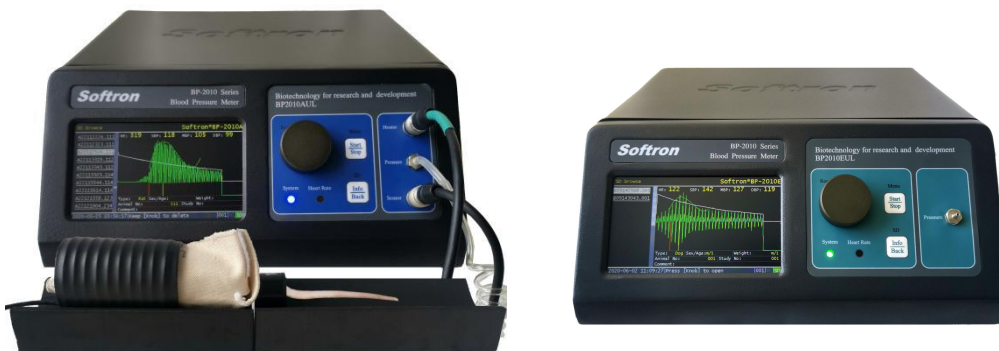




Intelligent Non-Invasive Blood Pressure Monitor Software User Manual

(Applicable Models: BP-2010A / BP-2010E)



Beijing Softron Biotechnology Co., Ltd.

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1. System Overview

- This software is designed for use with the BP-2010A Intelligent Non-Invasive Blood Pressure Monitor for small animals and the BP-2010E model for large animals. It enhances the intuitiveness and usability of blood pressure measurement, and includes data editing and export functions.
- Operating system: Windows
- Communication with the BP-2010A/BP-2010E main unit is established via a USB cable.
- Software components:
 - Driver File: BP_USB_Driver_Universal_Installer.exe
 - Main Software: BPSeries_Setup.exe

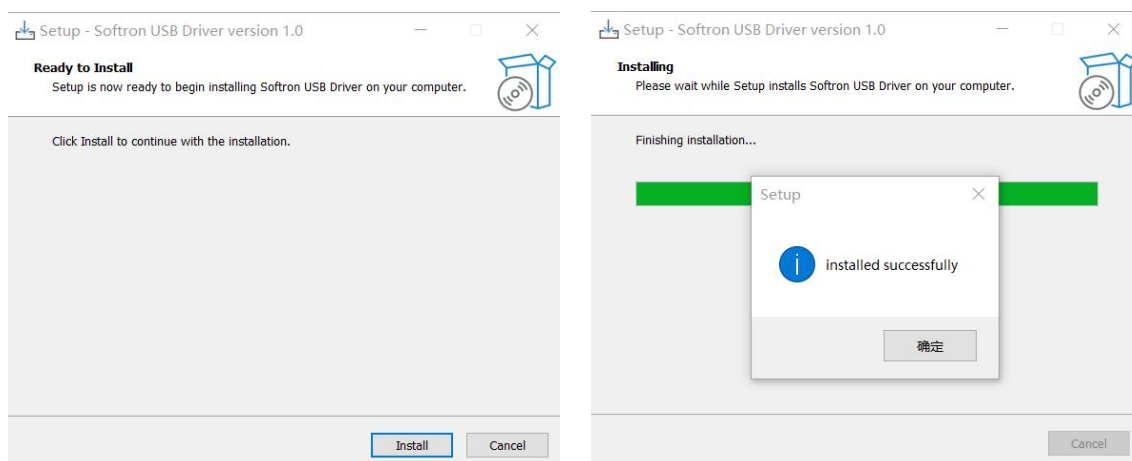
2. Installing the Software and Driver

2.1 Installing the Driver

- (1) Connect the device to the computer using the USB cable, and turn on the device.

