

## MCH OS-3040A

# MCH OS-3040A 40MHz Dual Channel Analogue Oscilloscope User Manual

Model: OS-3040A | Brand: MCH

## 1. INTRODUCTION

This manual provides detailed instructions for the safe and effective operation of the MCH OS-3040A 40MHz Dual Channel Analogue Oscilloscope. The OS-3040A is designed for laboratory and testing applications, featuring a 6-inch rectangular screen with an internal graticule and multiple display modes for waveform analysis. Please read this manual thoroughly before using the instrument.

## 2. SAFETY INFORMATION

To prevent electric shock or personal injury, and to avoid damage to the instrument or connected equipment, observe the following safety precautions:

- **Ground the Instrument:** Ensure the oscilloscope is properly grounded using the supplied power cord.
- **Power Source:** Connect the instrument to a power source within the specified voltage range (110V/220V AC, 50/60Hz).
- **Avoid Wet Conditions:** Do not operate the oscilloscope in wet or damp environments.
- **Do Not Operate with Suspected Failures:** If the instrument appears damaged or is not operating correctly, do not use it. Refer servicing to qualified personnel.
- **Ventilation:** Ensure proper ventilation to prevent overheating. Do not block ventilation openings.
- **Use Proper Probes:** Use only probes rated for the voltage and current of the measurement.

## 3. PACKAGE CONTENTS

Verify that all items listed below are included in your package. If any items are missing or damaged, contact your supplier.



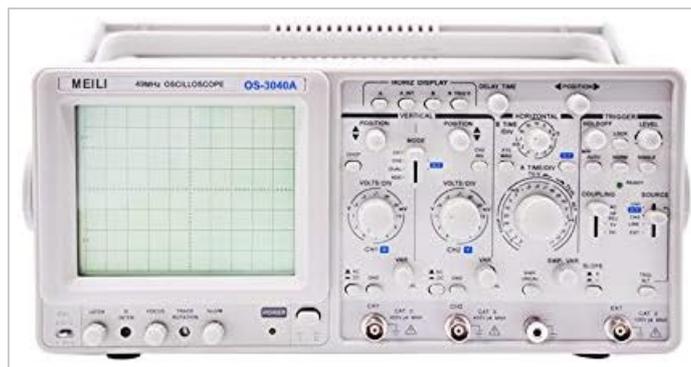
**Figure 3.1: Included Accessories.** This image displays the standard accessories: a power cord, a user manual, a screwdriver with color-coded rings, and two oscilloscope probes.

- MCH OS-3040A Analogue Oscilloscope Unit
- Power Cord
- User Manual
- Oscilloscope Probes (x2)
- Adjustment Tool (Screwdriver)

## 4. PRODUCT OVERVIEW

The MCH OS-3040A is a 40MHz dual-channel analogue oscilloscope. Familiarize yourself with the main components and controls.

### 4.1 Front Panel



**Figure 4.1: Front Panel.** This image shows the front panel of the oscilloscope, featuring the CRT display on the left and various control knobs and input connectors on the right.

- **CRT Display:** 6-inch rectangular screen with internal graticule (8x10 divisions).
- **Vertical Controls (CH1/CH2):** VOLTS/DIV, POSITION, AC/DC/GND coupling, MODE (CH1, CH2, DUAL, ADD).
- **Horizontal Controls:** TIME/DIV, POSITION, X-Y mode.
- **Trigger Controls:** LEVEL, MODE (AUTO, NORM, TV-V, TV-H), SOURCE (CH1, CH2, LINE, EXT), COUPLING (AC, DC, HF REJ, LF REJ).
- **Input Connectors:** CH1, CH2, EXT TRIG.
- **Calibration Output:** For probe compensation.

- **Power Switch:** On/Off control.

## 4.2 Rear Panel



**Figure 4.2: Rear Panel.** This image shows the rear panel of the oscilloscope, including the power input, fuse holder, and various warning labels.

