

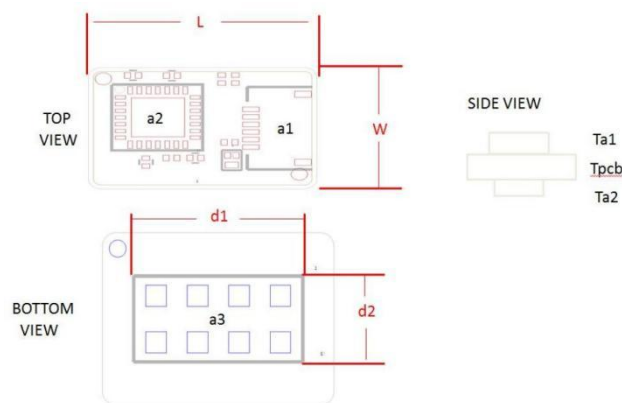


1. External Dimension

a1: Connector YXT-ZF50-06B-00

a2: Front main chip area

a3: Back sensor area



Module Length	11.18 ± 0.15
Module Width	8.13 ± 0.15
Sensor Length d1	7.7 ± 0.05
Sensor Width d2	3.6 ± 0.05
Connector Thickness Ta1	1.0 ± 0.1
Sensor Thickness Ta2	1.0 ± 0.05
PCB Thickness Tpcb	0.8 ± 0.1

Table 1:Module Dimensions,Unit mm

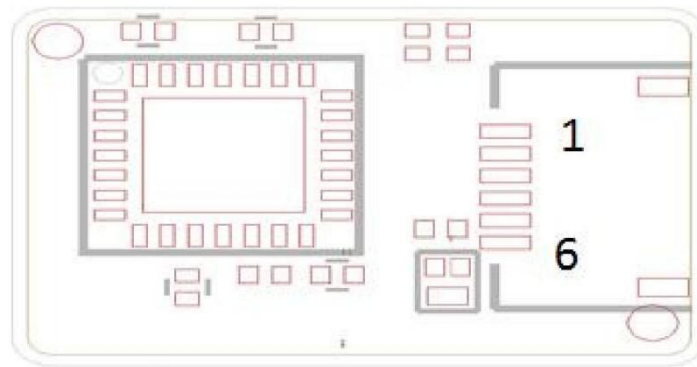


2. Pin Definition

2.1 Connector model

	Connector Model
JFH142 Connector	FH34SRJ-6S-0.5SH(50)
Client FPC	Customer customized

2.2 Pin Definition



a2: Front-side device area

No.	Signal Name	Function	Instructions
1	VCC	Digital IO Power Supply	2.7V ~ 3.6V
2	RST	Reset	Low Level Works
3	URX	UART Received	2.7V ~ 3.6V
4	UTX	UART sent	2.7V ~ 3.6V
5	STA	Keep	悬空
6	GND	GND	



3. Electrical Performance

3.1 Absolute MAX/MIN Value

VCC	Input Voltage	-0.3V ~ 3.8V
URX	Input Voltage	-0.3V ~ (VCC+0.3)V
RST	Input Voltage	-0.3V ~ (VCC+0.3)V

3.2 Working Electrical Characteristics

Note: All tests are conducted at 3.3V; for detailed instruction sending, refer to [5. Software Communication Protocol]

Test items		Typical Values		Condition
Module Current	Input Voltage	2.6V ~ 3.6V		
	Working Voltage	Finger contact measures 5mA	Finger detachment measures 4.3mA	Send 0x8A
	Standby Current	640 μ A		Send 0x88
	Sleep Current	3.4 μ A		Send 0x98
Working Temperature Range		-20°C ~ 60 °C		
Storage Temperature		-40°C ~ 85 °C		
VIH		0.7 x VCC (min)		
VIL		0.35 x VCC (max)		
VOH		VCC-0.5V(min)		IOH = -5mA
VOL		0.5V(max)		IOL = 5mA
Reset Pulse Width		Low-level reset, reset pulse width time $\geq$ 1 ms		Vreset<0.9
The waiting time between reset release and receiving instructions		$\geq$ 100ms		
UART port baud rate		See the "Module Interface Specifications" section		