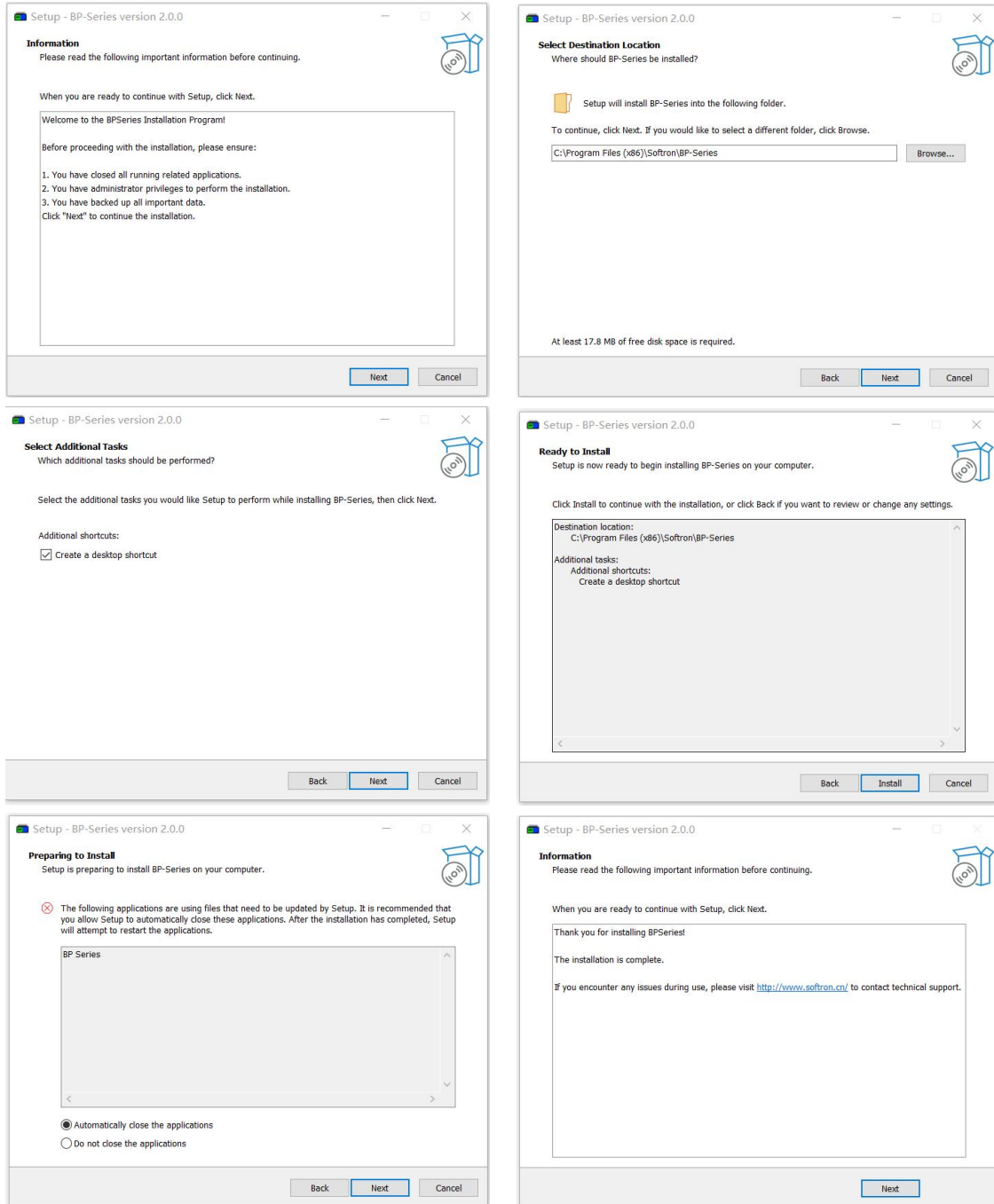


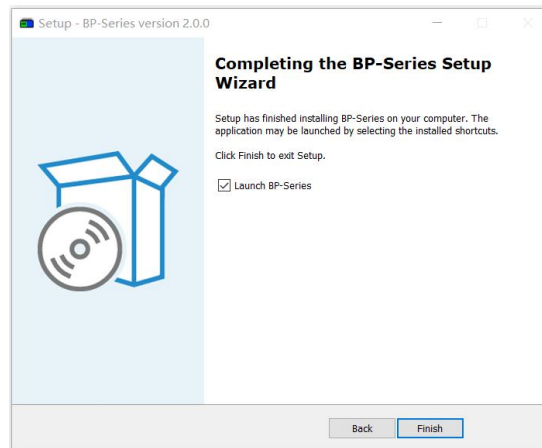
- (2) Double-click the driver file **BP_USB_Driver_Universal_Installer.exe**, then select **"Install"** to begin installation. When the installation is complete, a message saying **"Installed successfully"** will appear. Click **"确认"** to finish the installation.



2.2 Installing the Main Software

- (1) Double-click the file **BPSeries_Setup.exe**, and follow the prompts shown in the setup interface. Use the blue-highlighted buttons to proceed through the installation.





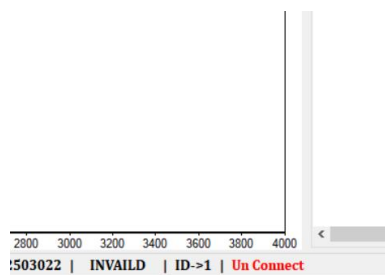
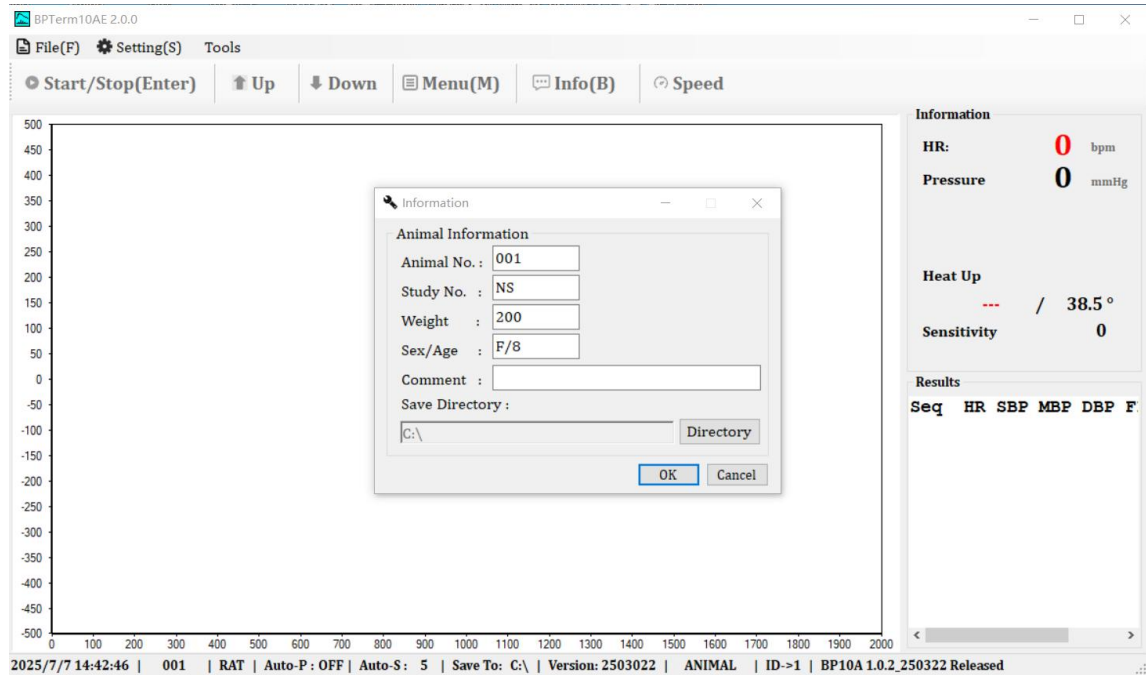
(2) Upon completion, the following software interface will appear, and a shortcut  will be created on your desktop.



