

2. Analogue Oscilloscope – User Manual

Cover Page

Analogue Oscilloscope

User Manual

Version 1.0

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Table of Contents

1. Introduction
2. Safety Instructions
3. Device Overview
4. Operating Instructions
5. Maintenance and Troubleshooting
6. Specifications
7. Warranty and Support

1. Introduction

An analogue oscilloscope is used to visualize electrical signals as continuous waveforms. Unlike digital oscilloscopes, analogue types display signals directly on a cathode-ray tube (CRT), providing immediate response to input changes.

2. Safety Instructions

- * Ensure proper grounding before operation.
- * Avoid exposure to liquids or high temperatures.
- * Do not exceed voltage limits specified for the device.
- * Handle CRT carefully to prevent damage.

3. Device Overview

Key Features:

- * CRT display for waveform visualization
- * Voltage/div and time/div controls
- * Triggering for stable display
- * Multi-channel input (typically 2 channels)

Front Panel Functions:

- * *Display Screen (CRT):* Shows waveform
- * *Vertical Control Knobs:* Adjust amplitude
- * *Horizontal Control Knobs:* Adjust time base
- * *Trigger Controls:* Edge, level, slope settings
- * *Input Connectors:* Connect probes to channels

4. Operating Instructions

1. Connect probe to input channel and ground.
2. Adjust vertical and horizontal scales to fit the waveform on screen.
3. Set trigger type and level for stable display.
4. Observe waveform and perform necessary measurements manually.
5. Turn off and disconnect after use.

5. Maintenance and Troubleshooting

- * Clean front panel and screen with a dry cloth.
- * Inspect probes for wear.
- * Calibrate regularly for accurate measurements.
- * Check fuses if device fails to power on.

6. Specifications

- * Channels: 2
- * Bandwidth: 20 MHz – 100 MHz
- * Vertical Sensitivity: 2 mV/div – 10 V/div
- * Time Base: 0.1 μ s/div – 0.5 s/div
- * Input Impedance: 1 M Ω

7. Warranty and Support

* Warranty: 1 year

* Contact manufacturer for support

* Keep purchase details for warranty

3. Spectrum Analyzer – User Manual

Cover Page

Spectrum Analyzer

User Manual

Version 1.0

© 2025

Table of Contents

1. Introduction

2. Safety Instructions

3. Device Overview

4. Operating Instructions

5. Maintenance and Troubleshooting

6. Specifications

7. Warranty and Support

1. Introduction

A spectrum analyzer measures signal amplitude versus frequency, allowing analysis of frequency components, harmonics, and noise in electronic signals.

2. Safety Instructions

- * Proper grounding is essential.
- * Avoid high-voltage signals beyond input ratings.
- * Keep device away from liquids and dust.
- * Use caution when connecting RF signals.

3. Device Overview

Key Features:

- * Frequency span control
- * Resolution bandwidth adjustment

- * Peak detection and marker functions

- * Display in dBm, dBV, or volts

Front Panel Functions:

- * *Display Screen:* Shows frequency spectrum

- * *Frequency Controls:* Center, start, stop frequencies

- * *Amplitude Controls:* Reference level, scale

- * *Marker Functions:* Measure peak or specific frequencies

4. Operating Instructions

1. Connect input signal.
2. Set center frequency and span.
3. Adjust reference level and resolution bandwidth.
4. Observe spectrum on screen.
5. Use markers for peak and frequency measurements.
6. Save or record data if required.

5. Maintenance and Troubleshooting

- * Keep device clean and dry.
- * Check input connectors for wear.
- * Periodically calibrate for accurate readings.

* Contact service center for faults beyond basic troubleshooting.

6. Specifications

* Frequency Range: 9 kHz – 3 GHz

* Resolution Bandwidth: 10 Hz – 1 MHz

* Input Impedance: 50 Ω

* Amplitude Range: -120 dBm to +30 dBm

7. Warranty and Support

* Warranty: 1 year

* Manufacturer support for service and calibration

4. Frequency Counter – User Manual

Cover Page

Frequency Counter

User Manual

Version 1.0

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Table of Contents

1. Introduction
2. Safety Instructions
3. Device Overview
4. Operating Instructions
5. Maintenance and Troubleshooting
6. Specifications
7. Warranty and Support

1. Introduction

A frequency counter measures the frequency of a periodic signal. It provides high-accuracy readings using precise time base and counting mechanisms.

2. Safety Instructions

- * Ensure correct input voltage to avoid damage.
- * Proper grounding is required.
- * Avoid connecting to high-power circuits beyond rating.