- **AC Power Input:** Connector for the power cord.
- **Fuse Holder:** Contains the protective fuse.
- **Voltage Selector:** Allows selection between 110V and 220V AC operation.
- **Z-AXIS Input:** For external intensity modulation.
- **CAL Output:** Calibration signal output.

## 5. SETUP

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1. **Unpacking and Inspection:** Carefully remove the oscilloscope from its packaging. Inspect the instrument for any signs of physical damage.
2. **Power Connection:**
  - Ensure the power switch is in the OFF position.
  - Verify the voltage selector on the rear panel matches your local power supply (110V or 220V).
  - Connect the supplied power cord to the AC power input on the rear panel and then to a grounded power outlet.
3. **Probe Connection:** Connect the oscilloscope probes to the CH1 and/or CH2 input BNC connectors on the front panel.
4. **Probe Compensation:** Before taking measurements, compensate your probes. Connect the probe tip to the CAL output terminal and the ground clip to the ground terminal. Adjust the probe's compensation trimmer (usually on the probe body) until a stable, square waveform is displayed on the screen.

## 6. OPERATING INSTRUCTIONS

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This section outlines the basic operation of the MCH OS-3040A oscilloscope.

### 6.1 Power On and Initial Display

1. Turn on the power switch.
2. Allow a few moments for the display to stabilize. Adjust the INTENSITY and FOCUS knobs for a clear trace.
3. Set the vertical MODE to CH1, horizontal TIME/DIV to a mid-range setting (e.g., 1ms), and trigger MODE to AUTO.

### 6.2 Vertical System (CH1, CH2)

- **VOLTS/DIV:** Selects the vertical sensitivity (voltage per division). Rotate to adjust the amplitude of the displayed waveform.

- **POSITION:** Moves the waveform vertically on the screen.
- **AC/DC/GND Coupling:**
  - **AC:** Blocks DC components, displaying only the AC portion of the signal.
  - **DC:** Displays both AC and DC components of the signal.
  - **GND:** Disconnects the input signal and grounds the input amplifier, displaying a zero-volt reference line.
- **MODE:** Selects the display mode for multiple channels.
  - **CH1:** Displays only the signal from Channel 1.
  - **CH2:** Displays only the signal from Channel 2.
  - **DUAL (ALT/CHOP):** Displays both CH1 and CH2.
    - **ALT (Alternate):** Displays channels alternately, suitable for higher frequencies.
    - **CHOP (Chopped):** Displays channels by rapidly switching between them, suitable for lower frequencies.
  - **ADD:** Displays the algebraic sum of CH1 and CH2 signals.

### 6.3 Horizontal System

- **TIME/DIV:** Selects the horizontal sweep speed (time per division). Rotate to adjust the time scale of the displayed waveform.
- **POSITION:** Moves the waveform horizontally on the screen.
- **X-Y Mode:** Used for displaying Lissajous figures or phase relationships between two signals. CH1 typically controls the X-axis, and CH2 controls the Y-axis.

### 6.4 Trigger System

The trigger system synchronizes the horizontal sweep with a specific point on the input signal, providing a stable waveform display.

- **LEVEL:** Adjusts the voltage level at which the trigger occurs.
- **MODE:**
  - **AUTO:** Provides a free-running sweep if no trigger signal is present, ensuring a trace is always visible.
  - **NORM (Normal):** Requires a trigger signal to initiate a sweep. If no trigger is present, no trace will be displayed.
  - **TV-V (TV-Vertical):** For triggering on vertical sync pulses of video signals.
  - **TV-H (TV-Horizontal):** For triggering on horizontal sync pulses of video signals.
- **SOURCE:** Selects the signal source for triggering.
  - **CH1:** Triggers from the Channel 1 signal.
  - **CH2:** Triggers from the Channel 2 signal.
  - **LINE:** Triggers from the AC power line frequency.
  - **EXT:** Triggers from an external signal connected to the EXT TRIG input.
- **COUPLING:** Determines how the trigger signal is coupled.
  - **AC:** AC couples the trigger signal, blocking DC components.
  - **DC:** DC couples the trigger signal, including DC components.
  - **HF REJ (High Frequency Reject):** Filters out high-frequency components from the trigger signal.
  - **LF REJ (Low Frequency Reject):** Filters out low-frequency components from the trigger signal.

