

# LCR-Reader<sup>®</sup>-MPA

## Multi Purpose LCR- and ESR-Meter

L-C-R-ESR and LED/Diode Measurements

0.1% Basic Accuracy

AC/DC Voltage/Current Measurements

Frequency, Pulse Period, Duty Cycle Meter

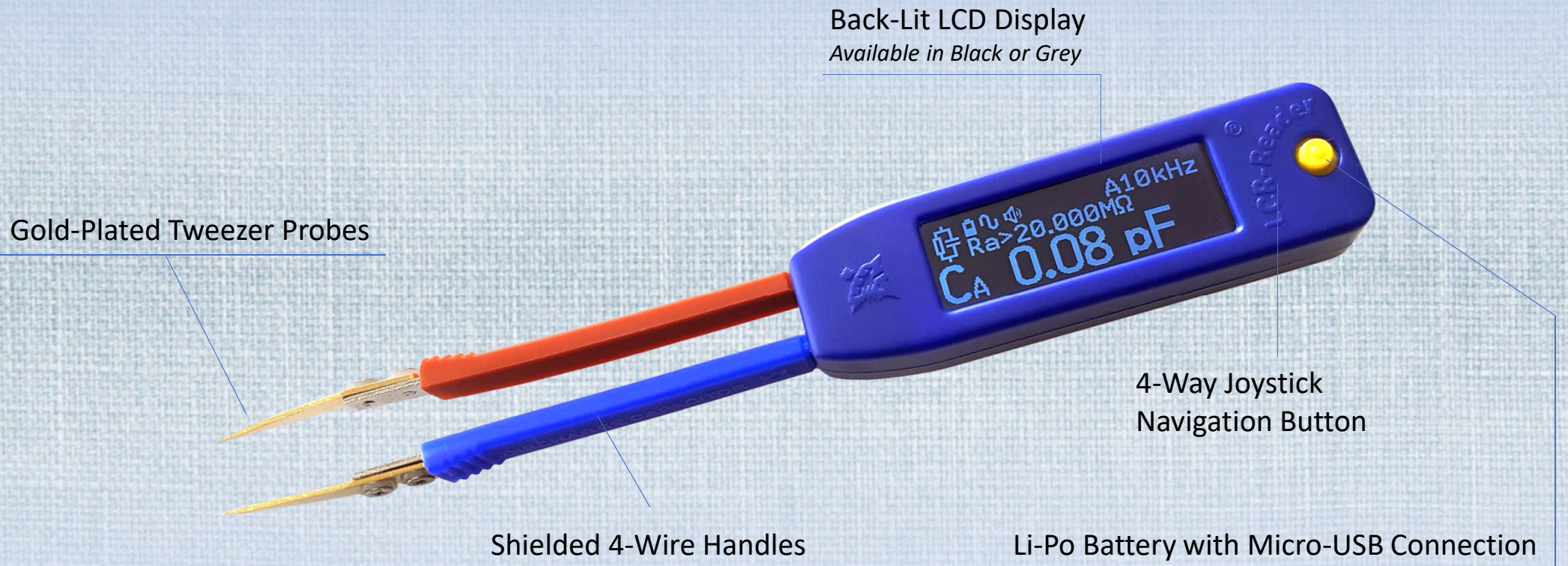
Oscilloscope, Signal Generator

Component Sorting

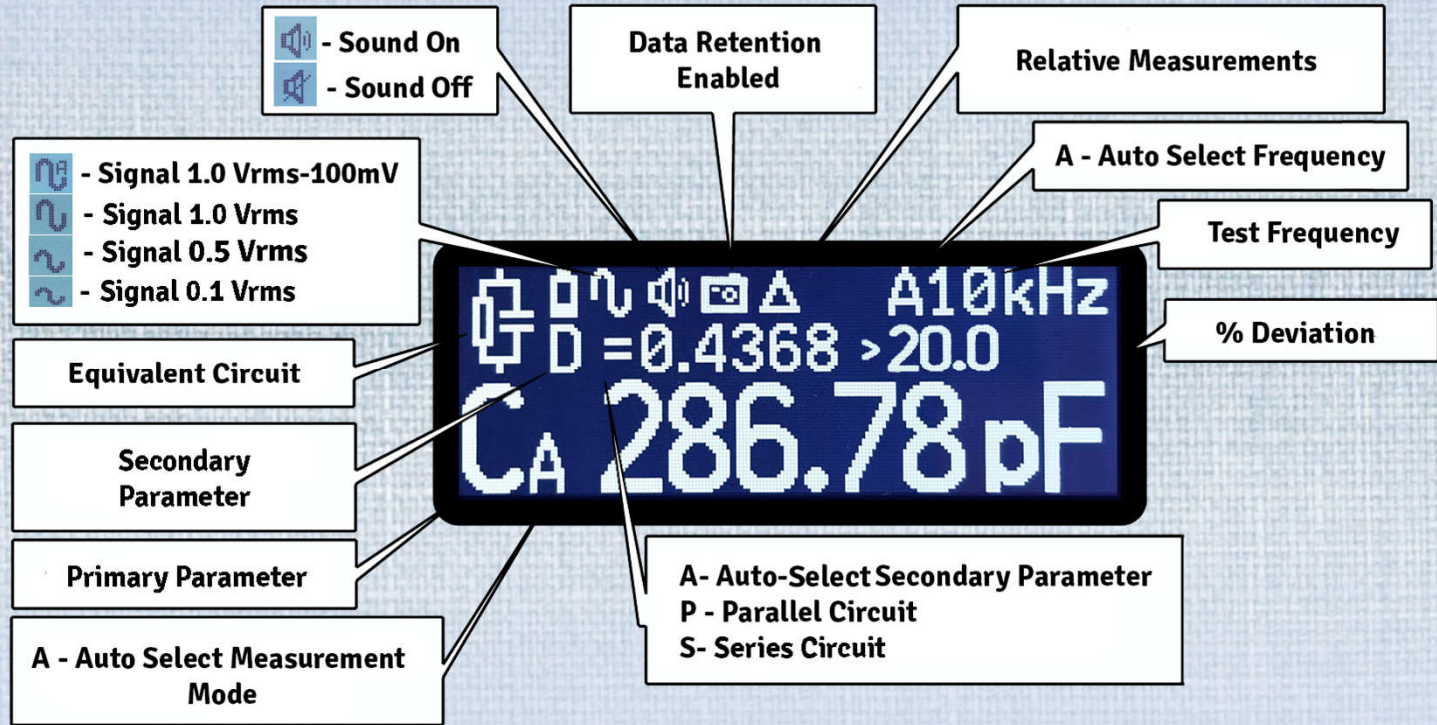
Super Cap Testing



# LCR-Reader-MPA Features



# Display Features



# Features

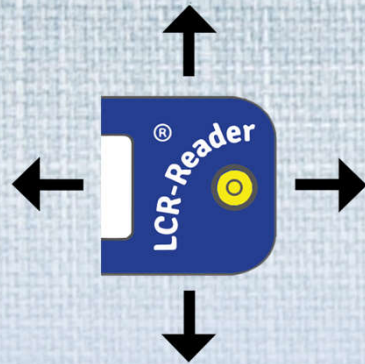
- Automatic and Manual LCR, ESR, LED/Diode measurements
- 0.1% Basic accuracy
- AC/DC Voltage and Current measurements
- Oscilloscope transient voltage up to 100 kHz
- Frequency meter
- Sine wave Signal Generator up to 100 kHz
- Super Cap DC test mode up to 1 F
- Automatic and manual Test Frequency including 100, 120 Hz, 100, 1, 10, 20, 30, 40, 50, 60, and 75 kHz
- Automatic Test Signal reduction to 0.1 V for in-circuit measurements

LCR-Reader-MPA has a 4-way joystick navigational button.  
**Navigating the Device**

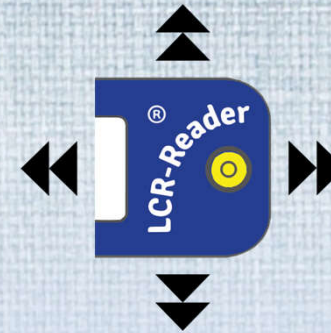


# Navigating the Device

The device is controlled by a 4-way joystick. Joystick functions are different when it is held for 1 or 2 beeps. Users can change basic settings for the test mode they are in from the measurement screen.



