MappingLab

Non-Invasive Telemetry System
Product Manual

Version: First Edition (V1.0)

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Chapter 1 Product Overview

1.1 Overview

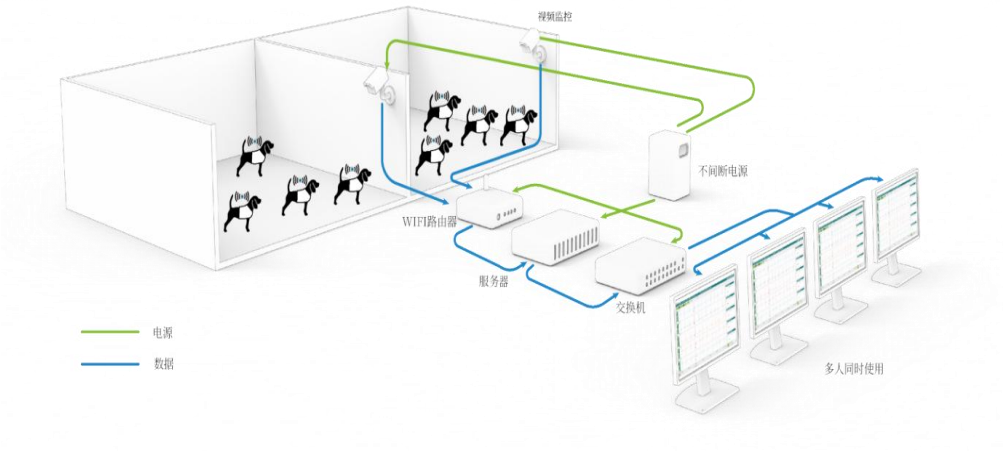
The MappingLab Non-Invasive Telemetry System is a physiological parameter telemetry device for animal research developed by MappingLab Ltd. The system enables real-time acquisition of multiple physiological parameters including ECG (11-lead), non-invasive blood pressure (NIBP), respiration, body temperature, and activity levels, and is widely used in non-clinical drug research (GLP) and related fields.

1.2 Intended Audience

This manual is intended for technical engineers and customer technical personnel, providing guidance on MappingLab telemetry hardware setup and ATScope software data acquisition and analysis operations.

1.3 System Architecture

The system employs digital signal transmission combined with a hardware caching mechanism, effectively resisting interference and providing up to 1 hour of data protection in the event of unexpected power loss or gateway failure. The system architecture is illustrated below:



Chapter 2 Hardware Equipment

2.1 Hardware Components

The MappingLab Non-Invasive Telemetry System consists of the following hardware components:

No.	Device Name	Purpose
1	Server	Receives and stores telemetry data
2	Wi-Fi Router	Receives transmitter signals; connects transmitters and receivers
3	Repeater Router	Enhances signal reception; ensures long-range data transmission
4	Jacket Telemetry Transmitter	Telemetry of ECG, blood pressure, respiration, temperature, and activity
5	NIBP Module	Non-invasive blood pressure monitoring in animals
6	Respiration Band Module	Acquires respiration data
7	Temperature Sensor	Acquires animal body temperature data
8	Accessories	Electrode patches, lead wires, animal jackets, reset USB drive

2.2 Detailed Device Descriptions

2.2.1 Server

Used for receiving and storing telemetry data.

2.2.2 Wi-Fi Router

Receives the signals emitted by the transmitter. The receiver and transmitter are connected via the Wi-Fi router.

2.2.3 Repeater Router

Used to enhance signal reception and ensure reliable long-range data transmission.

2.2.4 Jacket Telemetry Transmitter

Used to acquire ECG (11-lead), blood pressure (non-invasive), respiration, body temperature, and activity data via telemetry.

2.2.5 Non-Invasive Blood Pressure (NIBP) Module

Used for non-invasive blood pressure monitoring in animals. Using a non-invasive tail-cuff method, it can obtain systolic pressure, diastolic pressure, mean arterial pressure, and other indicators. The module is equipped with a connecting cable that

links the jacket telemetry transmitter to the NIBP module and is responsible for pressure output and release during blood pressure measurement.

2.2.6 Respiration Band Module

Respiration bands of different lengths can be selected according to the size of the animal (capable of recording both thoracic and abdominal respiration). A respiration calibration device is available for calibrating respiration waveforms.

2.2.7 Temperature Sensor

Used for acquiring animal body temperature data.

2.2.8 Accessories

(1) ECG electrode patches

(2) ECG lead wires: Used for monitoring animal ECG and ECG electrode impedance respiration data.

(3) Animal jackets: Used to secure and protect sensors. The jackets are available in multiple sizes to accommodate different species and body types.

(4) Reset USB drive: Used for device reset, transfer, and server connection.

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2.3 Hardware Connections

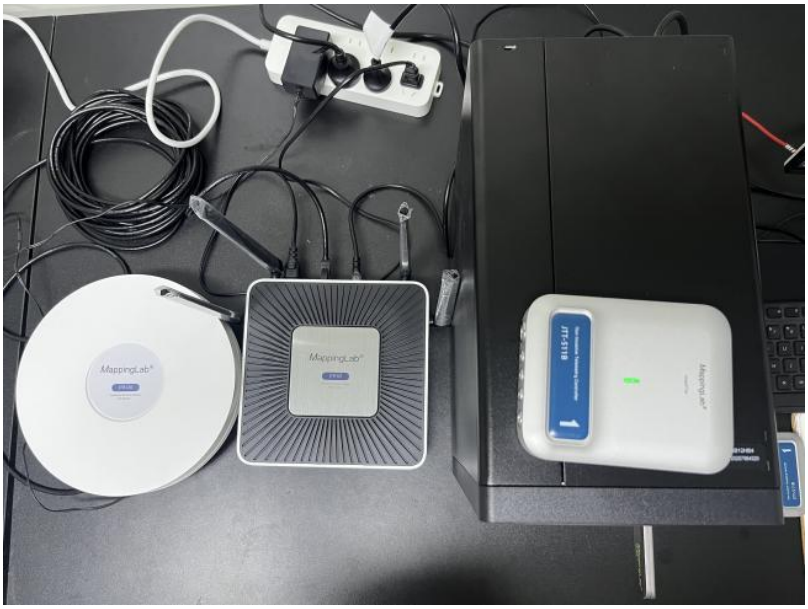
This section describes how to connect the various devices.

2.3.1 Connecting the Wi-Fi Router to the Server

Connect the two devices using an Ethernet cable.

2.3.2 Connecting the Jacket Telemetry Transmitter to the Server

Insert two lithium batteries into the jacket telemetry transmitter. The device indicator light will flash green. Once connected to the server, the indicator light will turn solid green.



2.3.3 Sensor Connections

As shown in the figure below, all sensor connectors have a red dot. When inserting, align the red dot on the connector with the red dot on the device housing. All sensor connectors are equipped with a spring-loaded locking mechanism. Therefore, when

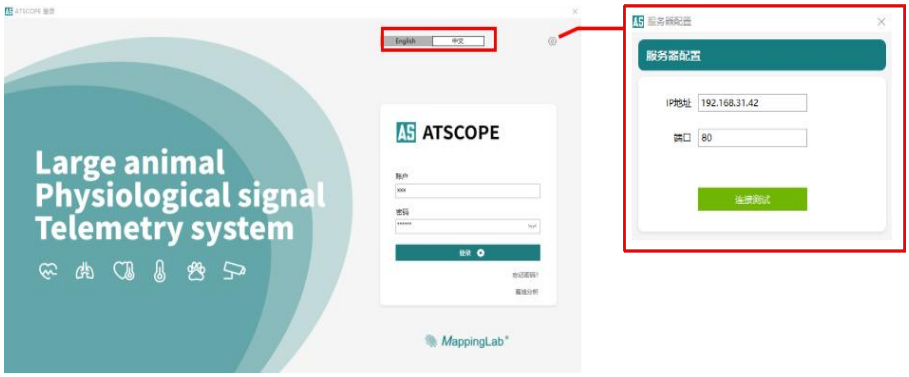
disconnecting, do not pull directly on the sensor wire or connector. Instead, pull back on the textured grip to retract the latch before removing the connector.

