



PCBA Module Product Manual

IPH2516 Blood Pressure Monitor PCBA

Pressure Measurement Control Chinese Voice Prompts BLE Data Sync

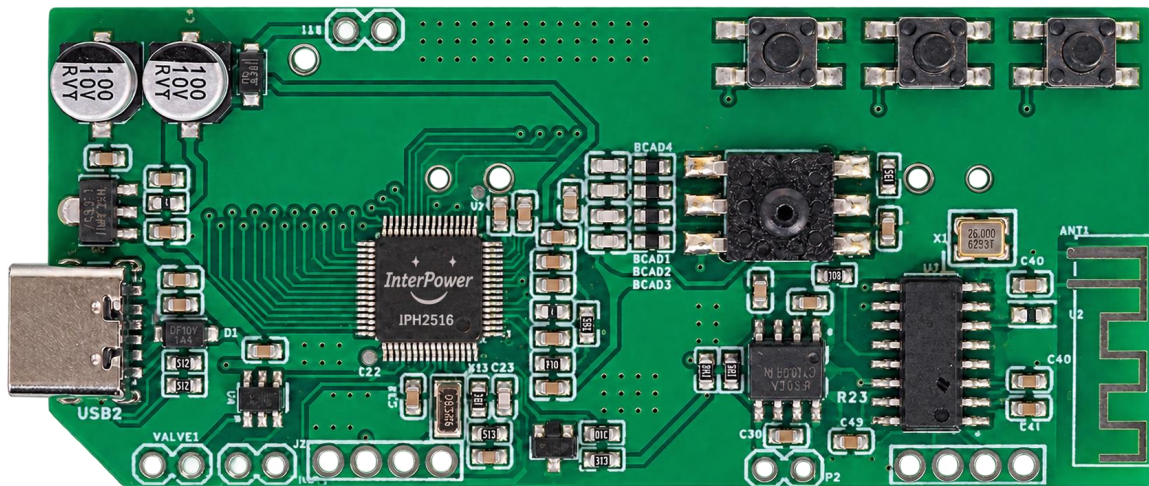


Figure 1 IPH2516 blood pressure monitor PCBA, component side

Designed for electronic blood pressure monitors, the IPH2516 PCBA integrates pressure acquisition, measurement control and user interface circuits. It can form a prototype with a matching LCD, pump, valve, cuff and speaker. Matching firmware provides Chinese voice prompts and mobile data synchronization.

This manual covers module architecture, peripheral connections, power requirements, the companion app and prototype integration. The app supports Android, iOS and HarmonyOS, with logo and function customization, for product selection and project development.

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1 Product Overview and Features

The module combines measurement control, pressure sensing, key input, audio and communication circuits on one PCBA. System integration requires compatible pneumatics, display and power, with matching controller firmware, audio resources and app protocol.

Function	Description	Integration Requirements
Blood pressure and pulse	Measurement sequence provides systolic pressure, diastolic pressure and pulse rate	Matching pneumatics, pressure calibration and complete-system verification
Local interface	LCD display and Start, Memory and Settings key logic	LCD segment and key mappings must match the firmware
Chinese voice	Power-on, measurement start/completion and result announcements	Matching voice firmware, audio resources and speaker
Record review	Local history and average-value display and voice functions	Capacity, user groups and operation depend on supplied firmware
BLE data	Companion app receives status and results; supports Android, iOS and HarmonyOS	Both chips require matching app-compatible firmware
Power management	Battery voltage sampling, low-battery handling and sleep logic	Supply and thresholds matched to a four-cell battery pack

Selection Information

Item	Description
Product model	IPH2516 Blood Pressure Monitor PCBA
Power configuration	Four dry cells, nominal 6 V pack; this is not a guaranteed module operating range
On-board components	Three tactile keys, pressure sensing device, Type-C form-factor connector and PCB antenna area
Required peripherals	LCD, pump, valve, cuff and tubing, speaker, battery holder and enclosure
Specifications to confirm	Supply limits; peak/standby current; pressure and pulse ranges/accuracy; dimensions; mounting holes; environmental limits

Functions depend on the hardware and firmware version. Select the product using confirmed specifications and samples. Functional descriptions in this manual do not establish measurement performance or certification status.

