

IPH2332 Self-Powered Temperature Display PCBA

IPH2332 Self-Powered Temperature Display PCBA

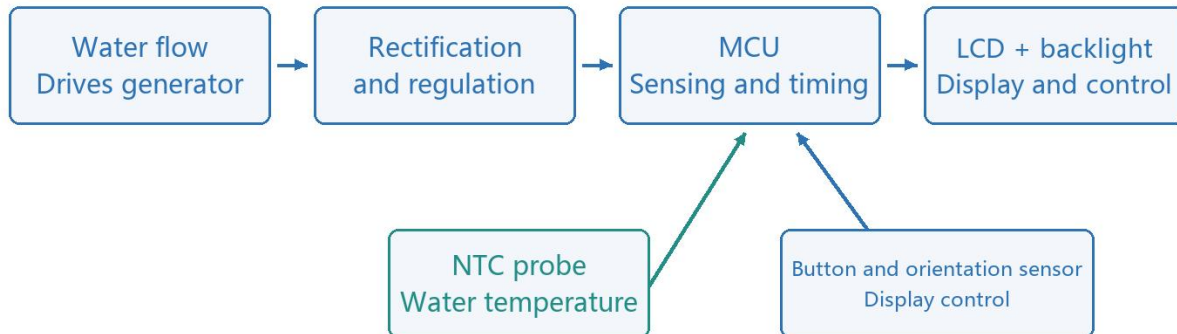
IPH2332 is designed for shower, faucet, and pipe temperature displays. With a water-flow generator and NTC probe, it provides self-powered temperature display and flow-duration timing. Annotated photos and diagrams explain the module, button controls, connections, and prototype verification.

InterPower | IPH2332 Self-Powered Temperature Display PCBA | Page 1

1 System Overview and Operation

Water flowing through a compatible generator produces electrical power. The PCBA rectifies and regulates it to supply the MCU, which reads the NTC sensor and displays water temperature or accumulated flow duration on the LCD.