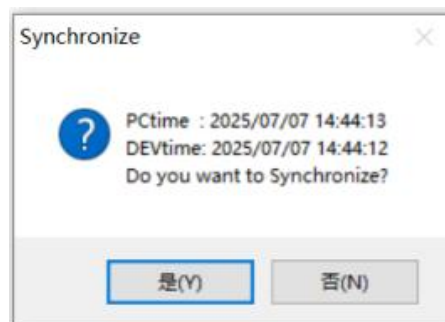
- The **BPTerm** module is used for blood pressure measurement.
- The **BPEDITOR** module is used for analyzing and exporting saved data.
- The **Contact** button links to the company website.
- The **Close** button exits the software.

3. Synchronizing Computer and Device Time

(1) Connect the device to the computer via USB, ensure the driver is properly installed, and double-click the software  to launch it. Select the **BPTerm** module to enter the measurement interface.



- (2) If the status bar shows a red "**Un Connect**" message, it indicates that the device is not properly connected to the computer. Please check the USB connection and confirm that the driver has been successfully installed.
- (3) After entering the measurement interface by clicking "**OK**" in the **Information** window, go to the top menu, select "**Setting (S)**", then click "**Time Synchronize**". In the pop-up dialog box, select "**Yes**" to synchronize the PC time with the device.



4. Measuring Blood Pressure

4.1. Entering Animal Information

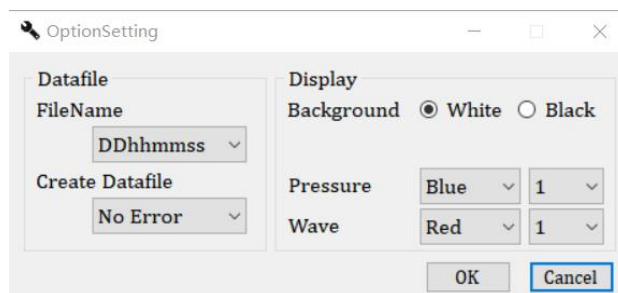
After entering the BPTerm measurement interface, the system will automatically display the **Information** window. Users can also manually open this window by clicking the '**Info (B)**' button in the toolbar.

Parameter Description:

Parameter	Requirement	Note
Animal No.	1) Max 8 half-width characters. The last 3 half-width characters will be used as a suffix for the saved file name to distinguish data source. 2) It is recommended to use 3 half-width characters (e.g., 001, 002). If more than 3 half-width characters are used, ensure the last 3 are unique for each animal.	Required
Study No.	Max 8 half-width characters.	Optional
Weight	Max 8 half-width characters.	Optional
Sex/Age	Max 8 half-width characters.	Optional
Comment	Max 32 half-width characters.	Optional
Save Directory	Click the ' Directory ' button to set the save path.	

4.2. Setting Save Options and Background Display

From the top menu bar, go to '**Setting(S)**' > '**Monitor**' to configure the following parameters:



- **FileName** : Choose the file name format. Default is 'DDhhmmss', representing day-hour-minute-second.

- **Create DataFile**: Choose save condition.

'Always': Save after every measurement regardless of result.

'No Error': Save only if no error occurs.

'Never': Disable auto-save.

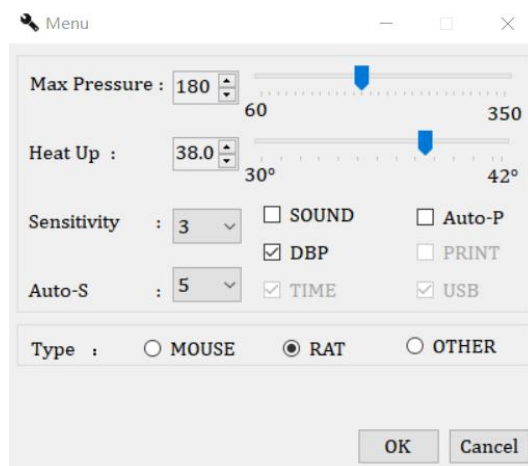
- **Background**: Set the background color.

- **Pressure**: Set the color and thickness of the pressure line.

- **Wave** : Set the color and thickness of the pulse wave line.

4.1. Setting Measurement Parameters and Starting Measurement (BP-2010A)

(1) Click the '**Menu (M)**' button to open the **Menu** window.