2 Module Appearance and Structure

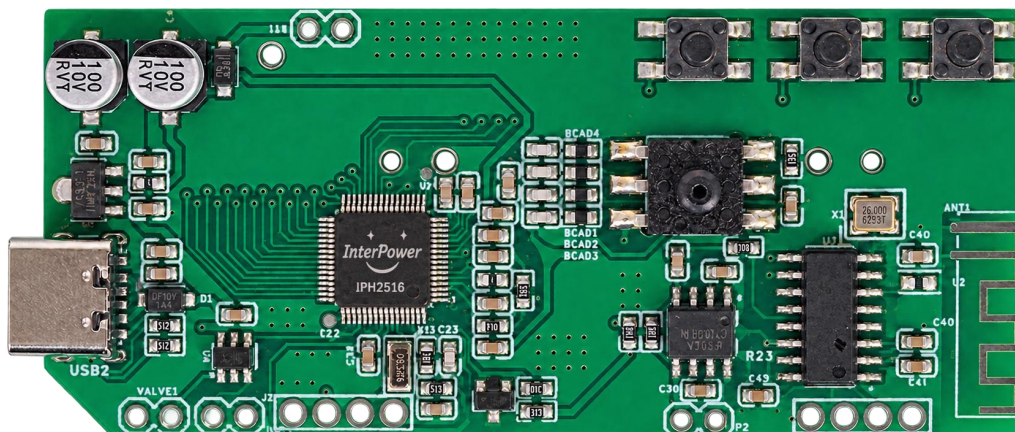


Figure 2 Component side with keys, controller, pressure sensing and wireless audio circuits

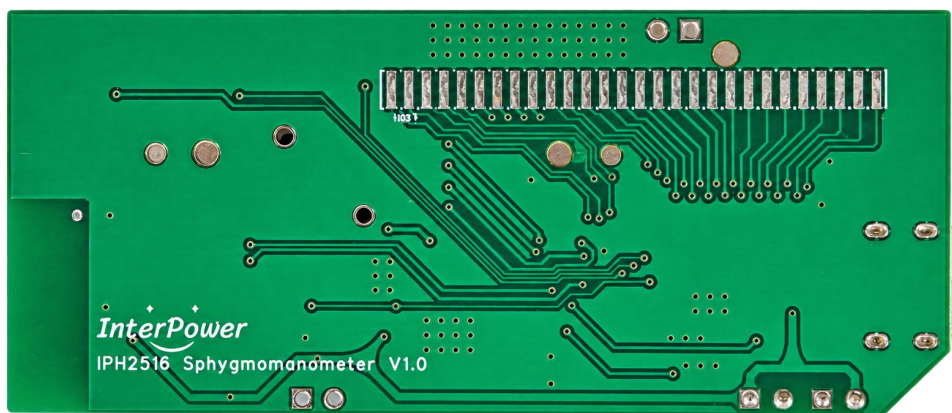


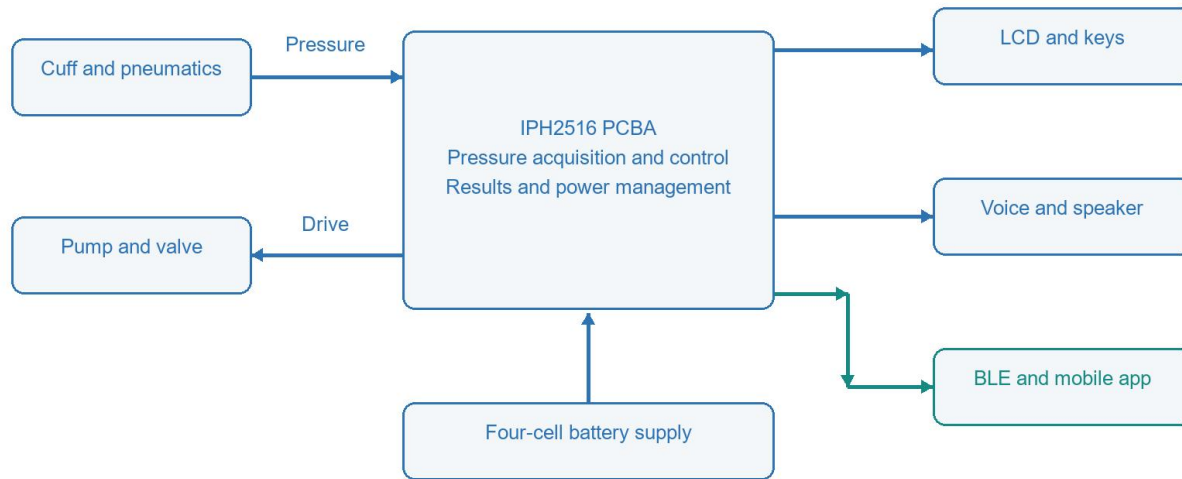
Figure 3 Solder side with LCD pads and board identification