## 7. MAINTENANCE

- **Cleaning:** Clean the exterior of the oscilloscope with a soft, damp cloth. Do not use abrasive cleaners or solvents. Ensure the instrument is powered off and unplugged before cleaning.

- **Fuse Replacement:** If the oscilloscope does not power on, check the fuse located on the rear panel. Replace it only with a fuse of the same type and rating. Refer to the specifications for fuse details.
- **Storage:** Store the oscilloscope in a clean, dry environment, away from direct sunlight and extreme temperatures.
- **Servicing:** Internal adjustments or repairs should only be performed by qualified service personnel.

## 8. TROUBLESHOOTING

Problem	Possible Cause	Solution
No display/No power	Power cord disconnected, fuse blown, power switch off.	Check power cord connection, replace fuse if necessary, ensure power switch is ON.
No trace on screen	INTENSITY too low, FOCUS out of adjustment, POSITION off-screen, trigger MODE set to NORM with no signal.	Adjust INTENSITY and FOCUS, center POSITION controls, set trigger MODE to AUTO or ensure a valid trigger signal is present.
Unstable waveform	Incorrect trigger settings (LEVEL, MODE, SOURCE, COUPLING), probe compensation incorrect.	Adjust trigger LEVEL, MODE, SOURCE, and COUPLING. Perform probe compensation.
Distorted waveform	Incorrect VOLTS/DIV or TIME/DIV settings, probe attenuation mismatch, input signal exceeding limits.	Adjust VOLTS/DIV and TIME/DIV. Ensure probe attenuation matches oscilloscope setting. Verify input signal is within instrument limits.

## 9. SPECIFICATIONS

The following are the technical specifications for the MCH OS-3040A Analogue Oscilloscope:

Parameter	Specification
Model	OS-3040A
Bandwidth	40 MHz (Vertical)
Channels	Dual Channel
CRT Display	6-inch Rectangular, Internal Graticule, 8x10 divisions (1 div = 1 cm)
Vertical Sensitivity	5mV/div to 5V/div (10 steps)
Rise Time	≤17.5 ns
Input Impedance	1 MΩ ±2%, 25 pF ±5 pF
Max Input Voltage	400 V (DC+AC peak)
Display Modes	CH1, CH2, DUAL (ALT/CHOP), ADD
Horizontal Sweep Time	0.2 μs/div to 0.5 s/div (20 steps)
Sweep Magnification	x10
X-Y Phase Difference	≤3° DC-50 kHz
Trigger Modes	AUTO, NORM, TV-V, TV-H

Parameter	Specification
Trigger Source	CH1, CH2, LINE, EXT
Trigger Coupling	AC, DC, HF REJ, LF REJ
Calibration Output	0.5 Vp-p $\pm$ 10%, 1 kHz $\pm$ 20%
Power Supply	110V/220V AC $\pm$ 10%, 50/60Hz
Power Consumption	Approx. 40 W
Dimensions (W×H×D)	310 × 130 × 370 mm
Weight	8.5 kg (Net)

# OS-3040A/3050A OS-3060A

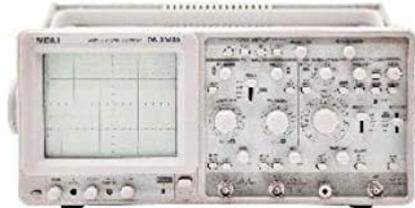
## OSCILLOSCOPE

### 带编码的开关示波器

#### 特点

- 双通四踪, X-Y操作作为进口编码开关控制系统, 手感好, 可靠性高、寿命长, A/B扫描
- 1mV/格高灵敏度触发、低漂移
- 延迟扫描便于仔细检验主时基的细小部分
- 触发电平锁定功能便于建立触发点, 在很宽的信号偏移变化范围内均可锁定
- 专用的视频H和V同步分离器可以使视频波形异常稳定
- 释抑时间可调, 便于观察长时间的复杂波形
- CH1输出可使CH1放大器作为一个高增益的校准前置放大级使用
- 6英寸大屏幕, 进口高亮度示波管