Parameter Descriptions

Parameter	Description
Max Pressure	Maximum pressure value applied to the animal's tail via the pressure sensor. Set 30–50 mmHg above the expected systolic pressure to ensure full occlusion. Recommended: 180 mmHg for rats; 150 mmHg for mice. Adjust flexibly based on actual blood pressure.
Heat up	Heating function for the thermal cylinder. Recommended temperature range: 38.0–39.0°C (suitable for standard lab conditions).

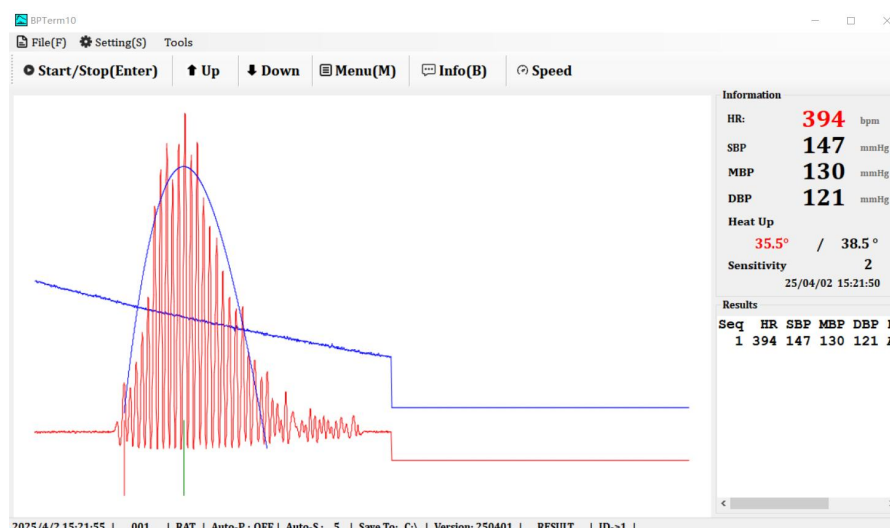
	To turn off: Drag the slider to the far left. The display will turn gray to indicate it is disabled.
Sensitivity	Controls the amplification of the pulse signal. Increasing the value enhances the waveform; decreasing it attenuates the signal. Typical range is 0–3 if the animal is adequately warmed. Adjust based on pulse intensity and software feedback.
Auto-S	Automatic measurement and statistical analysis. ① Set number of measurements (1–10). The system automatically starts once the pulse signal is stable, and displays results including: each value, average (AV), standard deviation (SD), standard error (SE), and coefficient of variation (CV). ② During wait time, manual measurement via button press is allowed and counts toward total. ③ Use when animal is stable or continuous non-disturbed measurements are needed. ④ Set to "Off" to disable.
SOUND	When enabled, the device beeps once upon pulse detection and during button presses. Disable to mute all sound outputs.
Auto-P	Automatic pressure increment. If the initial Max Pressure fails to occlude blood flow, the system automatically adds 50 mmHg. If still unsuccessful, another 50 mmHg is added. A maximum of 2 increments are allowed per cycle. When disabled, the device strictly applies only the preset Max Pressure
DBP	When enabled, the system collects HR, SBP, MBP, and DBP. When disabled, only HR and SBP are recorded.
Type	Animal mode selection: "Mouse" for mice, "Rat" for rats, "Other" for other species.

(2) Ensure the pressure sensor is properly placed at the base of the tail in the correct direction (as indicated"  ").

The device has a built-in tail detection feature: if proper placement is not detected, pressurization and measurement will be blocked (even forced attempts will fail).

(3) When the pulse waveform is stable and regular, and the animal remains still, press the **"Start/Stop (Enter)"** button.

The system will quickly inflate to the Max Pressure and then gradually deflate. The software records both pressure and pulse waveforms in real time. Results will be shown on the right panel after completion.



(4) If an error occurs during the measurement, the type of error will appear on the right panel. Follow the device screen prompts to adjust settings and retry.

(5) After each animal change, click the **"Info (B)"** button on the toolbar to enter the next animal's ID in the animal information window.

(6) If the Auto-S function is enabled, the system will automatically monitor the stability of the pulse signal. Once the stability threshold is reached, the measurement process will start automatically without manual intervention. After completing the preset number of measurements, the device screen will display the full data set, including individual measurement values, average (AV), standard deviation (SD), standard error (SE), and coefficient of variation (CV).

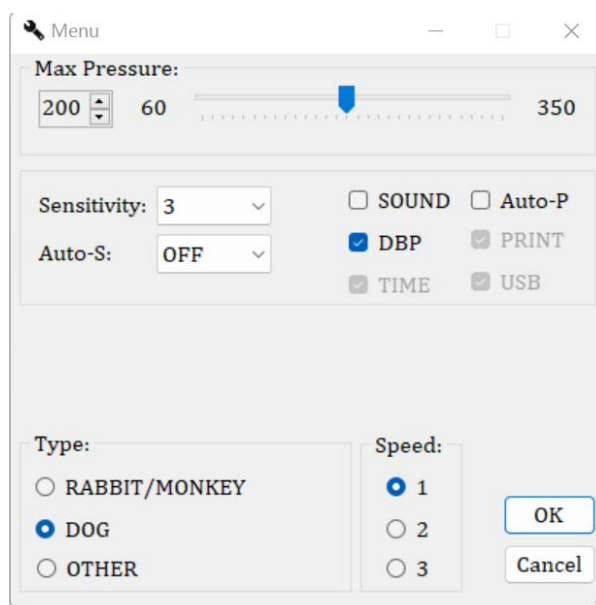
Note: This is particularly convenient for rats. For mice, due to their tendency to move, manual measurements are recommended once they reach a measurable state.