Separate paths for water-flow power and temperature sensing



Water flow → Power generation → Sensing → Temperature or duration display

Functional overview; external parts must match the PCBA

Figure 2 Water-flow power generation, sensing, and display

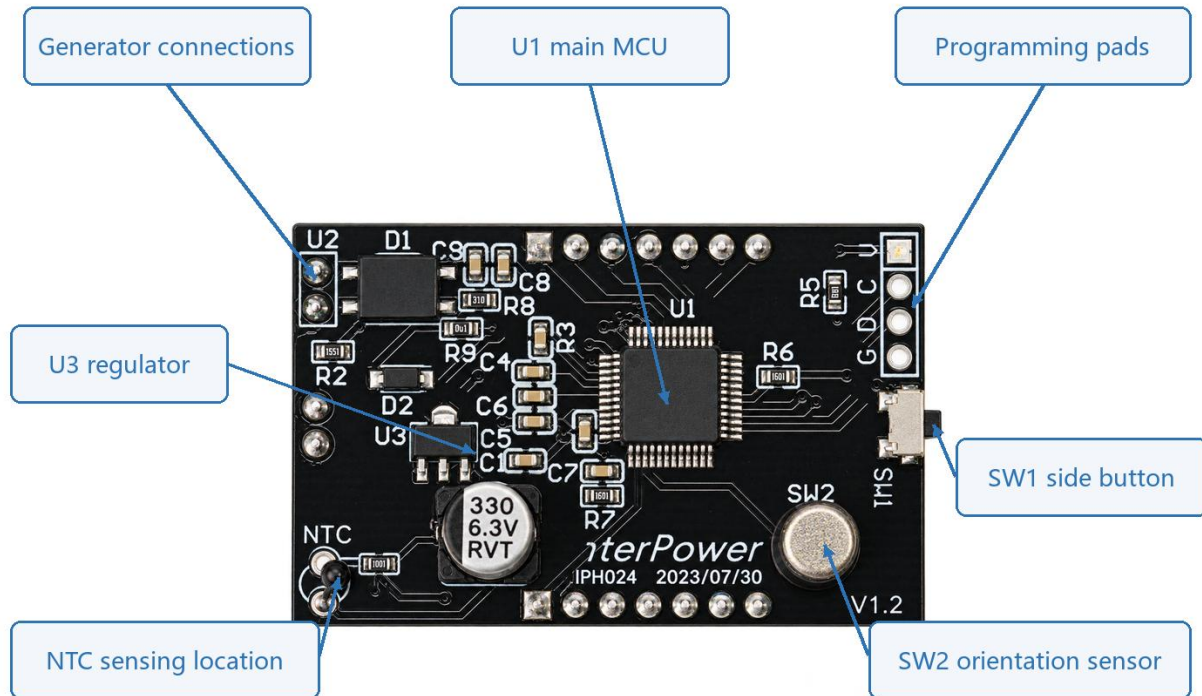
Required System Components

Component	Function and Compatibility
IPH2332 PCBA	Temperature acquisition, display, button control, and orientation detection
Water-flow generator	Supplies power; its output must match the board input specification
NTC temperature probe	Measures water temperature; resistance curve and mounting must match the firmware
Housing and water-path assembly	Provides mounting, sealing, thermal coupling, and button access

Typical uses include shower and pipe thermometers. The low-power LCD reduces the supply demand at low flow. Actual startup flow depends on the generator and complete system configuration.

2 PCBA Components and Locations

The diagram follows the component-side photo orientation. The display is on the opposite side, the tactile side button is on the right, and the NTC sensing location is identified by the board silkscreen.



Location guide only; use the current interface specification for wiring

Figure 3 Main components and connection areas

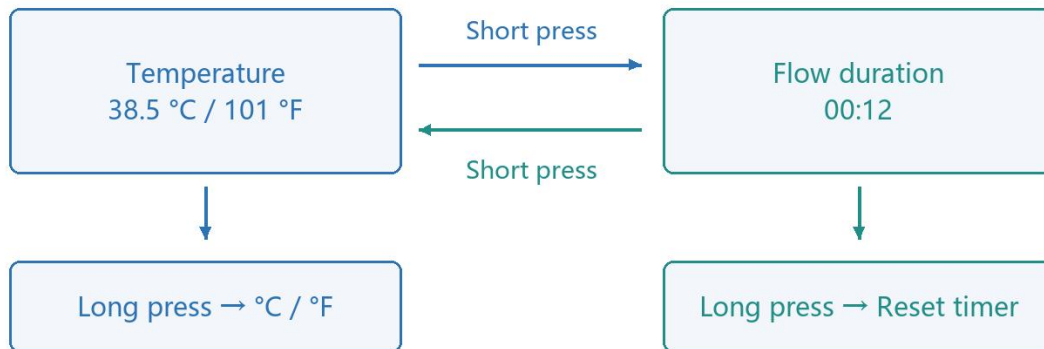
Location	Function
U1 and LCD	The MCU performs sensing and control; the LCD shows temperature and duration
SW1 side button	Short press, long press, and double press provide user control
SW2 orientation detection	Detects a change in orientation so the display can return upright
Power input and NTC areas	Connect power and temperature-sensing components separately; do not interchange them

The photo identifies functional areas only. Confirm programming-pad pinout, voltage levels, and tool requirements for the current hardware revision. Do not wire by appearance alone.

3 Display Modes and Button Controls

Temperature and timing share the LCD area. A short press switches modes. The long-press function depends on the current mode; a double press controls the backlight.

One side button with mode-dependent actions



Two quick short presses in either mode → Backlight on / off

00:12 means 0 hours 12 minutes; values are illustrative

Figure 4 Switching between temperature and timing modes

Current State	Action	Result
Temperature display	Short press	Switch to flow-duration display
Temperature display	Long press	Switch between Celsius and Fahrenheit
Timing display	Short press	Return to temperature display
Timing display	Long press	Reset accumulated flow duration
Either display mode	Two quick short presses	Enable or disable the backlight

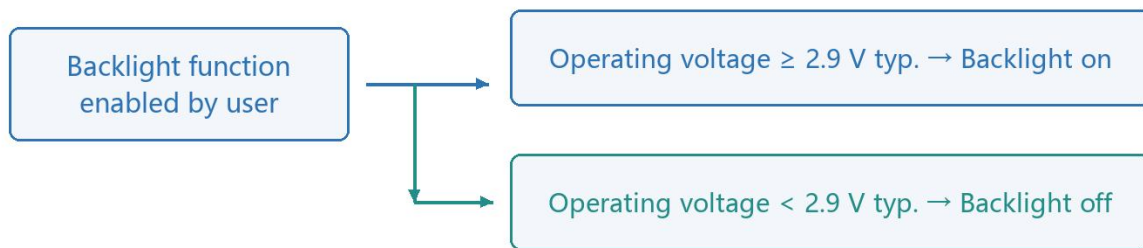
The reference firmware starts in Fahrenheit mode. Long-press duration and double-press timing depend on firmware settings. Timing uses hours:minutes and accumulates automatically while water flows; it is not a stopwatch.