Chapter 3 Software Operation — Data Acquisition

This chapter describes the data acquisition workflow of the ATScope software.

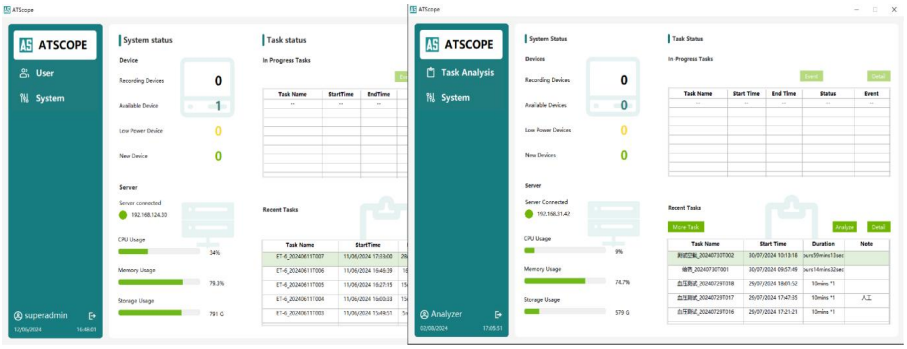
3.1 Software Login

Enter the correct IP address and port according to the server configuration, and select the Chinese or English version as needed.



3.2 User Login

The software supports administrator and standard user logins. Standard user permissions are configured by the administrator.



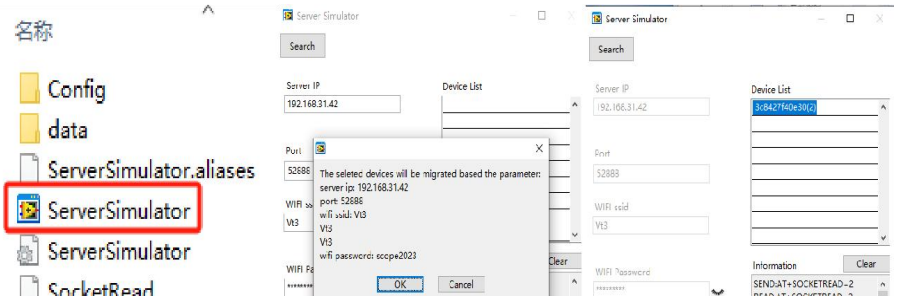
3.3 Creating an Experiment

3.3.1 Adding a Device

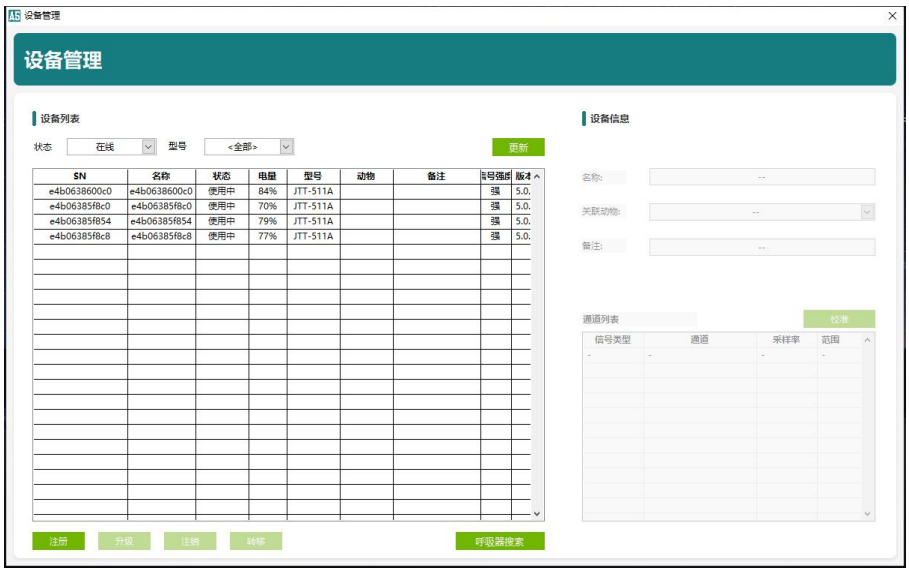
If the device is already bound to the server, skip the device setup steps below and proceed directly to experiment template creation.

Procedure:

a. Insert the reset USB drive into the host computer. In Server Simulator, double-click to open Server Simulator and server information. Add the server details from the server information panel into Server Simulator. Press and hold the RESET button on the JTT-511 device to initiate the device connection.

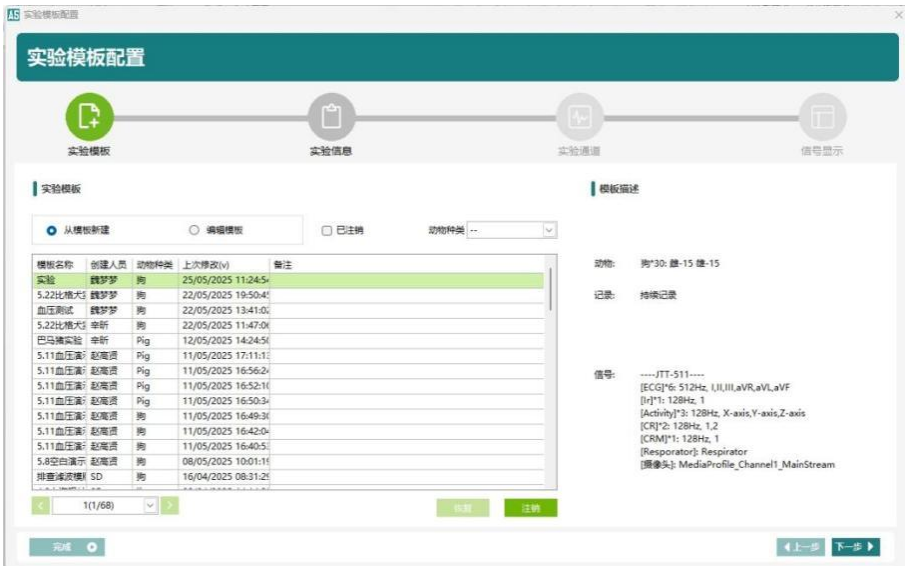


b. In the Device Management device list, check the device Status column. If the device is online, the JTT-511B indicator light will show solid green.



3.3.2 Creating an Experiment Template

a. Edit or create a new experiment template on the Experiment Template screen.