(7) The **"↑Up"** and **"↓Down"** buttons on the toolbar can be used to quickly adjust the Sensitivity value. When Auto-S is enabled, the Sensitivity adjustment range is limited to 0–3.

(8) The **"Speed"** button adjusts waveform scroll speed for better observation of data changes.

4.2. Setting Measurement Parameters and Starting Measurement (BP-2010E)

(1) Click the **'Menu (M)'** button on the toolbar to enter the **Menu** window.



Parameter Descriptions

Parameter	Description
Max Pressure	Max pressure applied to the animal's tail or limb via the cuff. Set 30–50 mmHg above the expected systolic pressure to ensure full occlusion.
Sensitivity	Adjusts signal amplitude. Higher values enhance pulse amplitude; lower values attenuate signals.
Auto-S	① Set the number of measurements (1–10 times). After completing the preset number, the device main unit will display the complete data set, including individual measurement values, average (AV), standard deviation (SD), standard error (SE), and coefficient of variation (CV); ② Selecting "Off" will disable this function.
SOUND	When enabled, emits a beep on pulse detection and button press. Disable to mute all sounds.
Auto-P	Automatic pressure increment. If the initial Max Pressure fails to occlude blood flow, the system automatically adds 50 mmHg. If still unsuccessful, another 50 mmHg is added. A maximum of 2 increments are allowed per cycle. When disabled, the device strictly applies only the preset Max Pressure
DBP	When enabled, collects HR, SBP, MBP, and DBP. When disabled, collects only HR and SBP.
Type	"RABBIT/MONKEY" mode is intended for rabbits and monkeys, typically with heart rates above 150 bpm. "DOG" mode is designed for dogs, with heart rates ranging from 80 to 180 bpm. "OTHER" mode is used for other animals, typically with heart rates between 40 and 100 bpm.
Speed	Exhaust speed setting; 1 = slowest, 2 = medium, 3 = fastest.

- (2) Ensure the cuff is correctly secured on the animal. When the animal is calm, press '**Start/Stop(Enter)**'. The system will pressurize to Max Pressure, then gradually release. Results will be shown on the right panel.
- (3) If an error occurs, it will appear on the right panel. Adjust parameters as prompted and retry.
- (4) After changing animals, click '**Info(B)**' and enter new animal data.
- (5) If Auto-S is enabled, results will be displayed after preset cycles (AV, SD, SE, CV).
- (6) On the toolbar, the "**↑Up**" and "**↓Down**" buttons are used to quickly adjust the Sensitivity value. When Auto-S mode is enabled, the adjustable range for Sensitivity is limited to 0–3. The "**Speed**" button adjusts the waveform display speed, making it easier to observe changes in the signal.

5. Scheduled Measurements by Time Queue

From the top menu, go to "**Setting(S)**" > "**Time Mode**" to open the scheduling window.

Setting

Time Interval : 1 Min Add List

Cycles : Loop

Configuration

Stage	Interval	Cycles
0	2	5
1	1	Loop

Execute

Cancel

Save

Import

Clear

In the "**Time Interval**" field, set the measurement interval.

In the "**Cycles**" field, set the number of measurement repetitions.

If "**Cycles**" is set to "**Loop**", the system will enter an infinite loop mode for continuous measurements.

Click the "**Add List**" button to add the current configuration to the execution queue.

Multiple time-based measurement tasks can be added to the queue (Note: If "**Loop**" is selected, no further tasks can be added afterward).

Save: Save the current queue configuration to the system database.

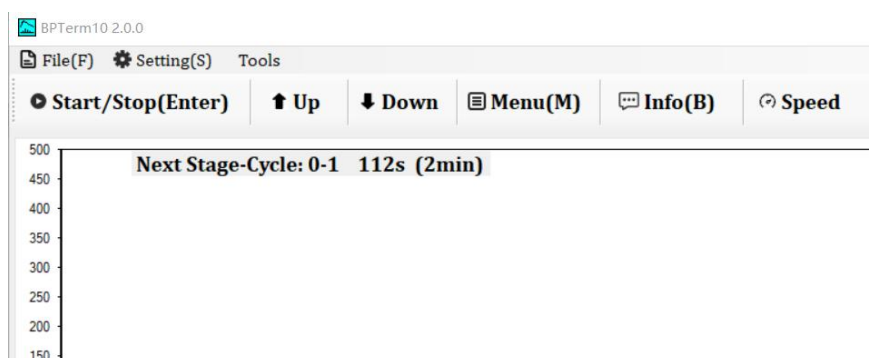
Import: Load the most recently saved queue configuration.

Clear: Clear all current queue configurations.

After all settings are configured, click the "**Execute**" button to start scheduled measurement. A live countdown timer will be displayed on the measurement screen.

During execution, you may click "**Menu(M)**" or "**Info(B)**" to terminate the process early.