Press and hold for one beep

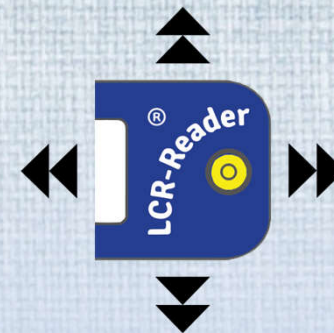
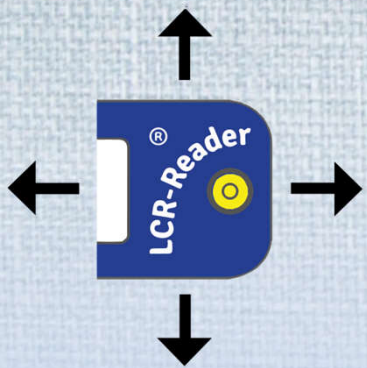


Press and hold for two beeps

# Navigating the Device

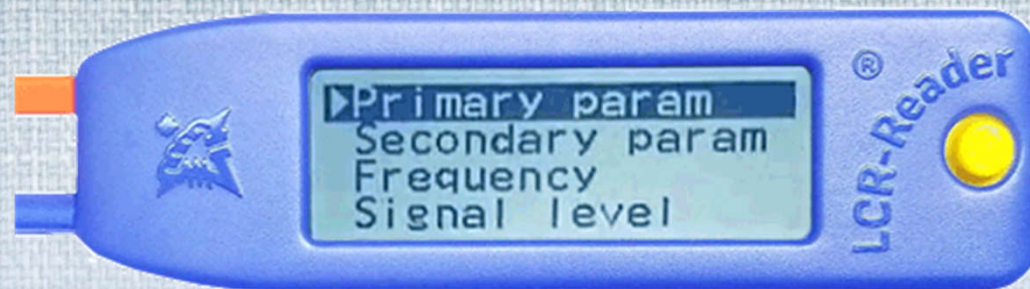
When on the default measurement screen, users can change the test parameters by pressing the button to the right. This includes the main and secondary test modes, test frequency, signal level, equivalent circuits, data hold, sounds, etc.

Push the joystick to the right and hold for 2 beeps to make Open/Short calibration and eliminate the offsets.



# Navigating the Device

Pressing and holding the joystick to the left for 1 beep changes the test frequency level. The device will cycle through test frequencies from Automatic 10kHz to 100Hz, 120 Hz, 1kHz, 10kHz, and 100kHz.





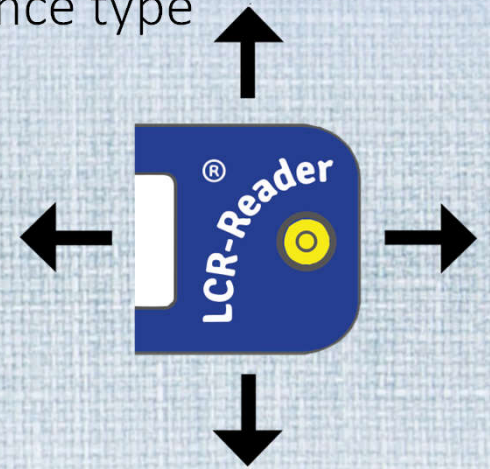
# Navigating the Device

Push the joystick up and hold for 1 beep to change the primary impedance type

Pressing the joystick to the left for 1 beep sets the test frequency.

Pressing the joystick to the right for 1 beep opens the secondary menu

Pressing the joystick down and holding for 1 beep will change the test signal level