4. System Connection Mode

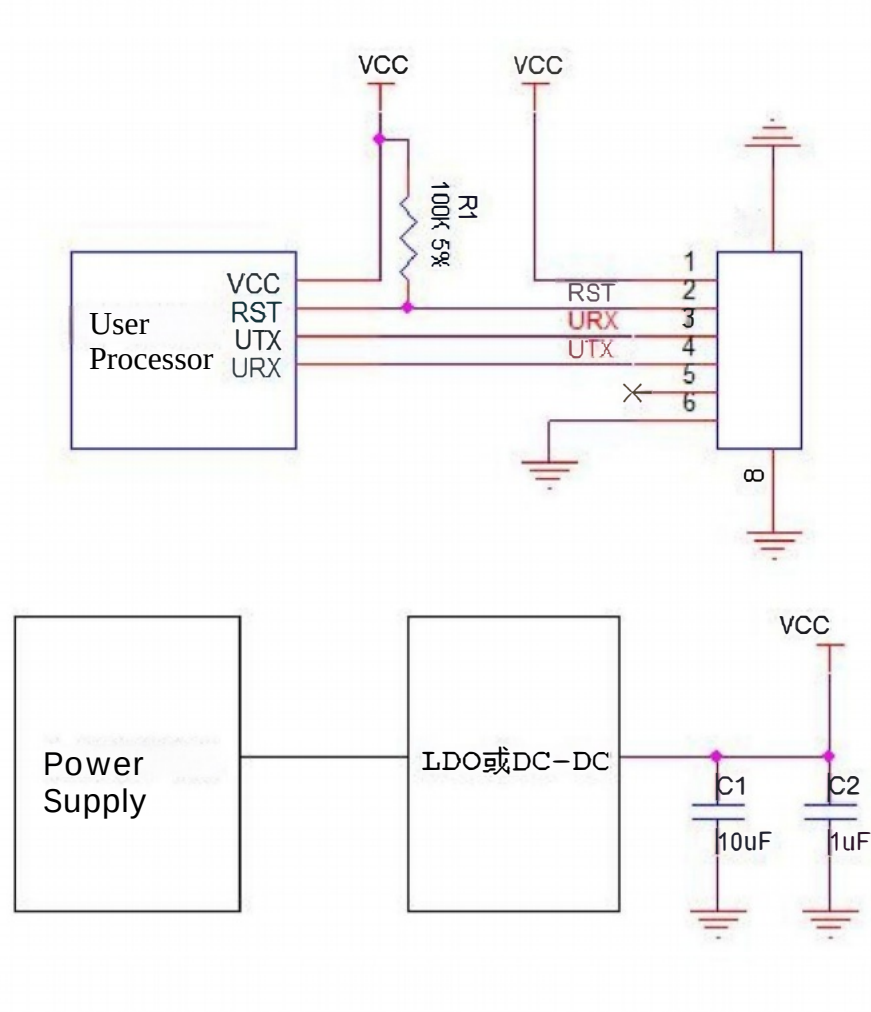


Figure 1: System Connection diagram



5. Software Communication Protocol

5.1 Module Interface Specification

Interface type	UART
Baud Rate	38400
Date bits	8
Parity check	n
Stop bit	1

5.2 Send & Receive Data Module Specification

The module can simultaneously receive corresponding configuration commands and return data packets. Both the commands and the returned data packets use little-endian format.

5.3 Instruction Data

Instructions in the command data can be divided into three categories: collection instructions, examination instructions, and sleep instructions.

① **Collection Instructions:** Used to control the module in collecting and transmitting health information from the human body, enabling or disabling the collection function. The module must first receive a collection command before it can operate.

Functions	Instructions
Turn on (Working)	0x8A
Turn off (Standby)	0x88

Collection Instruction

② **Examination Instructions:** It is designed to work with cloud-based big data for human body information management, collecting health data over a period of time and compressing it into packets for transmission to the cloud for processing. It requires sending a collection instructions first before operation.

Functions	Instructions
Turn on	0x84, 0x00, 0x00, 0x8E
Turn off	0x8C

Examination Instructions

③ **Sleep Instructions:** Allows the module to enter a low-power state, reducing power consumption. To exit sleep mode, pull the reset pin low to reset the module. (Note: Sending other commands can also wake up a sleeping module, but this may cause abnormal operation.)



Functions	Instructions
Turn on	0x98

Sleep Instructions

5.4 Packets

JFH142 sends two types of data packets via serial port: one is real-time data packets, which are continuously transmitted once the data acquisition function is enabled; the other is health check data packets, which are sent only after the health check function is activated.