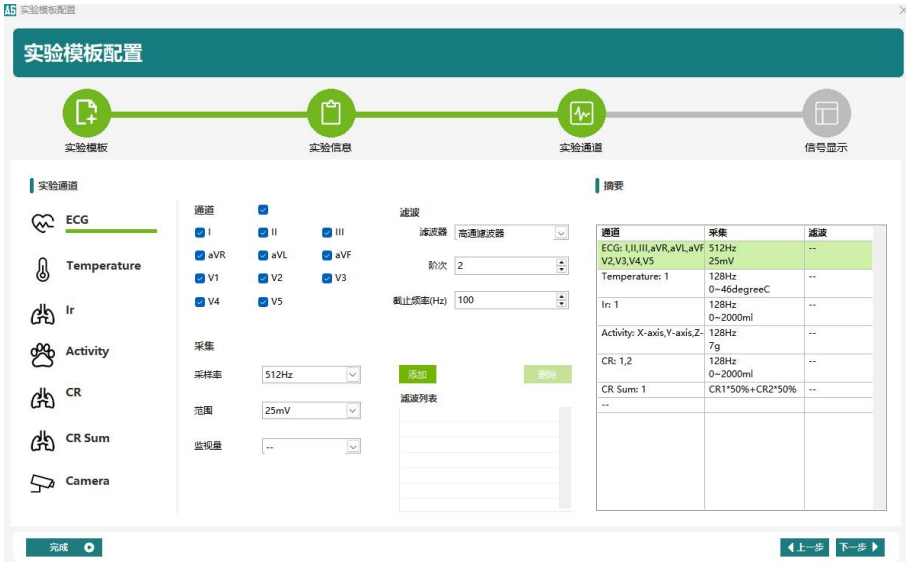


b. Edit the experiment name; select the experiment type (Normal: recording and saving data begins immediately upon start; Manual: preview first, then manually click

to begin saving data). Configure the master device, blood pressure and respiration device types, and other information. Edit the experimental animal information and recording duration.

c. Configure acquisition channels and sampling rates as needed:

Acquisition Channel	Parameter Type	Recommended Sampling Rate
ECG	ECG Signal	512 Hz
Temperature	Body Temperature	128 Hz
Respiration (Impedance Ir / Band CR)	Respiration Signal	128 Hz
Activity	Activity Data	128 Hz



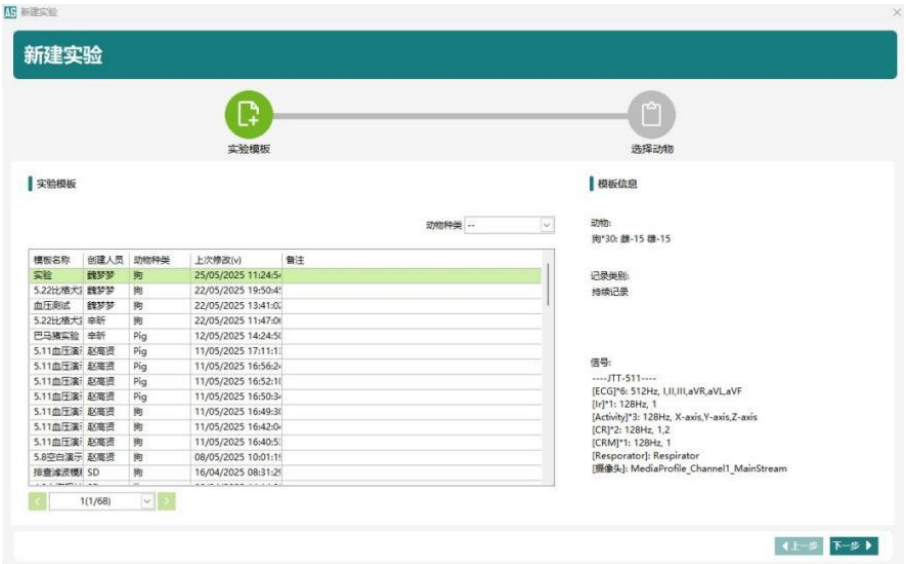
Signal display settings do not require editing. In the analysis interface, you can edit the signal display, number of channels, and the arrangement of channels associated

with animals.

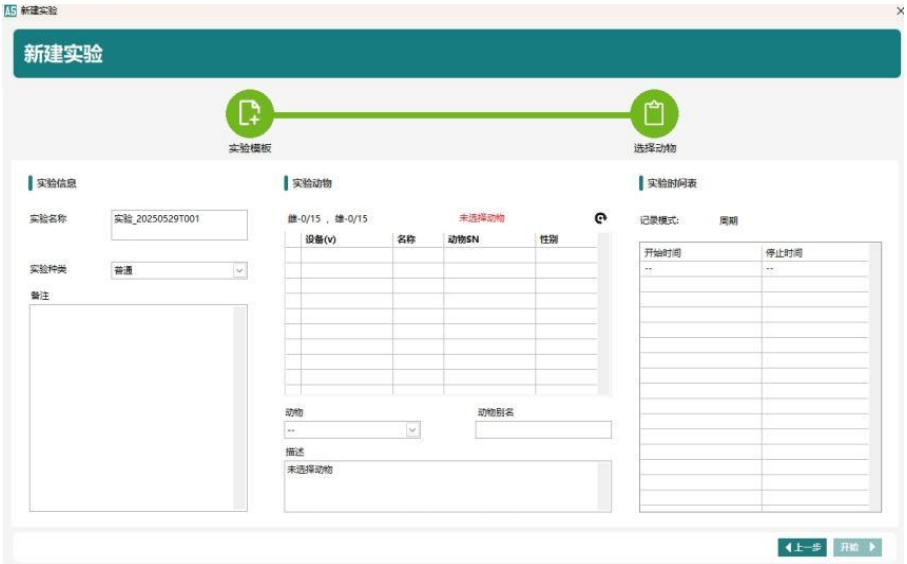
d. Once all settings are complete, click “Complete”, enter the user password to provide an electronic signature, and the template will be created successfully.

3.3.3 Creating a New Experiment

a. Click New Experiment and select the previously created experiment template.



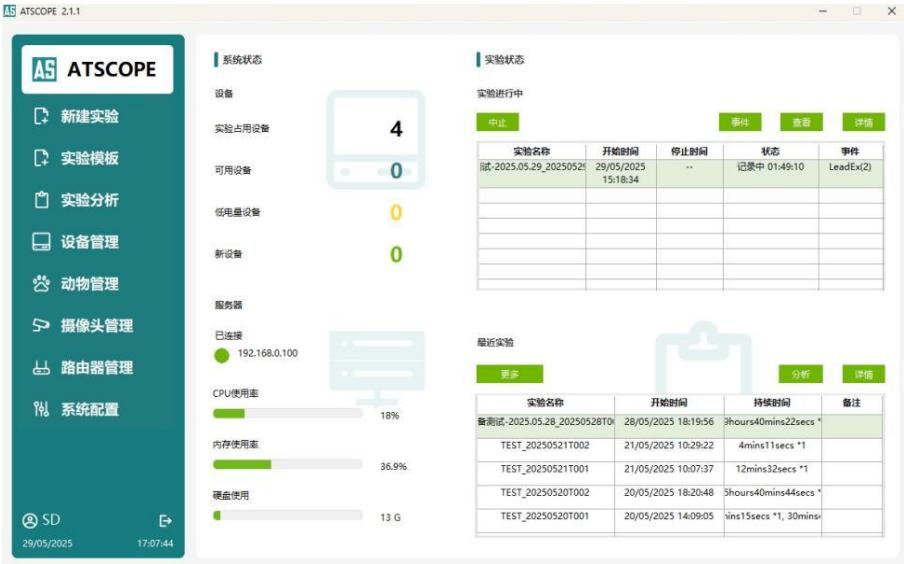
b. Click Devices and enter the alias for the animal using each device. After selecting the device, click “Start”, enter the current user password to provide an electronic signature, and the experiment will begin.



3.4 Experiment Data Acquisition and Viewing

3.4.1 Real-Time Data Viewing

a. The Experiment Status page displays detailed information and events for experiments currently collecting data, and also allows you to terminate data acquisition.

