

## KEYSIGHT TECHNOLOGIES (AGILENT HP)

# 54642A

The Keysight Agilent 54642A is a 2-channel, 500 MHz digital storage oscilloscope (DSO) featuring the patented MegaZoom deep memory technology. It offers a 2 GSa/s maximum sample rate, 8 MB of deep memory, and a high-definition display with 32 levels of intensity. With standard serial triggers for I<sup>2</sup>C, SPI, LIN, CAN, and USB, plus built-in floppy, RS-232, and parallel ports, the 54642A delivers high-performance analysis capabilities with a fast 25 million vectors/second update rate.

## SPECIFICATIONS

### General

|                                  |                                                                                                             |
|----------------------------------|-------------------------------------------------------------------------------------------------------------|
| Interfaces                       | Built-in Floppy drive, RS-232, and Parallel (Centronics) ports; optional GPIB and LAN via expansion modules |
| Display                          | 5.7-inch monochrome LCD with 32 levels of intensity, 320 × 240 resolution                                   |
| Real-Time Clock                  | Built-in, battery-backed (tracks date and time for file saving)                                             |
| Recommended Calibration Interval | 1 year                                                                                                      |

### Physical

|                       |                                                  |
|-----------------------|--------------------------------------------------|
| Power Supply          | 100 - 240 VAC (±10%), 47 - 440 Hz, 110 W maximum |
| Operating Temperature | 0 to +55 °C °C                                   |
| Dimensions (W×H×D)    | 322.6 mm × 172.7 mm × 317.5 mm mm                |
| Weight                | 4.3 kg kg                                        |

### Vertical System (Analog Channels)

|                                     |                                                                                 |
|-------------------------------------|---------------------------------------------------------------------------------|
| Analog Bandwidth (-3 dB)            | 500 MHz                                                                         |
| Calculated Rise Time (10% to 90%)   | ~700 ps                                                                         |
| Number of Input Channels            | 2                                                                               |
| Input Coupling                      | AC, DC                                                                          |
| Input Impedance                     | 1 MΩ ±1%    13 pF, or 50 Ω ±1%                                                  |
| Vertical Sensitivity Range          | 2 mV/div to 5 V/div (1 MΩ), 2 mV/div to 1 V/div (50 Ω)                          |
| Vertical Resolution (A/D Converter) | 8 bits                                                                          |
| DC Gain Accuracy                    | ±2.0% of full scale                                                             |
| Maximum Input Voltage               | CAT I 400 V (DC + peak AC), CAT II 300 V (DC + peak AC) on 1 MΩ; 5 Vrms on 50 Ω |
| Hardware Bandwidth Limiters         | 20 MHz selectable                                                               |

## Horizontal System & Acquisition

|                                                |                                            |
|------------------------------------------------|--------------------------------------------|
| Maximum Real-time Sample Rate (Single-Channel) | 2 GSa/s                                    |
| Maximum Real-time Sample Rate (Multi-Channel)  | 1 GSa/s per channel                        |
| Maximum Record Length (Memory Depth)           | 8 MB (single-channel), 4 MB (dual-channel) |
| Time Base Range                                | 500 ps/div to 5 s/div                      |
| Time Base Accuracy                             | ±0.002% (±20 ppm)                          |

## Trigger System

|                                     |                                                                        |
|-------------------------------------|------------------------------------------------------------------------|
| Trigger Sources                     | Channel 1, Channel 2, Line, External                                   |
| Trigger Modes                       | Auto, Normal, Single                                                   |
| Trigger Coupling                    | DC, AC, LF Reject, HF Reject, Noise Reject                             |
| Trigger Sensitivity                 | 0.5 div or 5 mV (DC to 100 MHz), 1.0 div or 10 mV (100 MHz to 500 MHz) |
| Trigger Level Range                 | ±8 div from center of screen                                           |
| Trigger Holdoff Range               | 60 ns to 10 s                                                          |
| Standard Trigger Types              | Edge, Pulse Width, Pattern, TV, Sequence                               |
| Advanced and Protocol Trigger Types | I <sup>2</sup> C, SPI, LIN, CAN, USB                                   |