4 Reference Parameters and Low Power

These design reference values support system selection and test planning. Confirm the delivered IPH2332 electrical specification and complete-system measurements separately.

Item	Reference Value and Conditions
Supply range	2.5–25 V, powered by a water-flow generator
Celsius display	0–99.9 °C; display resolution 0.1 °C
Fahrenheit display	32–212 °F
Flow duration	00:00–99:59, hours:minutes
Backlight voltage threshold	Approximately 2.9 V operating voltage, typical

Backlight operation also depends on available supply voltage



Typical design threshold; LCD operation can continue at low voltage

Figure 5 Backlight enable and voltage threshold

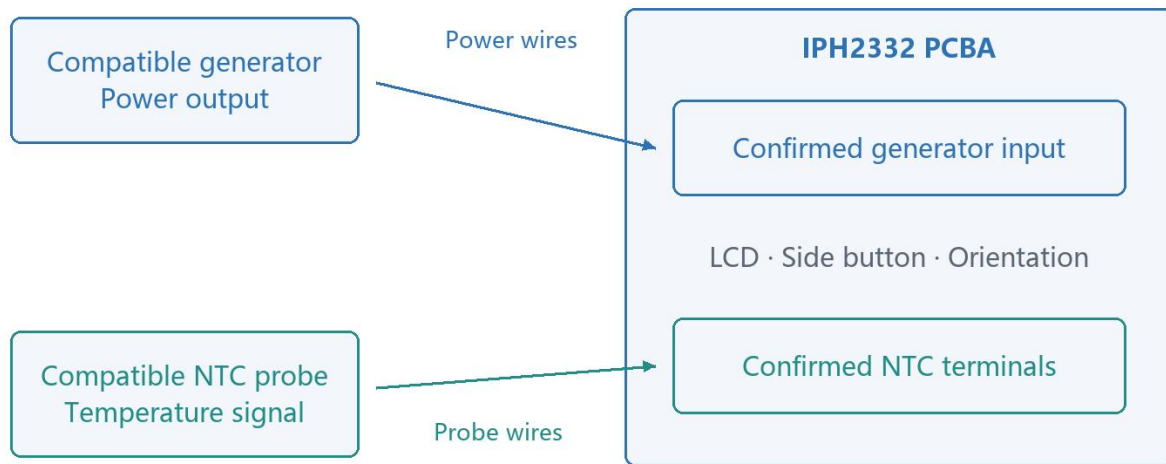
Reference Operating Current

Supply and Backlight State	Display Mode	Reference Measured Current
2.5 V, backlight off	Timing / Celsius / Fahrenheit	7 / 12 / 13 μ A
25 V, backlight off	Timing / Celsius / Fahrenheit	31 μ A in all modes
25 V, backlight on	LCD on	1.24 mA

The backlight cannot turn on at 2.5 V. The 0.1 °C value is display resolution, not measurement accuracy. Display range is not the permissible water-temperature range of the finished product.

5 Connections and Initial Power-Up

Before connecting, obtain the current electrical specification, interface definition, and compatible parts. Identify generator input, NTC terminals, and programming pads before soldering or assembling the harness.



Programming pads are for the tool; identify them separately from power input

Functional wiring only; does not define pad order, pin count, or wire colors

Figure 6 Functional connections for generator and temperature probe

Connection Sequence

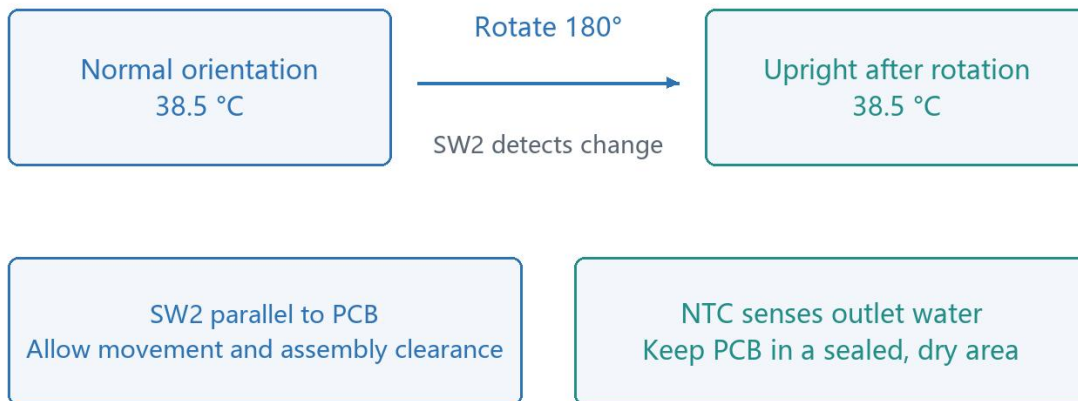
1. Stop water flow and disconnect test power. Confirm board and firmware revisions.
2. Connect the compatible NTC and generator according to the interface drawing. Secure and insulate the harness.
3. Check for shorts, poor solder joints, and loose probes. Keep the PCBA in a sealed, dry compartment.
4. Apply water flow or current-limited test power within confirmed input conditions. Check the LCD first, then test the button and backlight.