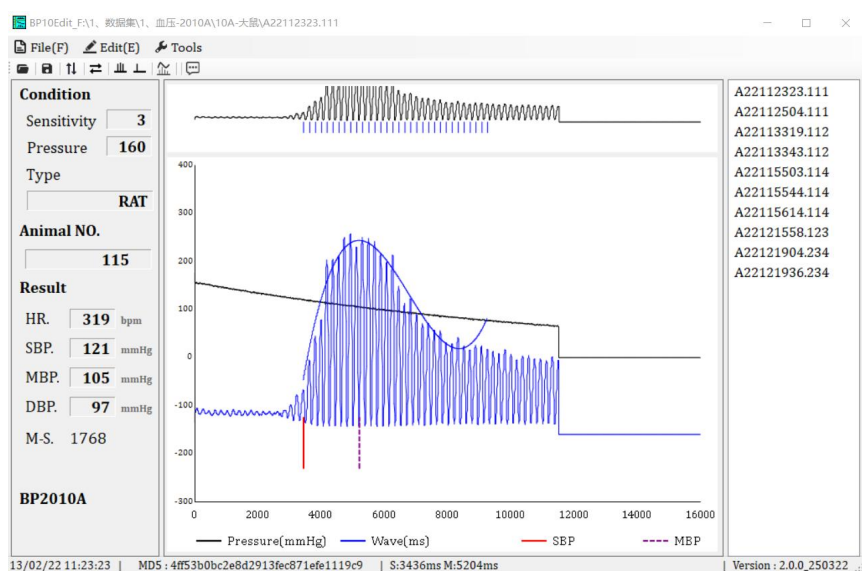
Cancel: Exit the current window.



6. Data Analysis and Export

6.1. Opening and Viewing Data

(1) Launch the **BPEDITOR** module in the software. From the menu bar, select "**File (F)**" > "**Open File**" to open the data files for analysis. Multiple files can be opened at the same time.

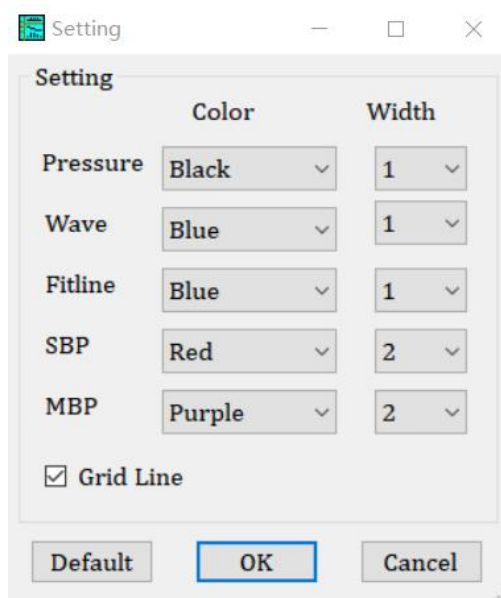


- The left panel displays the measurement parameters, animal information, and results.
- The center panel shows the pressure and pulse waveforms.

- The right panel lists the data files. Each file name corresponds to the measurement timestamp (day-hour-minute-second), with the animal No. as the file suffix.

(2) To adjust the line colors and background grid, go to **"File (F)" > "Setting"** in the menu bar. You can change the color and thickness of the waveforms.

Enable the Grid Line option to display background grids. Click the **"Default"** button to restore default settings.



(3) To resize the waveform:

Use  button to adjust vertical scaling.

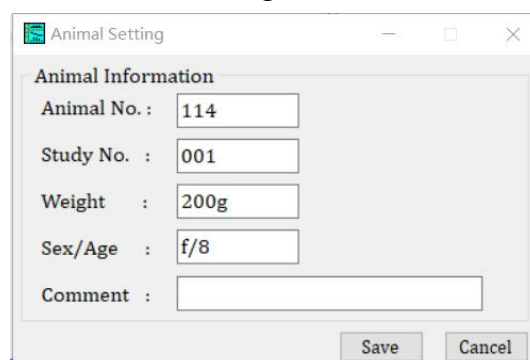
Use  button to adjust horizontal scaling.

(4) To toggle the display of the fitted curve, click  button on the toolbar.

(5) To view or edit animal information, click  button on the toolbar.

The information will be displayed in a pop-up window.

Edit as needed, then click **"OK"** to save the changes.



6.2. Data Correction

Use the data correction feature when signal interference in the original waveform triggers an error message, or when the software's automatic analysis shows a clear misalignment in detection.

(1) Click  button on the toolbar to enter correction mode.

The Result values will change from black to blue, indicating that editing is active.

(2) Click  button to hide MBP and DBP values.

Click  button again to restore the display of MBP and DBP.

(3) Double-click near the SBP or MBP marker line to activate the cursor positioning function.

(4) Hold down the left mouse button and drag the cursor to the desired position.

Double-click again to confirm. The result values will update accordingly.

(5) After correction is complete, click the Save button .

The system will generate a separate corrected file, preserving the original data file.

For example:

A22121558.123 is the original file.

A22121558_m1.123 is the corrected version.