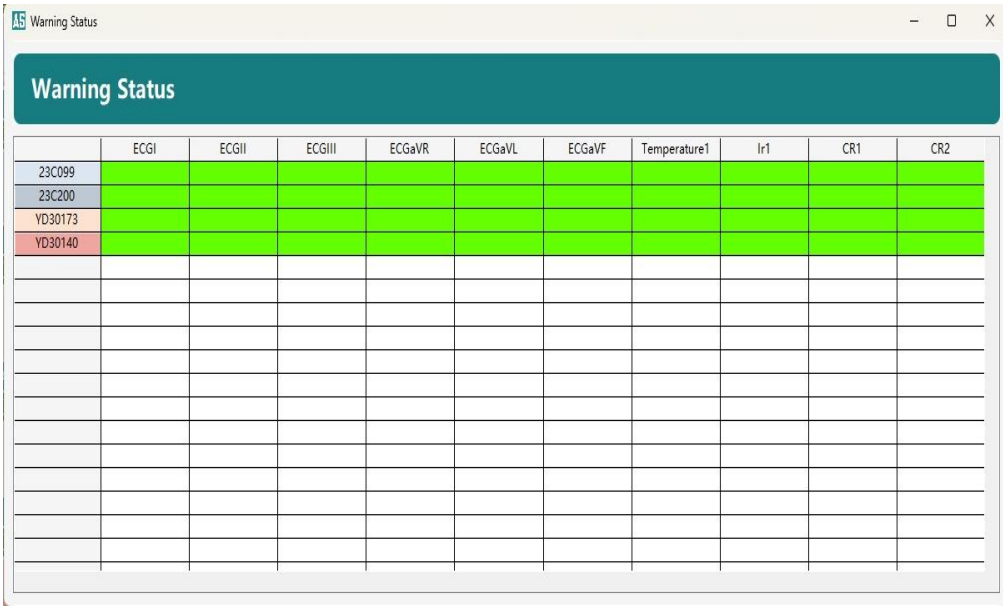


b. Click “View” to enter the real-time data main page. Available functions include:

- Terminate experiment
- Configure channel count, arrangement, and zoom; display vertical/horizontal axes
- View and edit real-time events
- Real-time analysis to assess data validity and trends

- Manual mask respiration acquisition
- Blood pressure data acquisition
- View experiment details

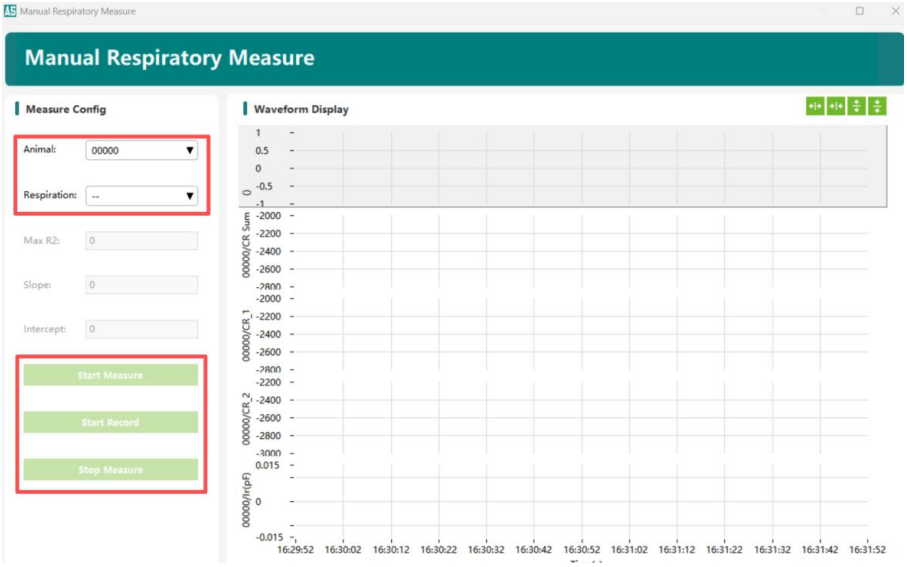
The signal alert page accompanies the real-time data main page, displaying signal strength and lead-off alerts.



3.4.2 Mask Respiration Data Acquisition

Click “Manual Respiration Acquisition” on the real-time data main page to perform mask respiration acquisition. Procedure: Select animal and respirator → Start acquisition → Start recording → Stop acquisition.

Note: Data will only be saved after clicking “Start Recording”.



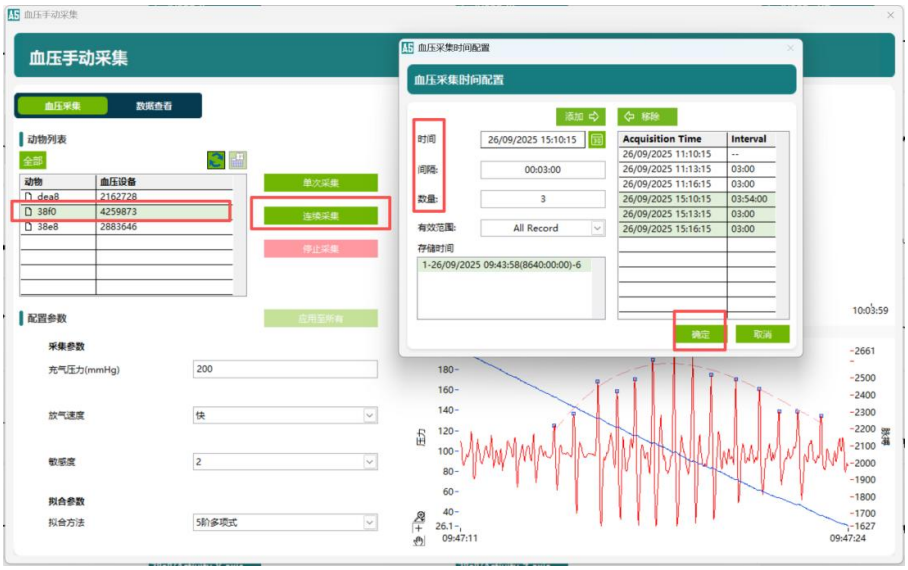
3.4.3 Blood Pressure Data Acquisition

Click “Manual Blood Pressure Acquisition” on the real-time data main page to perform blood pressure acquisition.

Acquisition Settings:

1) Sampling conditions: inflation pressure, deflation rate, sensitivity, and fitting method. Typical settings are 200 mmHg, deflation rate: fast, sensitivity: 2, 5th-order polynomial.

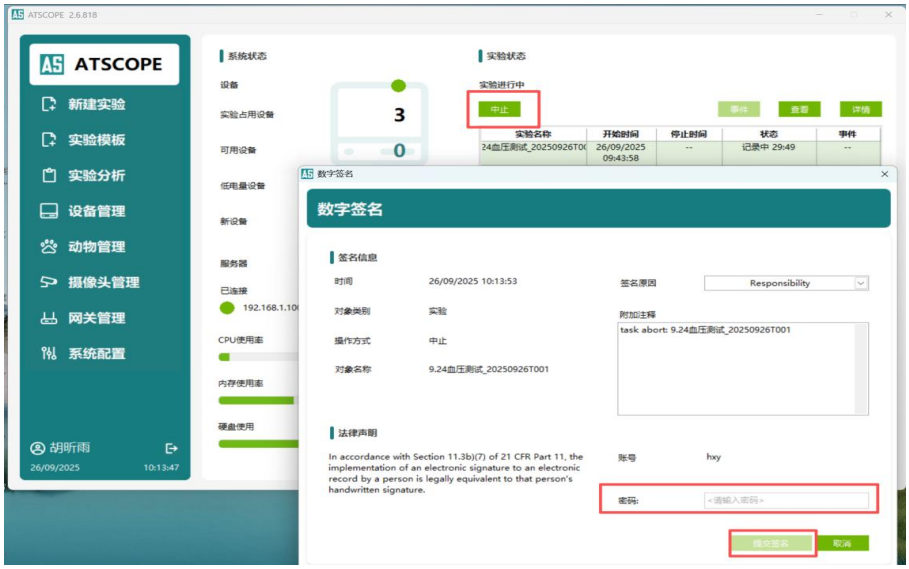
2) Sampling frequency: single manual acquisition or continuous acquisition (select single/all animals, click continuous acquisition; typically configured at different key time points, at 3 min intervals, 3 acquisitions per cycle).



Click Data View to review blood pressure results for different animals.