3. Device Overview

Key Features:

- * Direct frequency measurement
- * High-accuracy time base
- * Gate time selection
- * Display in Hz, kHz, MHz

Front Panel Functions:

- * *Display:* Shows measured frequency
- * *Input Connector:* Connect signal
- * *Time Base Selector:* Adjust measurement interval
- * *Function Buttons:* Hold, reset, mode selection

4. Operating Instructions

1. Connect input signal.
2. Select desired time base/gate interval.
3. Read frequency on display.
4. Use HOLD button to freeze reading if needed.
5. Turn off and disconnect after measurement.

5. Maintenance and Troubleshooting

- * Keep connectors clean.
- * Avoid dropping or physical shock.
- * Calibrate periodically for accuracy.
- * Replace damaged cables immediately.

6. Specifications

- * Frequency Range: 10 Hz – 100 MHz
- * Accuracy: $\pm 0.01\%$
- * Input Impedance: $1\text{ M}\Omega / 50\ \Omega$
- * Display: 6–8 digit LCD

7. Warranty and Support

- * Warranty: 1 year
- * Support via manufacturer's service center

5. Function Generator – User Manual

Cover Page

Function Generator

User Manual

Version 1.0

© 2025

Table of Contents

1. Introduction
2. Safety Instructions
3. Device Overview
4. Operating Instructions
5. Maintenance and Troubleshooting
6. Specifications
7. Warranty and Support

1. Introduction

A function generator produces various waveforms such as sine, square, and triangular waves over a wide frequency range. It is used to test circuits and simulate signals.

2. Safety Instructions

- * Verify output voltage limits before connecting to devices.
- * Ensure proper grounding.
- * Avoid contact with high-voltage circuits.

3. Device Overview

Key Features:

- * Multiple waveform outputs (sine, square, triangle)
- * Frequency and amplitude control
- * DC offset adjustment
- * Output display

Front Panel Functions:

- * *Waveform Selector:* Choose output type
- * *Frequency Control:* Adjust waveform frequency
- * *Amplitude Control:* Set signal amplitude
- * *Offset Control:* Adjust DC offset
- * *Output Connector:* Connect to DUT

4. Operating Instructions

1. Connect output to circuit or oscilloscope.
2. Select waveform type.
3. Adjust frequency and amplitude.
4. Apply output to DUT.
5. Turn off device and disconnect when done.

5. Maintenance and Troubleshooting

- * Keep knobs and connectors clean.
- * Avoid overvoltage on output.
- * Calibrate periodically.

6. Specifications

- * Frequency Range: 0.1 Hz – 2 MHz
- * Waveforms: Sine, Square, Triangle
- * Output Amplitude: 0–20 Vpp
- * DC Offset: ± 10 V

7. Warranty and Support

* Warranty: 1 year

* Manufacturer support center for repairs

6. Logic Probe – User Manual

Cover Page

Logic Probe

User Manual

Version 1.0

© 2025

Table of Contents

1. Introduction

2. Safety Instructions

3. Device Overview

4. Operating Instructions

5. Maintenance and Troubleshooting

6. Specifications

7. Warranty and Support

1. Introduction

A logic probe is used to test digital circuits by indicating high, low, or pulsing logic states. It is simple, portable, and essential for troubleshooting logic boards.

2. Safety Instructions

- * Avoid connecting to voltages beyond TTL/CMOS logic levels.
- * Do not short circuit probe tip to other connections.
- * Use in well-lit and dry areas.

3. Device Overview

Key Features:

- * LED indicators for HIGH, LOW, and PULSE states
- * TTL/CMOS compatible
- * Handheld design

Front Panel Functions:

- * *Probe Tip:* Connect to test point
- * *LED Indicators:* Show logic state

* *Power Connector:* Battery-operated

4. Operating Instructions

1. Connect probe tip to a logic circuit point.
2. Observe LED indicators:

* HIGH: Logic 1

* LOW: Logic 0

* PULSE: Flashing indicates transitions

3. Move probe to test different points.
4. Turn off probe when done.

5. Maintenance and Troubleshooting

- * Replace batteries as needed.
- * Keep probe tip clean.
- * Avoid dropping device.

6. Specifications

* Logic Compatibility: TTL, CMOS

* Power: 3V–9V battery

* Indicators: LED for HIGH, LOW, PULSE

* Input Impedance: $\sim 1\text{ M}\Omega$

7. Warranty and Support

* Warranty: 1 year

* Support via manufacturer or authorized dealer