The reference design uses an input bridge rectifier for AC or DC generators. Follow the delivered drawings for input terminals, permitted peaks, and polarity requirements. Do not apply input voltage directly to the MCU, LCD, or programming pads.

6 Installation and Display Orientation

Orientation detection depends on SW2 mounting. The reference design places SW2 parallel to the PCB and keeps tall components clear above it, allowing a 180° rotation to produce a detectable state change.

Match display orientation and probe mounting to the housing



Permitted housing rotation depends on mechanical design

Figure 7 Upright display behavior and installation requirements

Four Installation Areas to Check

Location	Installation and Inspection
LCD and backlight	Align the window; avoid pressure on the glass and pins
SW1 side button	The housing button must actuate reliably without holding the switch down after assembly
SW2 and wiring harness	Leave clearance; rotation must not pull the switch or solder joints
NTC and water path	Ensure stable thermal contact and sealing; keep live solder joints away from water

This is a bare PCBA. Waterproofing, pressure resistance, and permitted rotation depend on the finished mechanical design and validation. Confirm dimensions, clearance, and probe packaging against the matching mechanical drawings.

7 Prototype Functional Verification

Verify basic display behavior under controlled conditions, then retest with the final generator, probe, and housing. Record supply, firmware, and installation settings for each test to help diagnose issues.

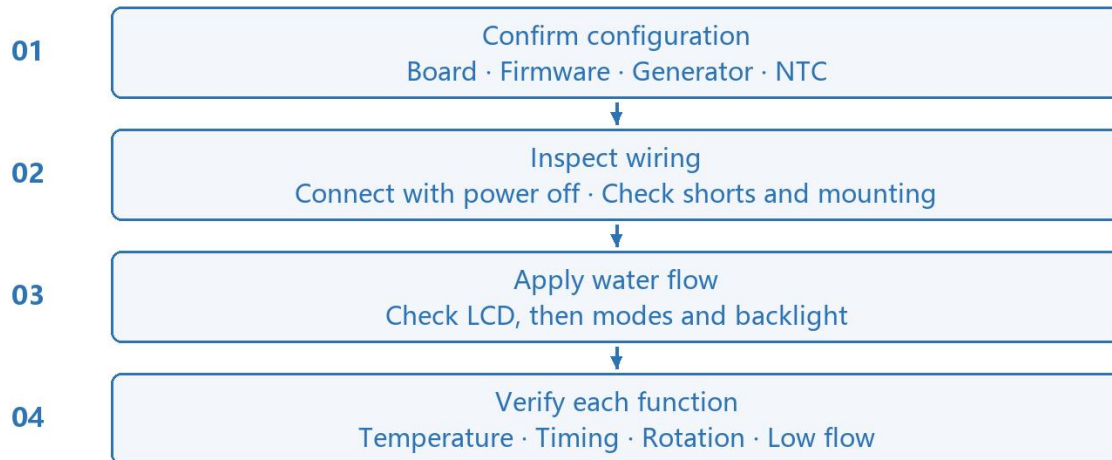


Figure 8 From configuration checks to functional verification

Test Item	Method	Record
Temperature display	Compare with a reference thermometer at several stable water temperatures	Reading, deviation, and settling time
Unit selection	Long-press in temperature mode	Unit change and corresponding reading
Flow duration	Short-press to timing mode; long-press after sustained flow	Accumulation and reset behavior
Backlight	Double-press, then vary the available supply gradually	Switching response and low-voltage behavior
Display orientation	Rotate the assembled housing 180°, then return it	Display result in both orientations
Water-flow changes	Start/stop flow and reduce flow gradually	Startup, display-off, and restart behavior

Acceptance limits are defined by the project specification. Place the probe and reference thermometer in comparable water-temperature conditions. Display fluctuation alone does not establish sensor error.