3.5 Terminating an Experiment

Select the target experiment, click “Terminate”, and confirm with an electronic signature.



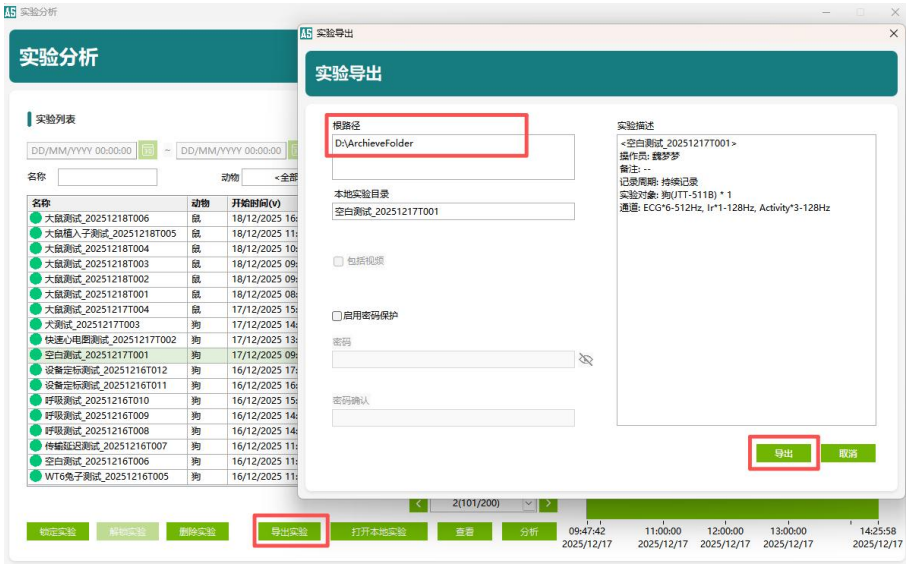
3.6 Raw Data Export

In the Experiment Analysis interface, select the experiment to export, click “Export Experiment”, and save it locally. The experiment file contains:

- Raw data
- System logs
- Electronic signatures
- Data analysis results

Exported files can be used for data archiving or transferred to another server for

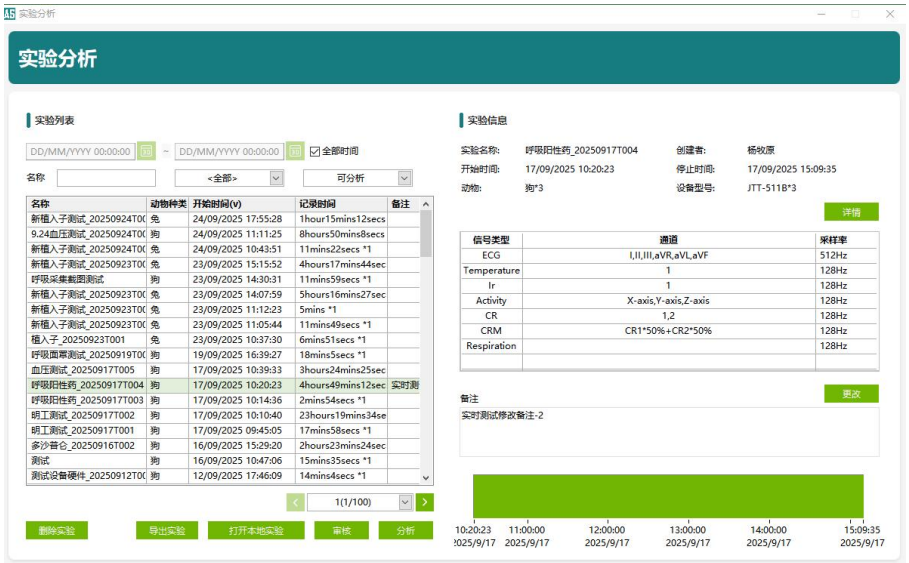
analysis.


实验分析
实验导出
根路径
D:\ArchieveFolder
本地实验目录
空白测试_20251217T001
包括视频
启用密码保护
密码
密码确认
实验描述
导出
取消
实验列表
锁定实验
解锁实验
删除实验
导出实验
打开本地实验
查看
分析

Chapter 4 Software Operation — Data Analysis

4.1 Selecting Experiment Data

Click the “Experiment Analysis” module in the main menu to enter the experiment list interface. Select experiments from the local server or open locally stored experiment data for analysis.



4.2 Selecting Analysis Parameters

After entering the analysis interface, you can select parameters for analysis including ECG, respiration, blood pressure, temperature, and activity.

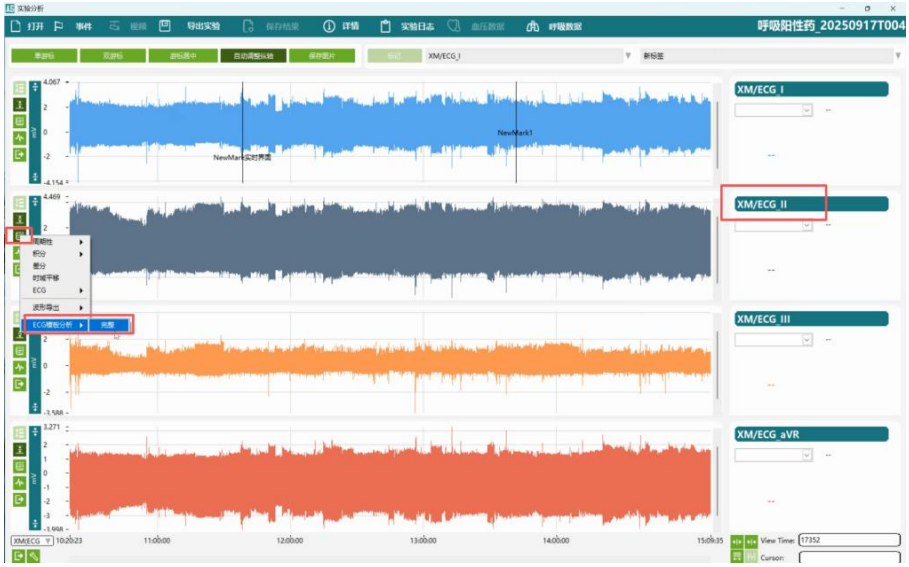
实验分析界面具体功能：

页面调整分析：进入分析界面，单击 Single Cursor 选择单游标或 Double Cursors 双游标，拖动游标至指定位置；Cursor Auto Middle 可设置游标居中；Auto Range Y-Axis 可设置通道纵向调节；Save Image 保存当前界面图；Mark 设置标注。

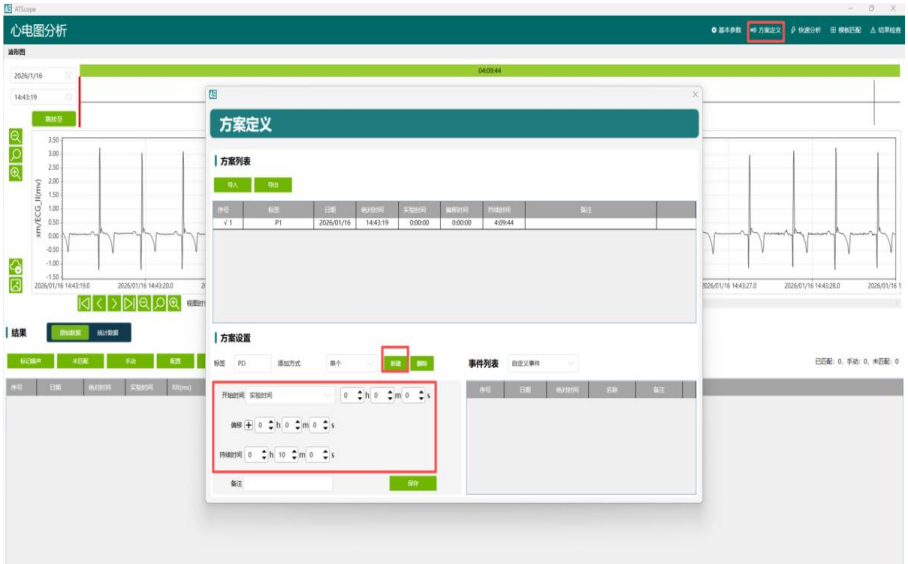
利用调节按键 进行横向和 纵向的放缩调节（单击按钮后在图中划定区域）、 配置滤波器、 通道分析、 浮出通道窗口、 页面设置、 Male1(E 键可选择不同的通道（心电ECG、呼吸Ir\CR1\CR2、体温Temperature、活动度Activity等）进行分析。