## Acquisition Modes & Signal Processing

|                         |                                            |
|-------------------------|--------------------------------------------|
| Acquisition Modes       | Normal, Peak Detect, Average               |
| Waveform Update Rate    | 25 million vectors/sec                     |
| Waveform Math Operators | Addition, Subtraction, Multiplication, FFT |
| FFT Window Types        | Hanning, Flat Top, Rectangular             |

## Measurements & Analysis

|                                           |                                                                     |
|-------------------------------------------|---------------------------------------------------------------------|
| Automatic Voltage Measurements            | Vpp, Vmax, Vmin, Vtop, Vbase, Vamp, Vavg, Vrms                      |
| Automatic Time and Frequency Measurements | Period, Frequency, Rise Time, Fall Time, +Width, -Width, Duty Cycle |
| Cursor Measurements                       | Manual, Track, Auto-measure; Voltage (ΔV) and Time (ΔT, 1/ΔT)       |

## Display & User Interface

|                               |               |
|-------------------------------|---------------|
| Waveform Persistence Settings | Off, Infinite |
|-------------------------------|---------------|

## Input/Output Interfaces

|                                    |                                                      |
|------------------------------------|------------------------------------------------------|
| External Trigger Input             | 1 MΩ, Max input 400 V (DC + peak AC)                 |
| Trigger Output / Calibrator Output | Amplitude ~5 V into open circuit, frequency ~1.2 kHz |

## Environmental & Compliance

|                                     |                                                |
|-------------------------------------|------------------------------------------------|
| Storage Temperature Range           | -40 °C to +70 °C                               |
| Operating Humidity Range            | 95% RH at 40 °C (non-condensing)               |
| Operating Altitude                  | Up to 4,600 m (15,000 ft)                      |
| Safety Certifications               | CSA C22.2 No. 1010.1, EN 61010-1 / IEC 61010-1 |
| Electromagnetic Compatibility (EMC) | IEC 61326-1, EN 61326-1, CISPR 11, ICES-001    |

## Accessories & Ordering Options

|                          |                                                  |
|--------------------------|--------------------------------------------------|
| Standard Included Probes | Two 10073C 10:1 passive probes with AutoProbe ID |
| Localization Support     | Quick Help in 9 languages                        |

## Vertical System

|                              |                                                               |
|------------------------------|---------------------------------------------------------------|
| Channel-to-Channel Isolation | > 40 dB from DC to 500 MHz                                    |
| Vertical Offset Range        | ±2 V (1 mV/div to 100 mV/div), ±200 V (101 mV/div to 5 V/div) |
| Vertical Dynamic Range       | ±8 divisions from center of screen                            |

## Storage

|                  |                                                   |
|------------------|---------------------------------------------------|
| Internal Storage | 3.5-inch floppy disk drive, 1.44 MB MS-DOS format |
|------------------|---------------------------------------------------|

## Interfaces

|                            |                                                                                |
|----------------------------|--------------------------------------------------------------------------------|
| Standard I/O Ports         | RS-232 (9-pin D-sub male, up to 57.6 kbps), Parallel (Centronics printer port) |
| Optional Interface Modules | N2757A GPIB, N2758A USB                                                        |

## Power

|                           |                                       |
|---------------------------|---------------------------------------|
| Line Voltage Range        | 100 V - 240 V AC (±10%, auto-ranging) |
| Line Voltage Frequency    | 47 Hz - 440 Hz                        |
| Maximum Power Consumption | 100 W                                 |

## Display

|                       |                                                                        |
|-----------------------|------------------------------------------------------------------------|
| Display Type          | Monochrome electromagnetic deflection CRT with 256 levels of intensity |
| Display Diagonal Size | 17.8 cm (7 inches)                                                     |
| Display Graticule     | 8 × 10 divisions                                                       |

## Environmental

|                         |                                                  |
|-------------------------|--------------------------------------------------|
| Operating Vibration     | 0.21 g rms (5 Hz to 500 Hz, 10 min/axis, 3 axes) |
| Non-operating Vibration | 2.09 g rms (5 Hz to 500 Hz, 10 min/axis, 3 axes) |
| Operating Shock         | 15 g (11 ms duration, half-sine pulse)           |

## TECHNOLOGY

Digital Storage Oscilloscope (DSO)

## APPLICATIONS

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### Electronic Design, Troubleshooting, Embedded Serial Bus Debugging

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