8 Troubleshooting

Check supply and wiring first, then sensors and controls. Change one component or condition at a time and observe whether the symptom changes.

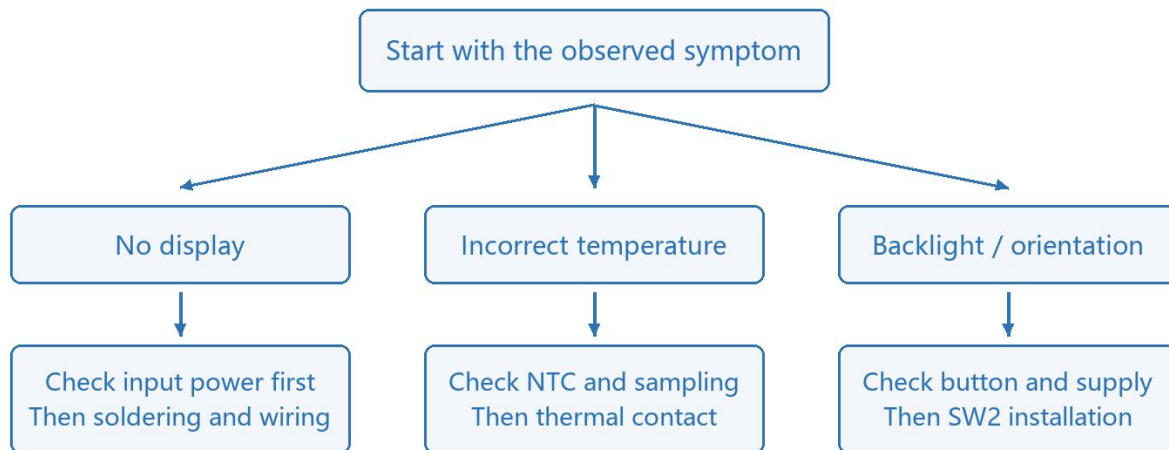


Figure 9 Troubleshooting by display symptom

Symptom	Check First
No display or repeated restarts	Generator output, board voltage, wiring, shorts, and input stability
Incorrect or unchanged temperature	NTC open/short circuit, sensor compatibility, soldering, and thermal contact
Backlight stays off after a double press	Backlight enable state, supply threshold, connection, and firmware settings
Unreliable side-button operation	Housing interference, solder joints, and long-/double-press timing
Display does not return upright	SW2 orientation, component interference, soldering, and final assembled position
Abnormal display after flow stops	Residual generator output, flow detection, and firmware state

Electrical Faults

If abnormal heating, odor, or an obvious short occurs, stop water flow and disconnect test power. After troubleshooting, resume verification under controlled, low-risk input conditions.

9 Prototype Test Record

Use this record for prototype evaluation and revision retesting. Record the actual setup and measurements, and assess results against the mutually agreed product specification.

Configuration Record

Item	Details
Date and tester	_____
Hardware and firmware revisions	Hardware: _____ Firmware: _____
Generator and NTC	Generator: _____ NTC: _____
Supply and water-flow conditions	Voltage: _____ Flow rate: _____
Housing and probe installation	_____

Functional Results

Item	Measurement or Observation	Result
Temperature point 1 / reference	_____	_____
Temperature point 2 / reference	_____	_____
Temperature point 3 / reference	_____	_____
Celsius / Fahrenheit selection	_____	_____
Timing accumulation and reset	_____	_____
Backlight and low supply	_____	_____
Normal and rotated orientation	_____	_____
Starting and stopping flow	_____	_____

Conclusion and improvements: _____

Retest setup and record ID: _____

10 Contact and Supporting Documents

Technical and Commercial Contact

Contact InterPower for IPH2332 samples, electrical specifications, interface definitions, generator/probe selection, firmware features, and complete-system commissioning support.

WhatsApp

+86 138 2963 2935

WeChat: scan the QR code on the right

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



WeChat QR code

Supporting Project Documents

Document	Purpose
Current electrical and interface specification	Confirm input conditions, terminals, programming levels, and tools
Mechanical drawings and matched-component specifications	Confirm dimensions, LCD window, NTC, generator, and sealed installation
Hardware/firmware revisions and test records	Fix the delivered configuration for retesting and issue tracking

Application Note

This manual supports IPH2332 product understanding, system integration, and prototype evaluation.

Component configuration, firmware behavior, temperature accuracy, and operating conditions are governed by the mutually agreed delivery specification and samples.

Document V1.1 Illustrated guide to operation, wiring, installation, and prototype verification.