4.3 ECG Data Analysis

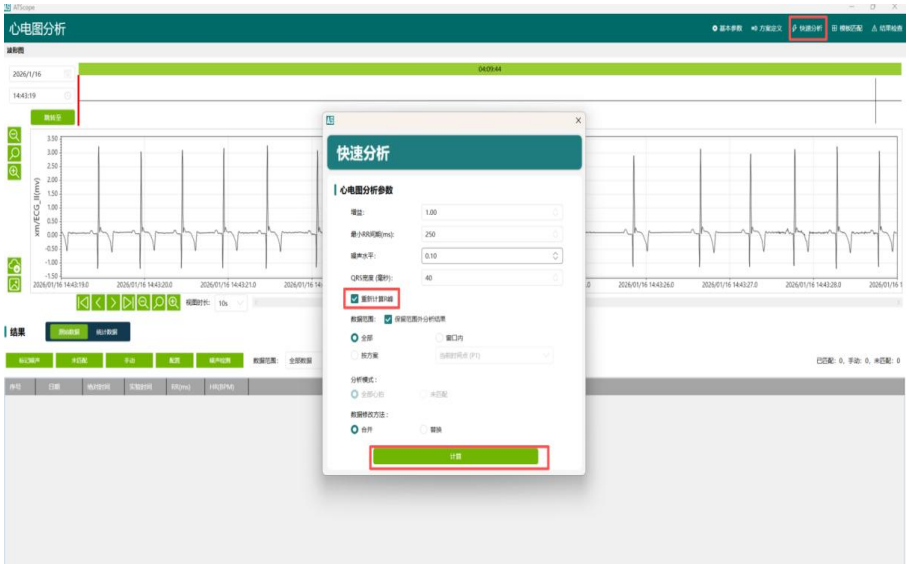
a. Select the ECG Lead II channel to enter the ECG analysis interface.



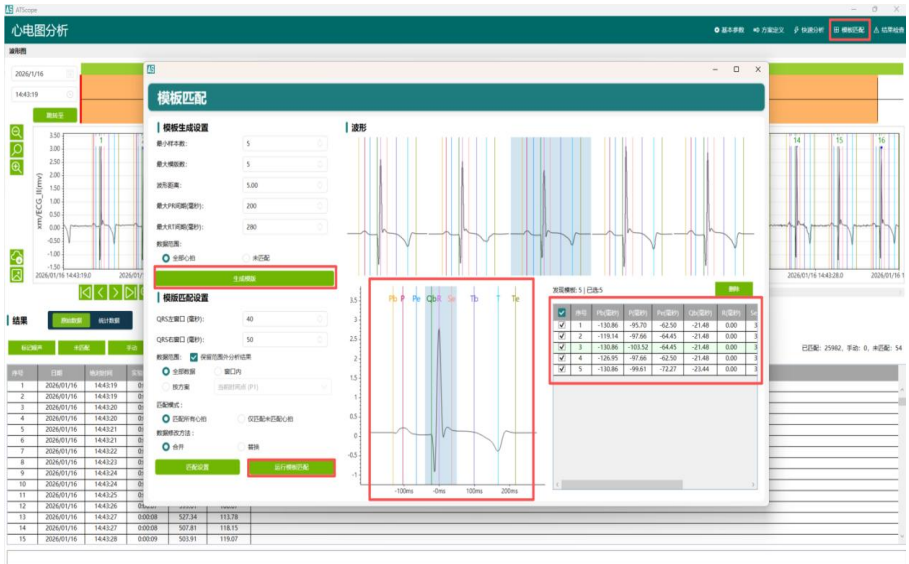
b. Click “Protocol Definition” to set data analysis time points according to the experimental protocol.



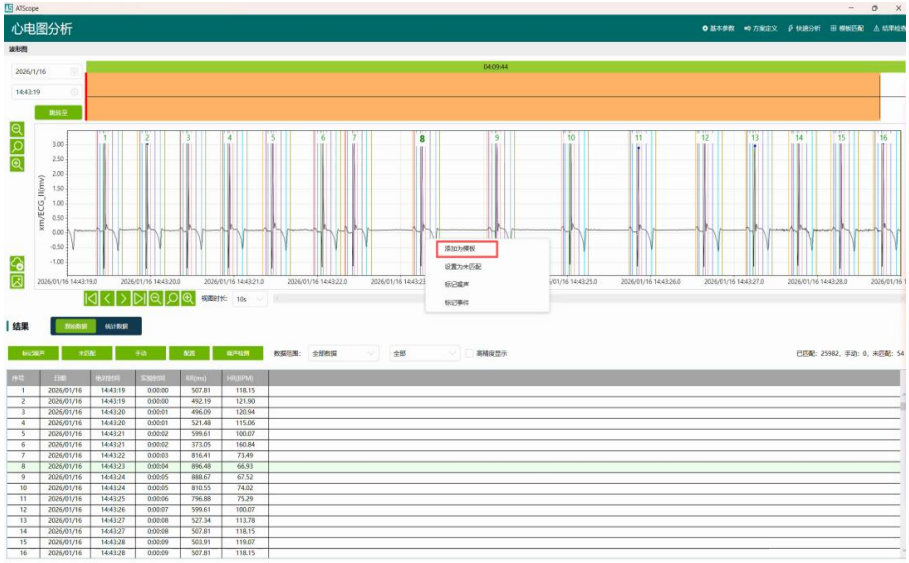
c. Click “Quick Analysis” to detect matched heartbeats and display P, QRS, T, and other characteristic point markers.



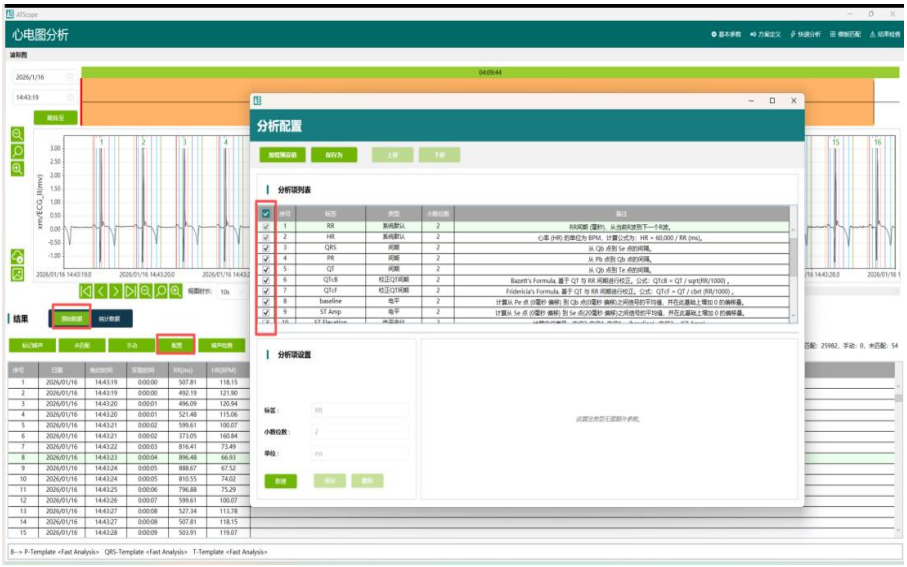
d. Click the “Template Settings” interface to configure template generation parameters, automatically generate templates, and adjust template marker positions for matching.