In Figure 2, the Type-C form-factor connector is on the left and the controller is near the center-left. Three keys run along the top edge. The pressure device with an air port is at center-right; wireless circuits and the PCB antenna are on the right. The long upper pad row in Figure 3 connects the matching LCD.

Check board outline, mounting holes, component height, tubing clearance and LCD contact method during mechanical design. Photos identify appearance only; use the supplied board and engineering drawings for chip markings, pin order and dimensions.

3 System Architecture and Peripherals

Assemble the module, pneumatic system, display and audio peripherals before functional integration. Pressure acquisition, pump/valve operation and result output are interdependent. Recheck measurement performance after changing the cuff, pump, valve or tubing.



Functional diagram: match peripherals and interfaces to the supplied configuration

Figure 4 Functional relationship between the PCBA and peripherals

Peripheral	Preparation and Matching Requirements
Pump and valve	Check rated voltage, operating current, drive method, pressure-release state and harness polarity
Cuff and tubing	Confirm pneumatic layout, fitting dimensions, secure connections and sealing
LCD and connector	Confirm segment map, pad orientation and connection process to prevent incorrect segments or poor contacts
Speaker	Match impedance, power rating, installation space and sound openings to the audio output
Power and enclosure	Coordinate battery holder, harness, insulated mounts and antenna clearance

Connections

Connect the pump, cuff, valve and pressure port according to the approved pneumatic drawing. Connect power, pump/valve, LCD and speaker electrically. Diagram arrows show functional relationships only, not pad numbers, tee locations or actual harness counts.

4 Power and Interface Integration

Power Requirements

The current design uses four dry cells with a nominal pack voltage of 6 V. On-board regulation supplies the logic circuits, and battery sampling is taken from the board supply path. Pack voltage, board VCC and regulated logic voltage are separate test points and should be recorded separately.

Before using a bench supply, confirm the board's permitted input range and polarity, then set current limiting. Check board voltage when pump startup, voice playback and wireless communication coincide, to prevent supply dips from causing resets or false low-battery states.

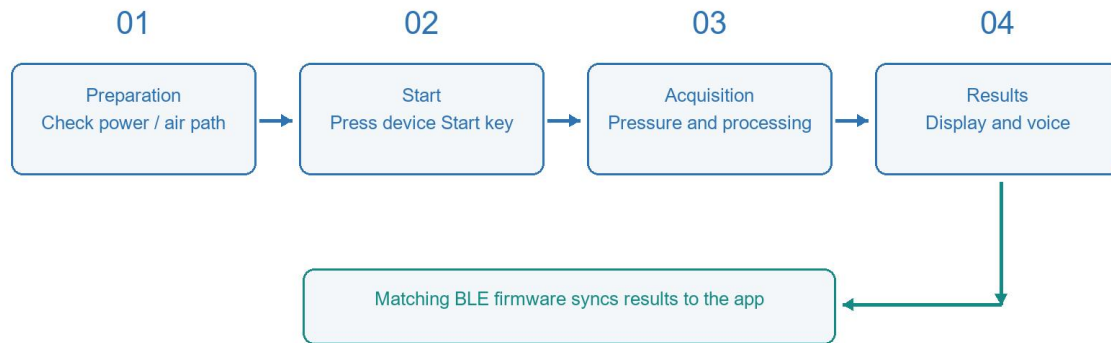
Interface or Area	Purpose and Connection Notes
Power input	Confirm polarity, rated range and return path from the electrical drawing; never apply pack voltage to logic pins
Type-C connector	Connector shape does not establish USB data, charging or fast-charge support; confirm actual wiring and power method
Pump/valve interface	Connect matching loads with the specified harness while power is off; verify drive polarity and load current
Pressure port	Keep fittings and tubing clean, dry and sealed; prevent kinks and liquid ingress
LCD pads	Check segment definitions, orientation and assembly method; avoid solder bridges and uneven contact pressure
Speaker output	Confirm load and output topology; do not ground either output until verified
PCB antenna area	Evaluate enclosure, metalwork, wiring and battery placement for RF performance; retain required clearance