# Navigating the Device

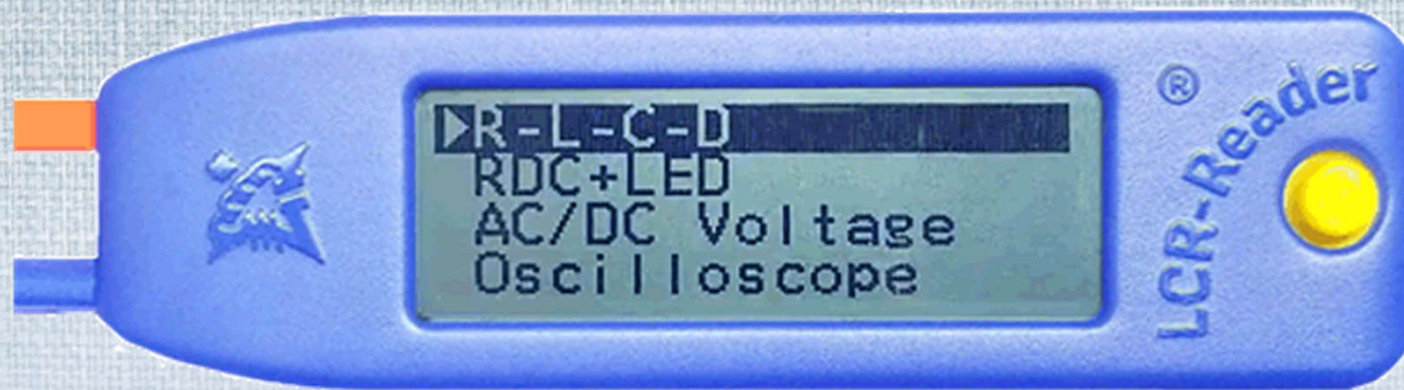
Push the joystick up and hold for 2 beeps to initiate Relative (tolerance) measurement mode. Press the joystick down and hold for 2 beeps to cancel Relative measurements.

Pressing the joystick to the left for 1 beep sets the test frequency.

Pressing the joystick to the right for 2 beeps to calibrate the device and remove the offset

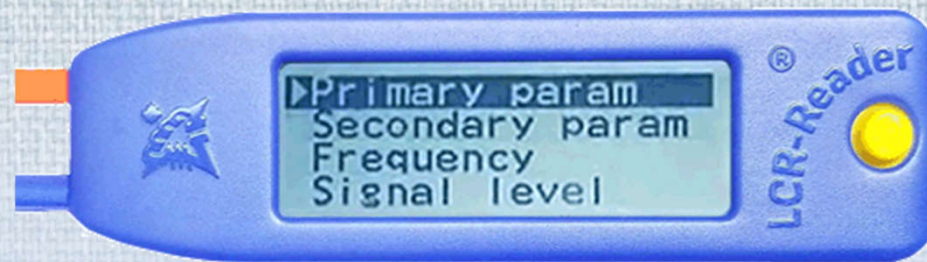
# Navigating the Device

Pressing the navigational button enters the main menu where users can select specific modes and change system settings.



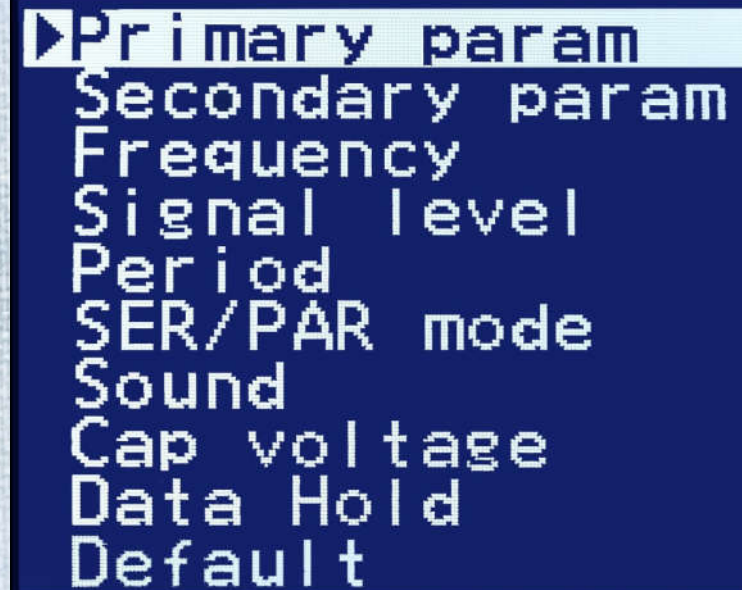
# Menus and Modes

LCR-Reader-MPA offers users more features and customization capabilities than previous LCR-Readers. Users are able to set ideal parameters for specific testing, whatever the task at hand may be.



