

Low-Noise Power Rail Probe

User Manual

UT-PR2060 (60V/1GHz)



Foreword

Thank you for choosing this UNI-T instrument. For safe and proper use of this instrument, please read this manual carefully, especially the safety instructions section.

After reading this manual, it is recommended to keep the manual in a convenient location, preferably near the device, for future reference.



Danger: This symbol indicates that the equipment may pose hazards to both personnel and equipment. All operations must be carried out in strict accordance with the instructions provided in this manual.

Warning

Warning: Improper operation may result in personal injury. To avoid such hazards, follow the specified safety precautions carefully.

Caution

Caution: Incorrect handling may also lead to minor injuries or material damage. This manual outlines the necessary precautions to prevent such occurrences.

Note

Note: This section contains critical safety and usage instructions. Please read thoroughly before operating the equipment.

To ensure **the safe operation of this equipment**, the following safety precautions must be strictly observed. Failure to operate the equipment in accordance with the instructions in this manual may compromise its protective features.

UNI-T assumes no responsibility for any personal injury or equipment damage resulting from non-compliance with the safety guidelines provided.



Danger

- Electrical shock hazard: Be aware of potential electric shock. Always observe the maximum rated input voltage of the instrument.
- Environmental restrictions: Do not use the instrument in humid environments or in areas with explosive atmospheres.
- Safe probe connection: Before connecting the probe to the circuit under test, ensure the circuit is powered off. After completing measurements, power off the circuit before disconnecting the probe.
- Grounding requirements: When connecting the probe's BNC output cable to an oscilloscope or other equipment, ensure the BNC terminal is securely grounded to avoid safety hazards and measurement errors.

- Probe inspection: Before use, inspect the outer insulation of the probe for any signs of damage. Stop using it immediately if any damage is found to prevent injury or equipment failure.

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UT-PR2060 Overview

UT-PR2060 probes provide a low noise, large offset range solution for measurement of ripple on DC power rails ranging from -60 to $+60V_{DC}$, making it ideal for modern low-voltage, high-speed electronic systems. It offers an industry leading low noise and high offset range required to measure AC ripple between $200\mu V_{p-p}$ and $800mV_{p-p}$ at below 1GHz. It is optimized for use on low-impedance power distribution planes and is not recommended for applications where the source impedance exceeds 1Ω , as this may lead to waveform distortion.

Modern electronic systems, driven by increased functionality, higher integration density, and faster switching speeds, require lower supply voltages and tighter noise margins. Design engineers must evaluate power rails with high sensitivity to detect high-frequency interference, measure ripple and noise, and analyze coupling effects from digital switching activity.

Traditional oscilloscopes often lack the necessary offset range to shift the DC level and center the ripple signal on screen. UT-PR2060 probe provides a low-noise measurement solution—inclusive of both the oscilloscope and the probe—which is essential for accurately distinguishing the inherent noise and ripple of the DC power supply under test from that introduced by the measurement system itself.

With a high input impedance of $56k\Omega$, the probe significantly reduces loading effects on the DC rail, ensuring minimal impact on the signal being measured. Additionally, the probe's wide bandwidth enables the capture of more signal content, such as data signals, clock edges, harmonics, and high-frequency ripple components that may be coupled onto the power rail. This enhanced visibility is critical for effective power integrity analysis in high-speed digital designs.

Features

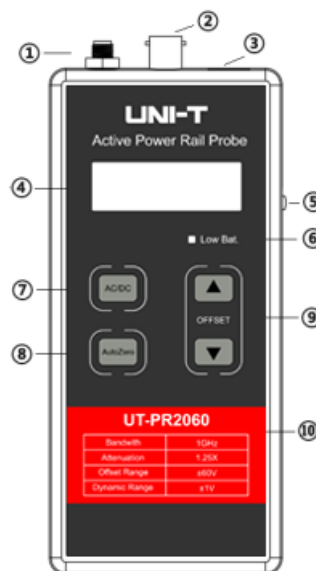
- High measurement bandwidth: 1GHz
- Low noise floor: $<300\mu V_{pp}$ (at 20MHz), $<3mV_{pp}$ (at 1GHz)
- Wide measurement range: Supports DC power rails up to $\pm 60V$
- Offset voltage elimination function: Supports both automatic and manual offset adjustment for accurate signal centering
- Flexible coupling mode: Supports AC and DC coupling to suit a range of signal types and analysis needs
- Integrated high-precision voltmeter: Industry-first integration of a 4-digit digital voltmeter for simultaneous voltage monitoring
- Dual power supply design: Supports both USB and battery operation for flexible usage in lab or field environments.

Application Scenarios

- Monitor power rail behavior: Detect and analyze power rail voltage supply and control functions in automotive, industrial, and consumer electronics chipsets.
- Validate digital subsystems: Verify digital power management, memory interfaces, and Ethernet connectivity for compliance and performance.
- Diagnose noise issues: Identify high-frequency noise sources on power rails to support power integrity analysis and EMI troubleshooting.

Product and Accessories

Active Power Rail Probe



- ① Input interface: SMA female connector for signal input
- ② Output interface: BNC female connector for signal output; connects to an oscilloscope using a standard BNC cable.
- ③ Power interface: USB 5V power supply port
- ④ LCD display: Displays the DC voltage of the signal under test. This feature can be used to confirm proper contact between the probe and the Device Under Test (DUT).
- ⑤ Power switch: Main power control for the instrument.
- ⑥ Low battery indicator: Illuminates when battery power is insufficient and replacement is required.
- ⑦ AC/DC mode button: Toggles the output between DC and AC coupling modes. In DC mode, both low and high frequency components are included in the output signal. In AC mode,

low-frequency components are filtered out.