20MHz / 40MHz  
OSCILLOSCOPE WITH CODED SWITCH



#### FEATURES

- Dual channel/four trace, X-Y mode, imported coded switch provides good feeling, high reliability and long life, A/B Sweep.
- 1mV/div High sensitivity, low drift. ● Delayed sweep helps to closely examine small parts of main time base.
- Trigger level lock function establish the trigger point within the p-p signal swing and ensure rock-solid triggering despite wide variations in signal excursions.
- Dedicated video H and V sync separator provides stable video waveform.
- Variable holdoff for viewing long, complicated wavetrains,
- CH1 OUTPUT enables scope's CH1 amplifiers to be used as a high-gain calibrated pre-amp.
- 6" display, imported high brightness CRT tube.

SPECIFICATIONS	MODEL	OS-3040A	OS-3050A	OS-3060A
CRT		6" rectangular screen with internal graticule, 8×10div (6英寸带内部格画线的屏幕 8×10格, 1格=1cm)		
Bandwidth (带宽)		40MHz	50MHz	60MHz
Vertical deflection (垂直偏向)				
Display model (显示模式)		CH1, CH2, ADD, ALT, CHOP (CH1, CH2, 相加, 交替, 断续)		
Deflection factor (偏转因子)		5mV/div to 5V/div ±3%, 1mV/div to 1V/div ±5% (×5), 10steps (5mV/格到5V/格, 5倍时: 1mV/格到1V/格, 10个档)		
Rise time (上升时间)		≤17.2ns		
Max. input voltage (最大输入电压)		250V(DC+AC peak) ≤1KHz		
Input Coupling (输入耦合)		AC, DC, GND		
Polarity selection (极性选择)		+or-(CH2 Only) (仅CH2)		
Horizontal deflection (水平偏向)				
Display mode (显示模式)		1, 10, X-Y		
Time base (时基)		0.2μs/div to 0.2s/div, 9 ranges (0.2μs/格到0.2s/格, 9个档)		
Sweep magnification (扫描展宽)		×10(10倍)		
Accuracy (精度)		±3%		
Trigger system (触发系统)				
Trigger mode (触发模式)		NORM, AUTO, TV-V, TV-H (常态, 自动, 电视场, 电视行)		
Trigger source (触发源)		CH1, CH2, VERT, LINE, EXT		
Sensitivity and frequency (灵敏度与频率)		20Hz~40MHz(VERT)	20Hz~50MHz(VERT)	20Hz~60MHz(VERT)
	AUTO, NORM	0.5div(INT), 0.5Vp-p(EXT)		
	TV-V, TV-H	At least 1 div or 1Vp-p (大于1格或1.0Vp-p)		
Input impedance (输入阻抗)		1MΩ		
X-Y operation (X-Y操作)				
X-Y phase difference (X-Y相位差)		≤3°, DC-50kHz		
Others (其他)				
Calibration waveform (校正波形)		Frequency: 1KHz ± 20%, Voltage: 0.5V ± 10% (频率: 1KHz ± 20%, 电压: 0.5V ± 10%)		
Power supply (电源)		220V/110V ± 10%; 50/60Hz		
Dimensions (尺寸)		310(W) × 130(H) × 370(D)mm		
Weight (重量)		8.5KG		

Figure 9.1: Detailed Specifications. This image provides a comprehensive table of technical specifications for the OS-3040A model.

*Note: Specifications are subject to change without prior notice.*

## **10. WARRANTY AND SUPPORT**

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For warranty information, technical support, or service inquiries, please contact your authorized MCH dealer or the point of purchase. Keep your purchase receipt as proof of purchase for warranty claims.