# R-L-C-D Mode

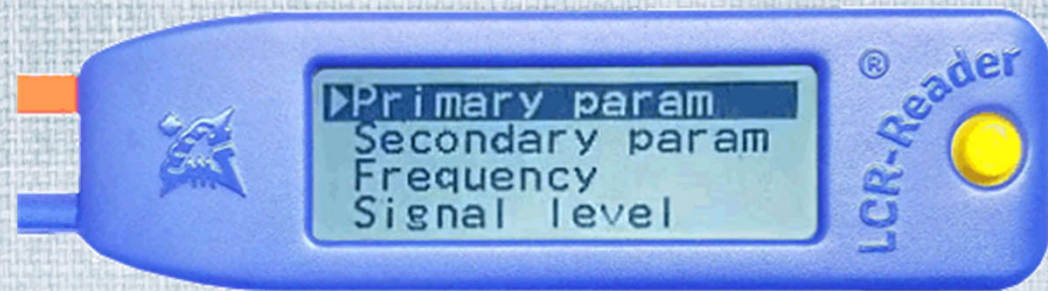
The R-L-C-D menu gives access to selecting test parameters and test settings such as Primary Parameter, Secondary Parameter, Frequency, Signal Level, Period, SER/PAR mode (series), Sound, Cap Voltage, Data Hold and Default.



```
▶ Primary param
Secondary param
Frequency
Signal level
Period
SER/PAR mode
Sound
Cap voltage
Data Hold
Default
```

# Primary Parameter

- Users can select the main impedance parameter from this menu.
- Auto: the device will automatically select the best parameter for the component
- R: Resistance
- C: Capacitance
- L: Inductance
- Z- Impedance
- Large Cap: Large Capacitance mode for measuring ESR cap from 0.5  $\mu\text{F}$  to 40 mF.



# Secondary Parameter

- Users can select the secondary parameter from this menu.
- Auto: the device will automatically select the best parameter for the component
- R: Resistance
- Q: Quality
- D: Loss Tangent



# Large Cap Mode

- Two sub-modes: Large Cap and Super Cap
- Press and hold joystick to the left for beep to toggle Large and Super Cap modes
- Two rejection tables are stored in the devices' memory – one for standard aluminum capacitors and other for Low ESR capacitors
- Two numbers are displayed in the top-right corner of the display: the first number is the quality of the capacitor. The second is the selected operating voltage of the capacitor in the menu under C voltage.





# Large Cap Mode

- This mode is selected when measuring capacitances and ESR of capacitors from 0.5  $\mu\text{F}$  to 40 mF. The capacitance is measured at 120 Hz test frequency and the ESR is measured at 100 kHz test frequency.
- Push joystick to left to toggle between lower than 40 mF and higher than 40 mF capacitance measurements.
- Push joystick down for 1 beep to toggle between 1.0 Vrms and 0.1 Vrms test signal level



# Super Cap Mode

- Super Large Cap > 40 mF to 680 mF
- This mode is selected when measuring capacitances and ESR of capacitors from 40 mF to 1 F. The capacitance is measured using DC while ESR is measured at 100 kHz.
- Push the joystick to the left to toggle between lower than 40 mF and higher than 40 mF capacitance measurements
- Push joystick down and hold for 1 beep to toggle between 1.0 Vrms and 0.1 Vrms test signal level



# RDC+LED Mode

- Tests DC resistance, leakage currents and parameters of Diodes/LEDs
- Auto mode automatically detects resistances and diodes
- Measures a shunt resistor on a board that can be used for evaluating the current via the shunt in a live current
- Four sub-modes available: Auto, Diode, R test at 1.3 V DC and R test at 100 mV DC

A Ω Ω Ω  
I<sub>r</sub>=0.047μA  
R > 20.0MΩ

A Ω Ω Ω  
I<sub>r</sub>=0.792μA  
0.239 V

A Ω Ω Ω  
I<sub>r</sub>=1.053μA  
0.244 V

Ω Ω Ω  
OL

# LED Mode

- Automatically determines and displays the polarity of the LED
- Shows Open forward bias and reverse current
- LED turns on during test
- Push and hold the joystick up for 2 beeps to calibrate with open and short probes to eliminate offsets



# Diode Mode

- Diode mode is used for diode parameter extraction using DC bias. This mode is recommended for in-circuit characterization of p-n junctions
- The screen displays the voltage drop in the open state when forward bias is applied
- Reverse bias is displayed as OL
- Push the joystick to the left and hold for 1 beep to reverse polarity