- ⑧ Auto-Zero button: Automatically removes DC offset from the output signal, eliminating the need for manual offset adjustment on the oscilloscope.
- ⑨ Offset adjustment button: Use the up/down buttons to manually adjust the output signal offset. If the output is not centered around zero, these buttons allow fine-tuning to achieve baseline alignment.

Accessories



1.3m cable, SMA male-to-MMCX male, 50Ω



1.3m cable, SMA male-to-SMA male, 50Ω



Y-lead adapter
MMCX female-to-0.8mm sockets



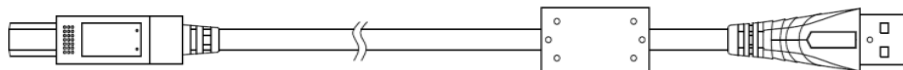
Solder-in cable adapter
MMCX female-to-solder coaxial cable end



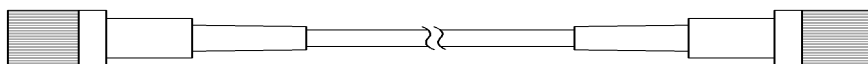
Adapter cable
MMCX female-to-U.FL female, 50Ω



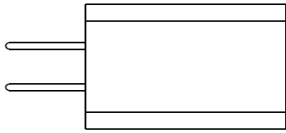
Cut-through load 50Ω (UT-50)



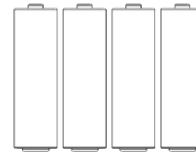
USB wire (AM-BM, 1.5m)



Coaxial cable output wire (1m)



Power adapter (USB output: DC5V/2000mA)



AA battery (Alkaline dry cell, 4×AA 1.5V)

Technical Specification

Bandwidth (-3dB)	1GHz
Rise time	≤350ps
Noise (probe only, typical value)	<300μVpp (at 20MHz) <3mVpp (at 1GHz)
Accuracy	≤±1%
Input impedance (DC-10Hz)	56kΩ
Input impedance (AC>100kHz)	50Ω
AC coupling mode Low-frequency cutoff point (-3dB)	17kHz
Battery life	Approximately 12 hours
Delay time	Probe: 490ps
	BNC (1m): 5ns
	SMA male-to-MMCX male cable: 6.31ns
	SMA male-to-SMA male cable: 6.31ns
	Y-lead adapter: 350ps
	Solder-in cable adapter: 750ps
	Adapter cable, MMCX female-to-U. FL female: 750ps
Terminal load	50Ω

Mechanical Characteristics

Characteristic	Description
Probe dimensions	162mm*70mm26mm
Probe weight	165g
USB wore AM-BM (UT-315B)	1.5m
BNC output wire (UT-310)	1m
SMA male-to-MMCX male cable (UT-317B)	1.3m
SMA male-to-SMA male cable (UT-317A)	1.3m
Y-lead adapter (UT-317D)	50mm
Solder-in cable adapter (UT-317E)	150mm
Adapter cable (UT-317C)	150mm

Environmental Requirements

Temperature Requirements		Description
Operating temperature	Probe box	0°C to 50°C
	Accessories	-40°C to 125°C
Storage temperature		-30°C to 70°C
Operating humidity		≤85%RH
Storage humidity		≤90%RH
Operating altitude		3000m
Storage altitude		12000m

Operating Procedure

1. Connect the probe to the oscilloscope
Attach the probe's output interface to the oscilloscope and set the oscilloscope input impedance to 50Ω.
2. Attach the appropriate probe accessory
Select and install suitable accessory based on the test requirements, connect it to the test point, and then power on the probe.
3. Power on the DUT and perform measurement
After powering on the DUT, perform the measurement. Use the auto-zero function to eliminate any initial offset and ensure an accurate baseline.
4. Complete the measurement and store the probe
Once the measurement is finished, turn off the DUT, disconnect the probe, and store it properly to prevent damage.

Maintenance and Cleaning

1. Keep the probe clean and dry

Ensure the probe is kept free from dust, moisture, and contaminants to maintain optimal performance.

2. Clean with care

If cleaning is necessary, gently wipe the probe with soft, dry cloth. Do not use chemical solvents or cleaning agents, as they may damage the surface or internal components.

3. Proper storage

When the probe is not in use, store it in the original packaging in a cool, clean, and dry environment to prevent damage from humidity, dust, or impact.

4. Safe transportation

During transport, always place the probe in the manufacturer-supplied protective packaging, which is designed to prevent shock and vibration damage.

5. Avoid cable damage

Do not pull, twist, or apply excessive force to the input or output cables to prevent internal wire breakage or connector damage.

Packing List

Item	Quantity
UTR-PR2060 probe	1
USB 5V/2A adapter (UT-605)	1
USB wire (UT-315B)	1
BNC output wire (UT-310)	1
SMA male-to-MMCX male cable (UT-317B)	1
SMA male-to-SMA male cable (UT-317A)	1
Y-lead adapter (UT-317D)	1
Solder-in cable adapter (UT-317E)	2
Adapter cable (UT-317C)	2
Cut-through load 50Ω (UT-50)	1
AA battery (Alkaline dry cell)	4
User Manual	1
Calibration report	1

Limited Warranty and Liability

UNI-T guarantees that the Instrument product is free from any defect in material and workmanship within three years from the purchase date. This warranty does not apply to damages caused by accident, negligence, misuse, modification, contamination, or improper handling. If you need a warranty service within the warranty period, please contact your seller directly. UNI-T will not be responsible for any special, indirect, incidental, or subsequent damage or loss caused by using this device. For the probes and accessories, the warranty period is one year. Visit instrument.uni-trend.com for full warranty information.



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