Before Power-On

Verify hardware version, harness pin order and supply polarity. Check for a supply-to-ground short and inspect joints, mounts and tubing. Ensure the mechanics do not obstruct pump/valve operation. After power-on, check standby before testing loads.

5 Measurement and Chinese Voice Prompts

Measurement includes preparation, acquisition/processing and result output. Inflation, deflation and key operation are defined by the supplied firmware.



On Stop or an exception, exit measurement and release pressure

Figure 5 Local measurement and result output sequence

Voice Interaction

Chinese voice resources cover the welcome message, measurement start and completion, and systolic pressure, diastolic pressure and pulse values. Numbers follow natural Chinese speech; for example, 120 and 101 use the appropriate Chinese forms of one hundred twenty and one hundred and one.

History and average values can be announced as configured in firmware. Some versions provide reading-status prompts. Freeze prompt rules and language resources at project confirmation; these are interface messages and must not be presented as medical diagnoses.

Consistency Checks

Check	Prototype Verification
Display and voice	Compare displayed values, units and announcement order for the same measurement
Stop and exceptions	Check that old results are not announced after Stop, Mute, low battery or measurement failure
Repeated use	Repeat power cycles and measurements; check welcome prompts, result announcements and key response
Voice configuration	Update controller firmware, audio firmware and resources together to avoid resource-ID mismatches

6 Companion App and Customization

The IPH2516 PCBA has a companion mobile app that connects to the monitor over BLE and synchronizes measurement status and results. Users can review blood pressure, pulse rate and history. The app supports Android, iOS and HarmonyOS, with customer-specific logo and function customization.



Figure 6 Companion app: Health home screen (left) and Records/trends (right)

The Health screen shows connection status and the latest systolic pressure, diastolic pressure and pulse rate. Records provides 7-, 30- and 90-day trends, measurement details and export access. Values shown are example records. Screens may vary by customized version; screenshots show the Chinese interface.

6.1 Platforms and Customization

Item	Description
Platform support	Android, iOS and HarmonyOS; supported OS versions and device models are confirmed at project delivery
Logo customization	Replace app branding with the customer's logo, and adjust the app name and brand presentation as required
Function customization	Customize functions to business requirements; scope may include screen flows, record views, data export and device interaction
Matched delivery	App, BLE protocol and device firmware are matched; both parties confirm customization scope, versions and acceptance tests

6.2 Connection and Use

1. Use matching controller and wireless audio firmware. Power on the device and install the companion app on a supported phone.
2. Enable phone Bluetooth and grant Bluetooth and other system permissions requested by the app.
3. Scan for and connect to the monitor on the Device page. Wait for connection readiness; customized device names follow the project configuration.
4. Select the member and press Start on the monitor. Keep the app in the foreground during measurement and check the automatically saved result afterward.
5. Review trends and details on the Records page and export data as needed. Disconnect before switching members to prevent incorrect record assignment.

6.3 Synchronization and Records

The app receives status and results while connected and stores records on the current phone. Reconnection can retrieve the latest cached result while the device remains powered, not its complete history. Records from before device power-off are outside the current sync scope. Timestamps are estimated from phone reception time and device interval information.

Uninstalling the app or clearing its data affects local records; use export to back them up. For customized projects, confirm record ownership, storage/backup, access control and reconnection requirements, and record the app, protocol and firmware versions.

7 Prototype Assembly and Verification

Proceed through power/interfaces, pneumatics/loads, local functions, wireless sync and complete-system retesting. Change only one component or setting at a time to simplify troubleshooting.