Real-time packet:

After receiving the acquisition start command, the module transmits data every 64 sampling points (1.28 seconds), with each packet containing 88 bytes. Real-time packets are prefixed with 0xFF, and no other 0xFF values appear within the data packets. The `acdata[64]` can be used to plot the heart rate waveform, while `raa[6]` can be used to generate an RR interval scatter plot.

Fatigue index classification is recommended as follows: above 25 indicates normal, between 15 and 25 indicates mild, and below 15 indicates severe. Adjustments can be made according to specific needs and actual conditions.

When plotting the **heart rate waveform**, plot 64 points every 1.28 seconds, using time as the x-axis and the data from `acdata[64]` as the y-axis; note that `acdata[64]` contains signed numbers.

When plotting the **RR interval scatter plot**, the starting byte serves as the x-coordinate, and each subsequent byte acts as both the y-coordinate of the current point and the x-coordinate of the next point, and so on. This rule applies across packets, with zero values considered invalid and excluded from plotting. Note that the exact number of valid data points in the array depends on how many heartbeats were captured within 1.28 seconds. For example:

`raa1[6]:[1, 2, 3, 0, 0, 0]`

`raa2[6]:[4, 5, 6, 0, 0, 0]`

The coordinates obtained are (1, 2), (2, 3), (3, 4), (4, 5), (5, 6). **Note that the values in this example are not actual measurements but for demonstration purposes only.**

Module status state: When no human body is detected in the module's sensing area, bit 2 of this byte will be set to 1 (starting from bit 0).

Once the data collection start command is received, real-time data packets will begin to be transmitted; transmission stops upon receiving the data collection stop command

```
.typedef struct
{
    uint8_t  0xFF;           /Date Head
    int8_t   acdata[64];     /Heart waveform
                                data
    uint8_t  heartrate;      /Heart Rate
    uint8_t  spo2;           /Spot
    uint8_t  bk;             /Microcirculation
    uint8_t  rsv[8];         /Retain Data
    uint8_t  sdnn;           /HRV
    uint8_t  rmssd;
```



```

uint8_t nn50;
uint8_t pnn50;
uint8_t rra[6];
uint8_t rsv;
uint8_t state;           /Module Status

```

```

} RT_PACK;

```

Byte1		Byte2			Byte65		Byte 66		Byte 67		Byte68					
0xFF (Data Head)		acdata[0] (Rhythm of the waveform data value range is -128 to +127)			acdata[63] (Rhythm of the waveform data value range is -128 to +127)		heartrate (Heart Rate)		spo2 (SpO2)		bk (Microcirculation)					
Byte 69			Byte 71		Byte 72		Byte 73		Byte 74		Byte 75		Byte 76			
rsv[0] (Fatigue Index)			rsv[2] (Retain Data)		rsv[3] (SBP)		rsv[4] (DBP)		rsv[5] (Cardiac output)		rsv[6] (TPR)		rsv[7] (RR)			
Byte 77		Byte 78		Byte 79		Byte 80		Byte 81		...	Byte 86		Byte 87		Byte 88	
sdnn		rmssd		nn50		pnn50		rra[0] (RR)			rra[5] (RR)		rsv (Retain)		state (Status)	

Real-time packet data description

Medical Examination Data Package:

Once the examination command is received, the module begins collecting examination data for a specified duration according to the instruction, which will then be uploaded to the cloud for analysis and return of results. During data collection, processing and compression are performed simultaneously, with one packet transmitted every 1.28 seconds, each packet being 196 bytes in size. Each examination packet starts with 0xFFFF, and one or more 0xFF may appear during transmission. After receiving 0xFFFF, the end of the compressed examination packet must be determined by counting.

```

typedef struct
{
    uint16_t head;           /Data Packet Head
    uint16_t sequence;       /Packet Sequence Number
    uint8_t id[16];          /Unique Hardware Number
    uint8_t tst30_data[168]; /Examination Data
    uint8_t rsv1[8];         /Retain
} TST30_PACK_S;

```

Byte1,2	Byte3,4	Byte 5		Byte 20	Byte 21
head (Data Packet Head)	sequence (Packet sequence number)	id[0] (Unique hardware number)		id[15] (Unique hardware number)	tst30_data[0] (Examination Data)