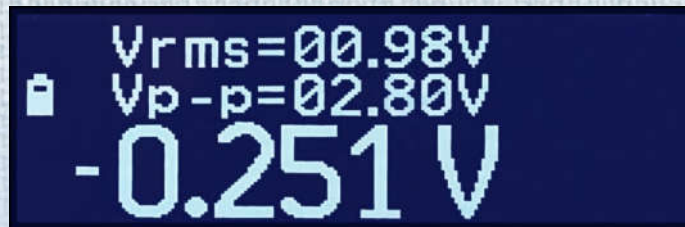
# R Tests

- Push the joystick up for 1 beep to enter R-test mode – a resistor symbol is shown on the top left corner of the display
- Push the joystick up again to toggle between 1.3 and 0.1 Volts – displayed on the screen by the pulse height icon
- Used for in-circuit detection of resistors
- Measures selected shunt resistor on the board
- Set shunt resistor value by pushing the joystick down and holding for 2 beeps while measuring the shunt



# Voltage Mode

- Measures DC and AC Voltage
- Automatically detects the polarity of the DC voltage
- Screen displays the values of the RMS voltage and peak-to-peak voltage range

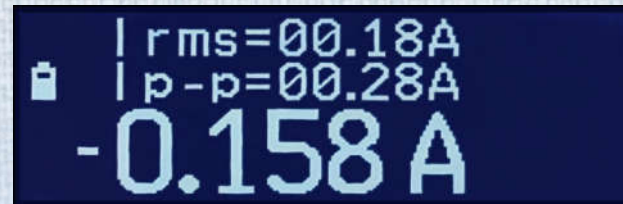


# Voltage Mode

- Push the joystick up for 1 beep to toggle on/off the current/voltage measurement mode
- Voltage mode measures the external resistors (shunts) and converts into a current to be displayed on the screen
- The display shows resistance and the lower value of the current
- Device can remembers the value of the shunt
- Device remembers max and min voltages with capture mode