Stage	Key Actions	Criteria to Proceed
01 Power-off checks	Verify versions, pin order, polarity and shorts; secure the board and peripherals	No miswiring, solder bridges or mechanical interference
02 Initial power-on	Use confirmed supply conditions; check logic rails and standby	No abnormal heat, repeated resets or unexpected current
03 Pneumatic checks	Use appropriate equipment to check sealing, pump/valve operation and pressure release	Secure connections; pressure changes match actions
04 Local functions	Check keys, LCD, measurement, Stop and voice in sequence	Display matches voice; Stop response meets requirements
05 BLE integration	Connect the app; test measurement, disconnection and reconnection	Matching results; no misassigned, missing or duplicate records
06 Enclosure retest	Retest with final batteries, enclosure, cuff and audio components	Performance and stability meet project acceptance criteria

Calibration and Measurement Performance

Use a calibrated pressure reference and approved methods to check zero, multiple pressure points, sealing and pump/valve operation. Verify blood pressure and pulse performance under specified complete-system conditions. A single human reading or a difference between two home devices is not a substitute for calibration.

Mechanical and Environmental Retesting

After enclosure assembly, recheck key feel, LCD contacts, tubing bends, speaker volume and wireless connection. Assess pump vibration, supply dips and wireless activity for effects on sampling. Plan temperature/humidity, drop and EMC testing to suit the target product.

Configuration Records

Record hardware, controller firmware, audio firmware/resources, app version, pump/valve models, cuff/tubing, supply conditions and test results. Repeat affected tests after changing key components, firmware or mechanics.

8 Troubleshooting and Acceptance

Symptom	Check First
No power or repeated resets	Batteries/contact resistance, polarity, current limit and board voltage during pump startup
Start does not begin measurement	Key events, standby state, pressure zero, voice completion and low-battery state
Insufficient inflation or unstable pressure	Cuff/fitting leaks, kinked tubing, pump/valve action and supply capability
Missing voice or mismatched values	Audio resources/firmware, Mute state, speaker, display and voice units
Missing or incorrect LCD segments	Segment settings, contact pressure, solder joints and connection orientation
Bluetooth audio works but no data	Confirm BLE connection and matching app firmware; check permissions and notification channel
Old records missing after reconnect	Check the version's cache scope; pre-power-off history is outside this version's sync scope

Acceptance Record

Test Item	Result / Record ID	Notes
Power and standby	_____	Input voltage and current
Pneumatics and pump/valve	_____	Test conditions and reference equipment
Measurement and Stop	_____	Displayed values and Stop response
Display and voice	_____	Value and unit consistency
BLE and app	_____	Connect / Sync / Reconnect
Enclosure and repeat tests	_____	Mechanics / Wireless / Power

Sample ID: _____ Hardware version: _____

Firmware and app versions: _____

Date / Tester: _____ Conclusion: _____

Both parties confirm acceptance criteria. Stop testing if abnormal heat, odor, uncontrolled inflation or failed pressure release occurs. Resolve the fault before continuing.

9 Contacts and Supporting Documents

Technical and Sales Contact

Contact InterPower for IPH2516 samples, interface documents, voice configuration, app integration, or logo and function customization.

WhatsApp

+86 138 2963 2935

WeChat: Scan the QR code on the right

Website: <https://interpower-pcba.com/>



WeChat QR code

Project Documents

Document	Purpose
Electrical specifications and interface drawing	Confirm input range, load capability, logic levels, pad numbers and harness orientation
Mechanical and pneumatic drawings	Confirm outline, holes, height, LCD mounting and pneumatic connections
Firmware and app version matrix	Match controller, audio resources, BLE protocol and mobile app
Calibration and acceptance requirements	Define test conditions, performance criteria, calibration procedure and record format

Delivery and Use

This PCBA is intended for integration into a complete product and requires peripherals, mechanics and software. Specifications and delivery are governed by agreed documents and samples. Photos and block diagrams do not replace interface or mechanical drawings.

Measurement performance, reliability and target-market requirements must be verified on the complete product. Module demonstrations do not establish medical-use validation or certification of the finished device.

Document V1.1 September 2026 App screens, platform support and customization added