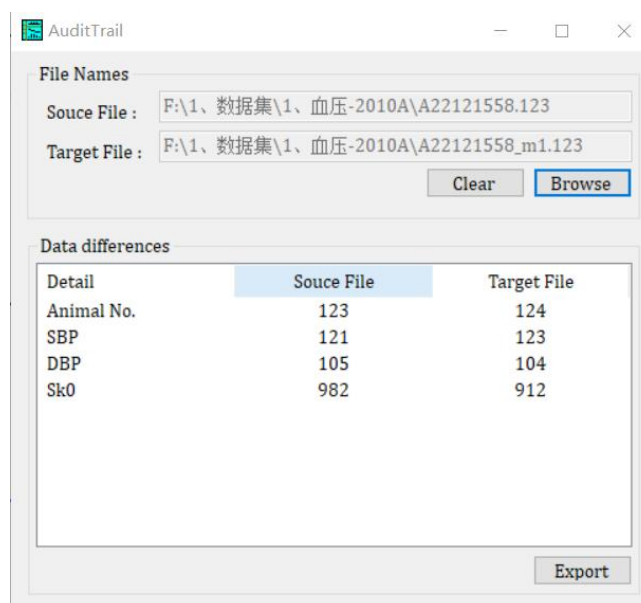
6.3. Traceability and Reproduction of Data Corrections

(1) Open the original data file (e.g., A22121558.123) using the **BPEditor** module.

(2) In the menu bar, go to **"Tools" > "Audit Trail"** to open the audit tracking interface.

Click the **"Browse"** button and select the corresponding corrected file (e.g., A22121558_m1.123).

Once loaded, the system will display the differences between the original and corrected files in the Data differences section.



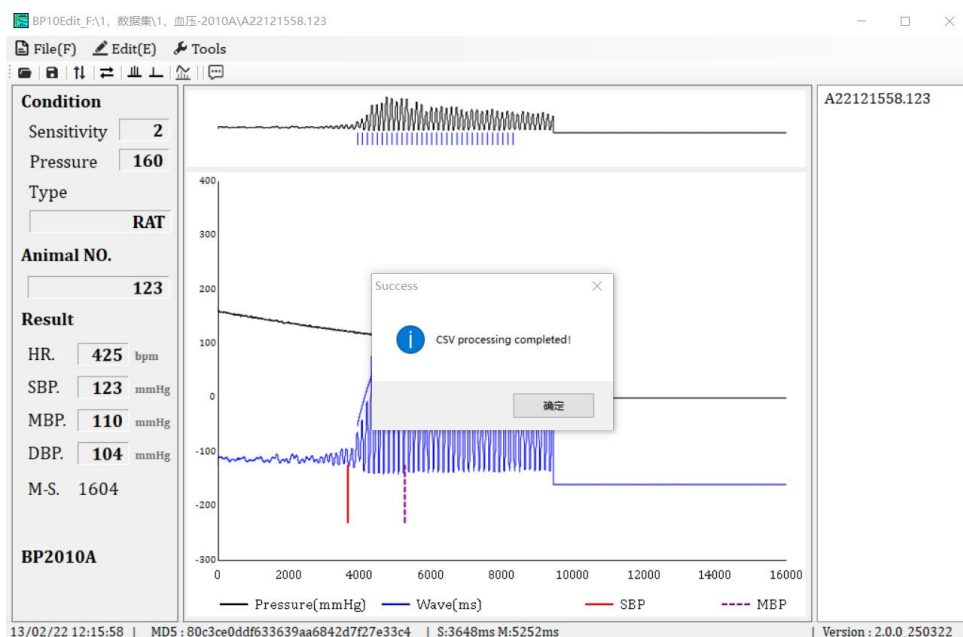
(3) Click the **"Export"** button to export the differences as a CSV file, which can be saved for future traceability or record-keeping.

	A	B	C
1	Detail	Source File	Target File
2	Animal No.	123	124
3	SBP	121	123
4	DBP	105	104
5	Sk0	982	912
6			

(4) To reproduce the data correction process, open the original file (e.g., A22121558.123) again in **BPEDITOR**.

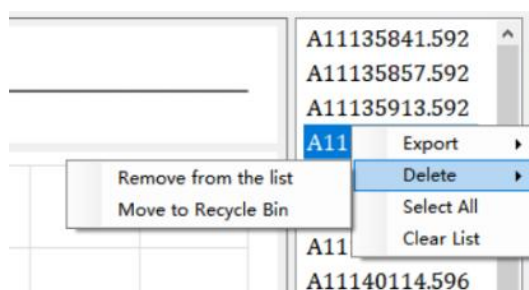
From the menu bar, select **"Tools" > "Reproduced"**, then load the CSV file exported in Step (3). A confirmation dialog will appear—click **"OK"** to proceed.

The software will automatically apply the correction parameters from the CSV file to recreate the exact data modification process.



6.4.Data Deletion

- (1) In the file list on the right, select the data file(s) to delete.
- (2) Right-click the selected file(s) and choose **"Delete"**. You will be presented with two options:



"Remove from the list": Only removes the selected file(s) from the current display list.

"Move to Recycle Bin": Removes the file(s) from the list *and* moves the original data file(s) to the system Recycle Bin.

⚠ Note: It is strongly recommended to back up original data files locally before performing this operation.

- (3) To clear all files from the current list, right-click anywhere in the file list area and choose **"Clear List"**.

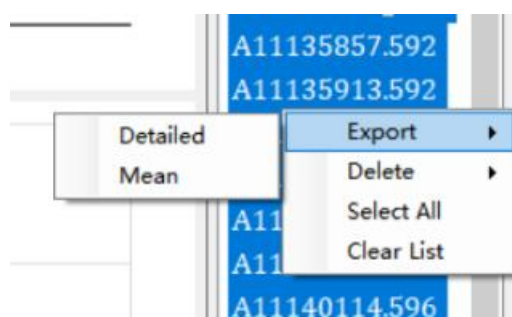
6.5.Data Export

(1) Select the data range you wish to export:

Box selection mode: Click and hold the left mouse button, then drag the cursor to draw a selection box around the target data range.