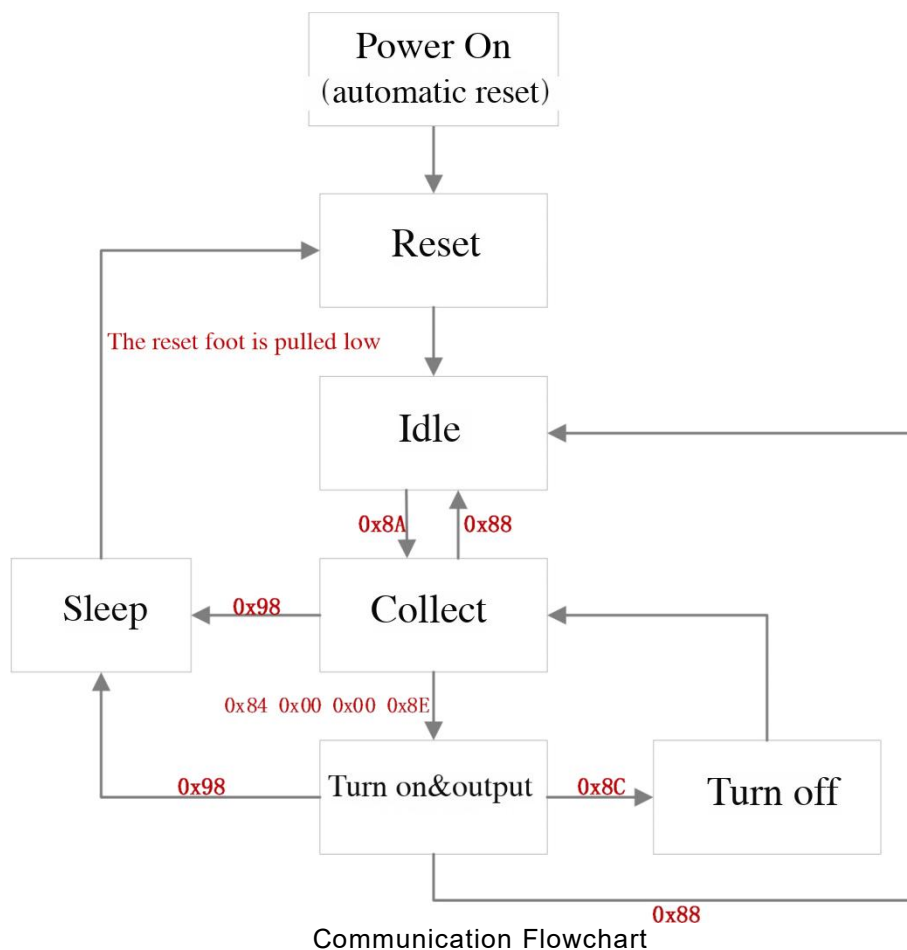
.....	Byte 188	Byte 189		Byte 196
	tst30_data[167] (Examination Data)	rsv1[0] (Retain)		rsv1[7] (Retain)

Medical Examination Package Data Description

The transmission of health check data packets does not affect real-time data packets; health check data packets are transmitted in a 1:1 ratio with real-time data packets.:



5.5 Flow Chart of Communication





6. Application Notes

6.1 Structural Design Considerations

- ① Ensure maximum and stable contact between the case and the skin for optimal signal.
- ② Please thoroughly test the housing, optical path, and materials.

6.2 Usage Precautions

- ① Prompt end users to regularly wipe the lens to prevent sweat and oil stains from accumulating on the surface, which may affect testing accuracy.
- ② The overall structural design should ensure good contact between the product and the skin.
- ③ Take precautions against static electricity during storage, transportation, assembly, and use.

6.3 Product Upgrades

The JFH142 module features precise measurement of pulse waveform, heart rate, blood oxygen saturation, and microcirculation parameters. After backend big data analysis, the health check package can also provide customers with functions such as blood pressure, respiratory rate, and blood flow velocity. Please stay tuned for updates on our latest product releases.

7. License Agreement

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8. Caution & Warning

- ① **This product must not be used in safety protection devices or emergency stop equipment.**
- ② **This product must not be applied to any other equipment where a failure of the product could result in personal injury.**
- ③ **Refer to the product manual before installing, handling, using, or maintaining this product.**

Failure to follow this advice may result in death or serious personal injury. The company shall not be liable for any compensation related to such injuries or deaths, and shall be released from all claims, including costs, damages, legal fees, etc., that may arise against its management, employees, affiliated agents, distributors, and others.



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