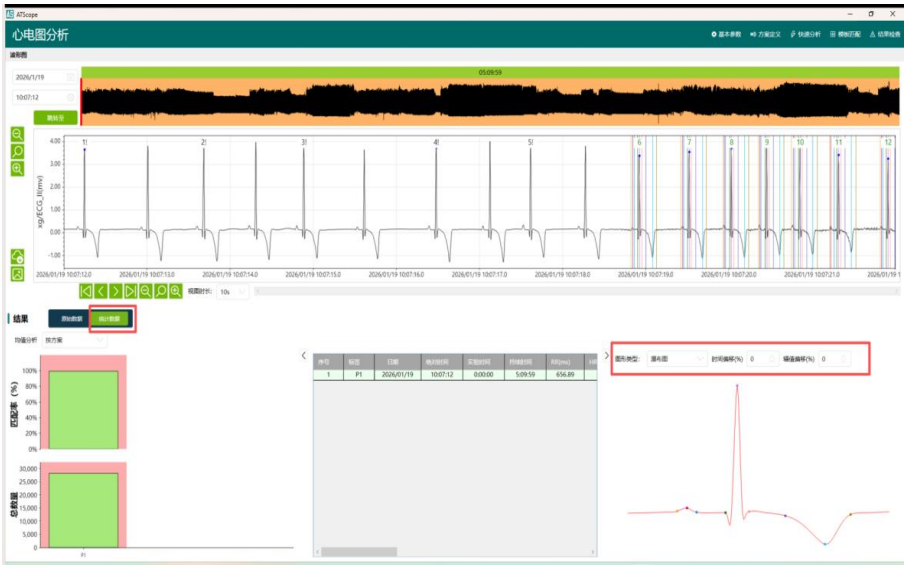
e. Click on a selected heartbeat to manually add a template and perform data matching.



f. Click “Raw Data” and select the required analysis parameters for configuration.



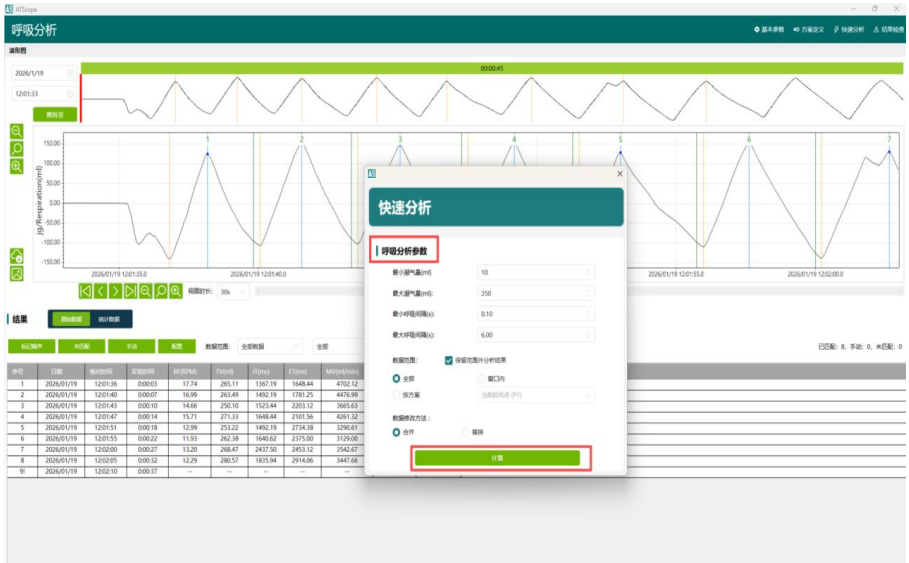
g. Click “Statistics” to view the overall waveform matching rate, trend charts, waterfall plots, and analysis result tables.



4.4 Respiration Data Analysis

4.4.1 Mask Respiration Data Analysis

Select mask data analysis and adjust respiration parameters in the Quick Analysis panel, then calculate matching respiration waves.

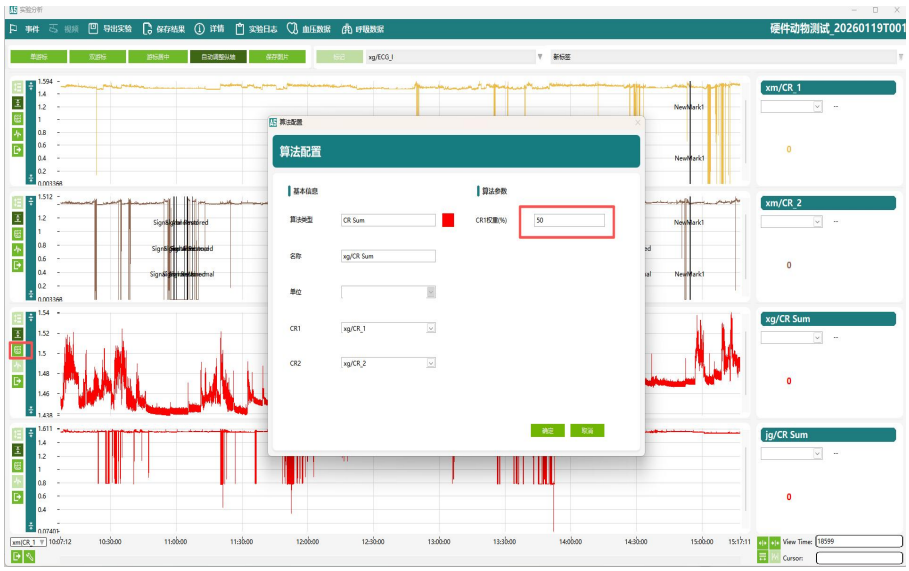


Click “Protocol Definition” to set data analysis time points according to the experimental protocol.

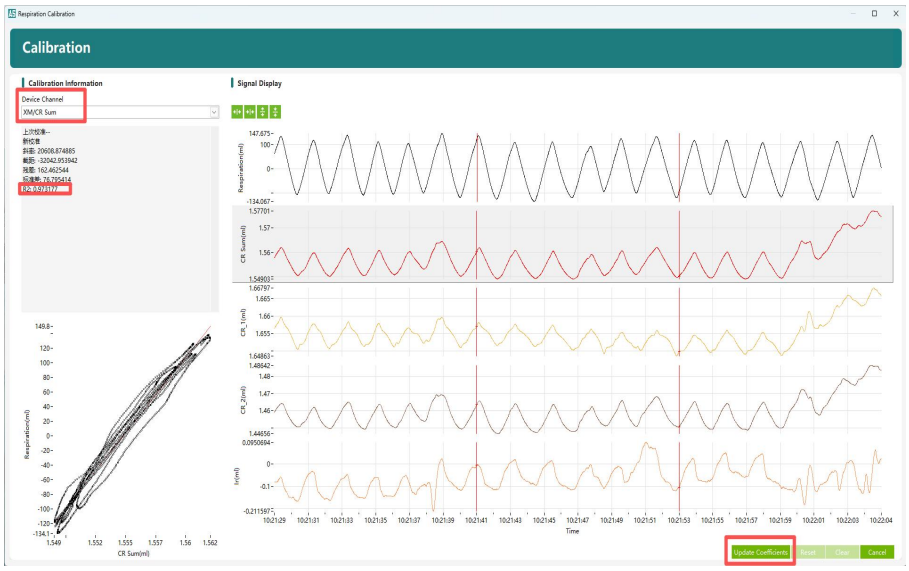
Click “Statistics” to view the overall waveform matching rate, trend charts, waterfall plots, and analysis result tables.