Select all mode: Right-click anywhere in the file area and choose **"Select All"** to highlight all data files.

(2) After selecting the desired files, right-click in the file area and choose **"Export"**. You will be presented with two options:



"Detailed": Exports all individual measurement values.

"Mean": Calculates and exports the average values of grouped data based on Animal No..

In the pop-up dialog, set the file path and file name to export the data as a CSV file.

#	A	B	C	D	E	F	G	H	I	J	K	L	M
1	FileName	DATE	TIME	ANIMAL NO	EX NO	WEIGHT	SEX/AGE	COMMENT	SAMPLING	HR	SBP	MBP	DBP
2	A11135857.592	2023/8/11	13:58:57	592	001	0.15Kg	m/1		4	416	184	166	157
3	A11135913.592	2023/8/11	13:59:13	592	001	0.15Kg	m/1		4	409	195	169	156
4	A11135926.592	2023/8/11	13:59:26	592	001	0.15Kg	m/1		4	421	193	155	136
5	A11135943.592	2023/8/11	13:59:43	592	001	0.15Kg	m/1		4	395	187	164	152
6	A11140015.596	2023/8/11	14:00:15	596	001	0.15Kg	m/1		4	387	209	175	158
7	A11140059.596	2023/8/11	14:00:59	596	001	0.15Kg	m/1		4	429	204	182	171
8	A11140114.596	2023/8/11	14:01:14	596	001	0.15Kg	m/1		4	383	201	178	167
9	A11140128.596	2023/8/11	14:01:28	596	001	0.15Kg	m/1		4	392	206	184	173
10	A11140747.596	2023/8/11	14:07:47	596	001	0.15Kg	m/1		4	357	203	169	152
11	A11141531.511	2023/8/11	14:15:31	511	001	0.15Kg	m/1		4	347	180	153	139
12	A11141547.511	2023/8/11	14:15:47	511	001	0.15Kg	m/1		4	350	176	157	147
13	A11141636.511	2023/8/11	14:16:36	511	001	0.15Kg	m/1		4	336	172	155	147
14	A11141652.511	2023/8/11	14:16:52	511	001	0.15Kg	m/1		4	372	176	157	148
15	A11141726.511	2023/8/11	14:17:26	511	001	0.15Kg	m/1		4	345	178	152	139
16	A11142007.662	2023/8/11	14:20:07	662	001	0.15Kg	m/1		4	466	171	151	141
17	A11142023.662	2023/8/11	14:20:23	662	001	0.15Kg	m/1		4	457	169	142	129
18	A11142039.662	2023/8/11	14:20:39	662	001	0.15Kg	m/1		4	426	176	147	133
19	A11142108.662	2023/8/11	14:21:08	662	001	0.15Kg	m/1		4	433	176	145	130
20	A11145027.495	2023/8/11	14:50:27	495	001	0.15Kg	m/1		4	397	178	136	114
21	A11145044.495	2023/8/11	14:50:44	495	001	0.15Kg	m/1		4	398	168	133	115
22	A11145102.495	2023/8/11	14:51:02	495	001	0.15Kg	m/1		4	374	169	142	129
23	A11145226.394	2023/8/11	14:52:26	394	001	0.15Kg	m/1		4	458	171	149	138

Select **"Detailed"** to export detailed measurement results.

#	A	B	C	D	E	F	G	H	I	J	K	L	M
1	FileName	DATE	TIME	ANIMAL NO	EX NO	WEIGHT	SEX/AGE	COMMENT	SAMPLING	HR	SBP	MBP	DBP
2	A11145226.394	2023/8/11	14:52:26	394	001	0.15Kg	m/1		4	457	174.8	151.4	139.8
3	A11141531.511	2023/8/11	14:15:31	511	001	0.15Kg	m/1		4	350	176.4	154.8	144
4	A11150853.492	2023/8/11	15:08:53	492	001	0.15Kg	m/1		4	329.2	192.8	161.8	146.4
5	A11140015.596	2023/8/11	14:00:15	596	001	0.15Kg	m/1		4	389.6	204.6	177.6	164.2
6	A11142007.662	2023/8/11	14:20:07	662	001	0.15Kg	m/1		4	445.5	173	146.2	133.2
7	A11135857.592	2023/8/11	13:58:57	592	001	0.15Kg	m/1		4	410.2	189.8	163.5	150.2
8	A11151447.691	2023/8/11	15:14:47	691	001	0.15Kg	m/1		4	354.5	176.5	148.8	135
9	A11150606.595	2023/8/11	15:06:06	595	001	0.15Kg	m/1		4	339	196.5	174	162.2
10	A11145027.495	2023/8/11	14:50:27	495	001	0.15Kg	m/1		4	389.7	171.7	137	119.3
11													

Select "Mean" to export calculated averages.

6.6. Generating Data Reports

- (1) In the file list on the right, select the data file(s) to be included in the report.
- (2) From the menu bar, go to "File (F)" > "Print (P)".
- (3) To print a hard copy, select a connected printer, review the print settings, and proceed with printing.
- (4) To generate an electronic report, select a PDF printer, then specify the save location and file name to export the report as a PDF file.