4.4.2 Band Respiration Data Analysis

a. In the CR Sum function on the left side of the analysis main interface, edit the weights for the thoracic and abdominal respiration bands.

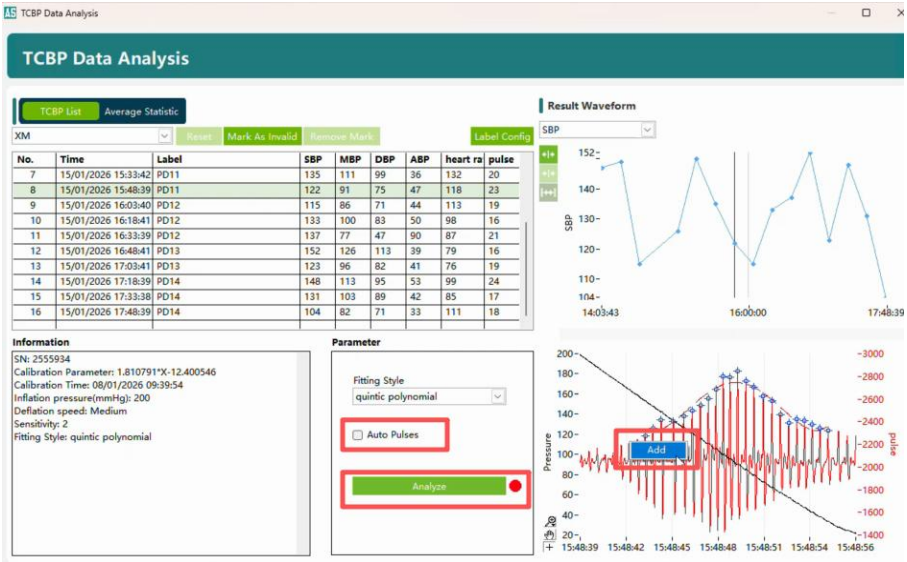


b. Use the mask data to calibrate the respiration band data. Subsequent operations are the same as for mask respiration analysis.



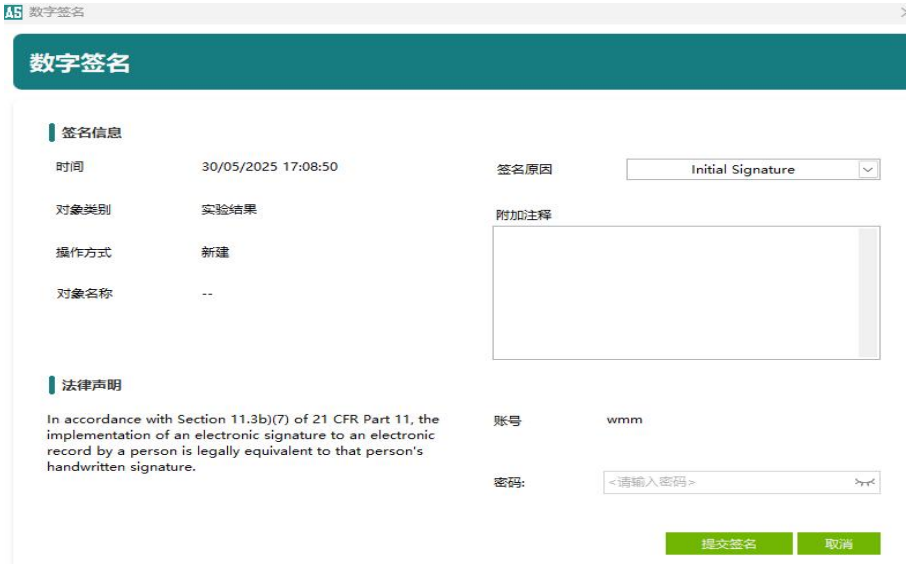
4.5 Blood Pressure Data Analysis

In the blood pressure table, select a blood pressure measurement record to view the blood pressure waveform. You can manually adjust parameters such as systolic pressure, diastolic pressure coefficient, and fitting method in the parameter area, then click “Analyse” to re-run the analysis. Additionally, you can manually mark abnormal or missed pulse waves on the pulse waveform to improve result accuracy.



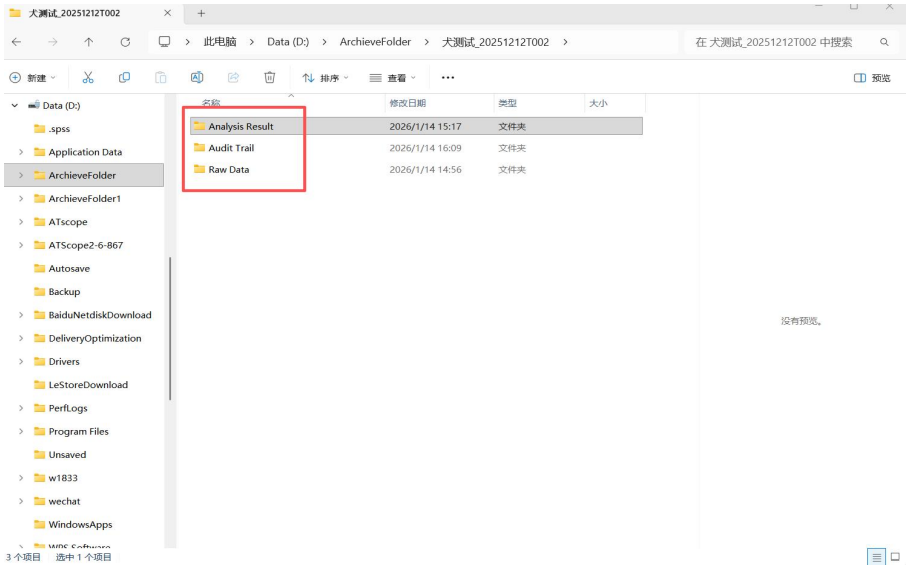
4.6 Saving Analysis Data

After analysis is complete, click “Save Results”. The digital signature dialog will appear. Enter the password to save the analysis results.



4.7 Viewing Analysis Data

Analysis results, audit trails, signatures, and other data can be viewed in the export folder.


犬测试_20251212T002
此电脑 › Data (D:) › ArchieveFolder › 犬测试_20251212T002 ›
在 犬测试_20251212T002 中搜索
新建
排序
查看
预览
Data (D:)
.spss
Application Data
ArchieveFolder
ArchieveFolder1
ATscope
ATScope2-6-867
Autosave
Backup
BaiduNetdiskDownload
DeliveryOptimization
Drivers
LeStoreDownload
PerfLogs
Program Files
Unsaved
w1833
wechat
WindowsApps
名称
修改日期
类型
大小
Analysis Result
2026/1/14 15:17
文件夹
Audit Trail
2026/1/14 16:09
文件夹
Raw Data
2026/1/14 14:56
文件夹
没有预览。
3 个项目
选中 1 个项目

Chapter 5 Glossary

Abbreviation	Full Name	Description
ECG	Electrocardiogram	Electrical activity of the heart
RIP	Respiration	Respiratory impedance plethysmography
NIBP	Non-Invasive Blood Pressure	Cuff-based blood pressure measurement
Temp	Temperature	Body temperature measurement
GLP	Good Laboratory Practice	Non-clinical research quality standards
SOP	Standard Operation Procedure	Documented standard operating procedure

Contact Information

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FCC Warnning:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection againstharmful interference in a residential installation. This equipment generates, uses and can radiateradio frequency energy and, if not installed and used in accordance with the instructions, maycause harmful interference to radio communications. However, there is no guarantee thatinterference will not occur in a particular installation. If this equipment does cause harmfulinterference to radio or television reception, which can be determined by turning the equipmentoff and on, the user is encouraged to try to correct the interference by one or more of thefollowing measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1)This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.