□ R=0.100Ω  
-0.433 A



□ I<sub>rms</sub>=00.18A  
I<sub>p-p</sub>=00.28A  
-0.158 A

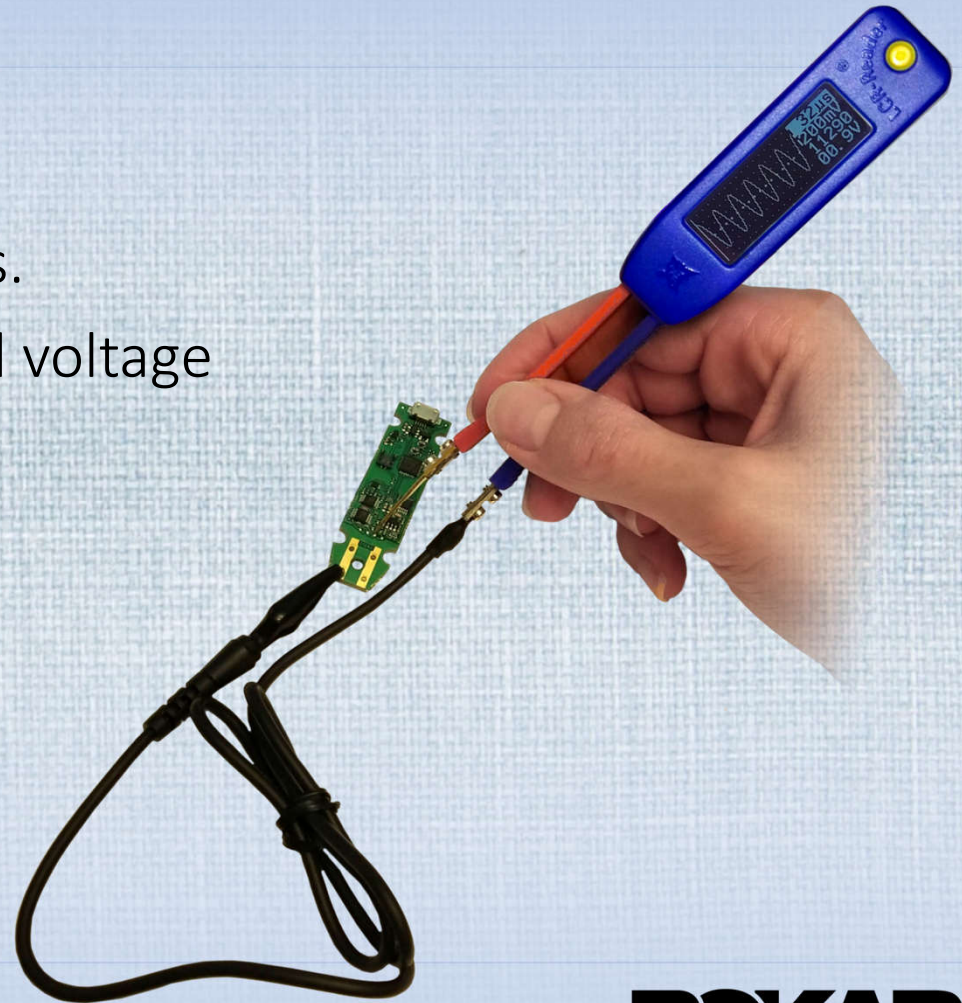


📷 V<sub>max</sub> 0.079V  
□ V<sub>min</sub> -1.532V  
-1.532 V



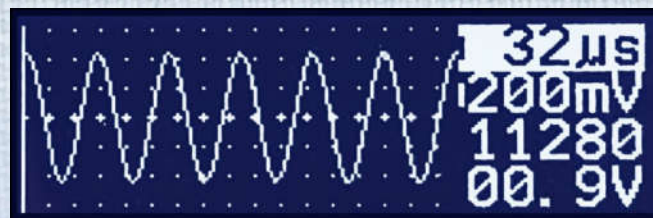
# Oscilloscope Mode

- Shows the voltage waveform
- Automatic and manual parameter settings.
- Manually adjustable time scale (T/pix) and voltage scale (V/div)
- Can be used with the LCR-Reader Kelvin Probe Connector to measure various waveforms on nodes



# Oscilloscope Mode

- Push the joystick to the right for 1 beep to increase parameter
- Push the joystick to the left to decrease parameter
- Push the joystick up or down for 1 beep to select the parameter to change: T/pix or V/div
- Push the joystick to the left for 2 beeps for automatic selection for T/pix (V/div)



# Frequency Meter Mode

- Using this mode, users can measure pulse duration, duty cycle, period, frequency and count the number of pulses



# Frequency Meter Mode

- **Counter:** hold the joystick to the left for 1 beep to change the measurements time 0.25s-0.5s-1s-2s
- **Pulse Duration:** hold the joystick to the left for 1 beep to measure duration of a positive or negative pulse.
- **Duty Cycle:** hold the joystick to the left for 1 beep to set positive or negative pulse

COUNTER  
00 000 278 332

PULSE DURATION  
000.0211 ms

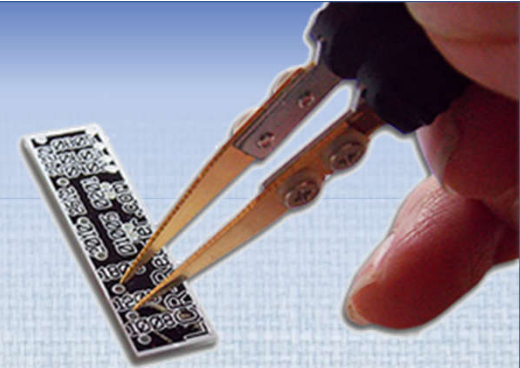
DUTY CYCLE  
56.29%

# Signal Generator Mode

- Generates Sine wave signal
- Signal is applied to the LCR-Reader-MPA probes
- Adjustable span (peak-to-peak) of a signal from 0.1 to 3.0V
- Frequency in Hz is displayed in the center of the screen
- Stores measurement parameters when the mode is exited
- Useful when used with Kelvin Probe Connector



# Offset Calibration Board



Offset calibration board offers precise measurements for determining parasitics. Instead of estimating the size of a component, place the tweezers into the corresponding holes on the Offset Calibration Board. Subtract the displayed value from the measured value of the component, the remaining value is the actual value of the component.

- Dummy PCB use holes to represent the variable widths of components(0201, 0402, etc. sizes)
- Helps accurately measure the offset capacitance of components

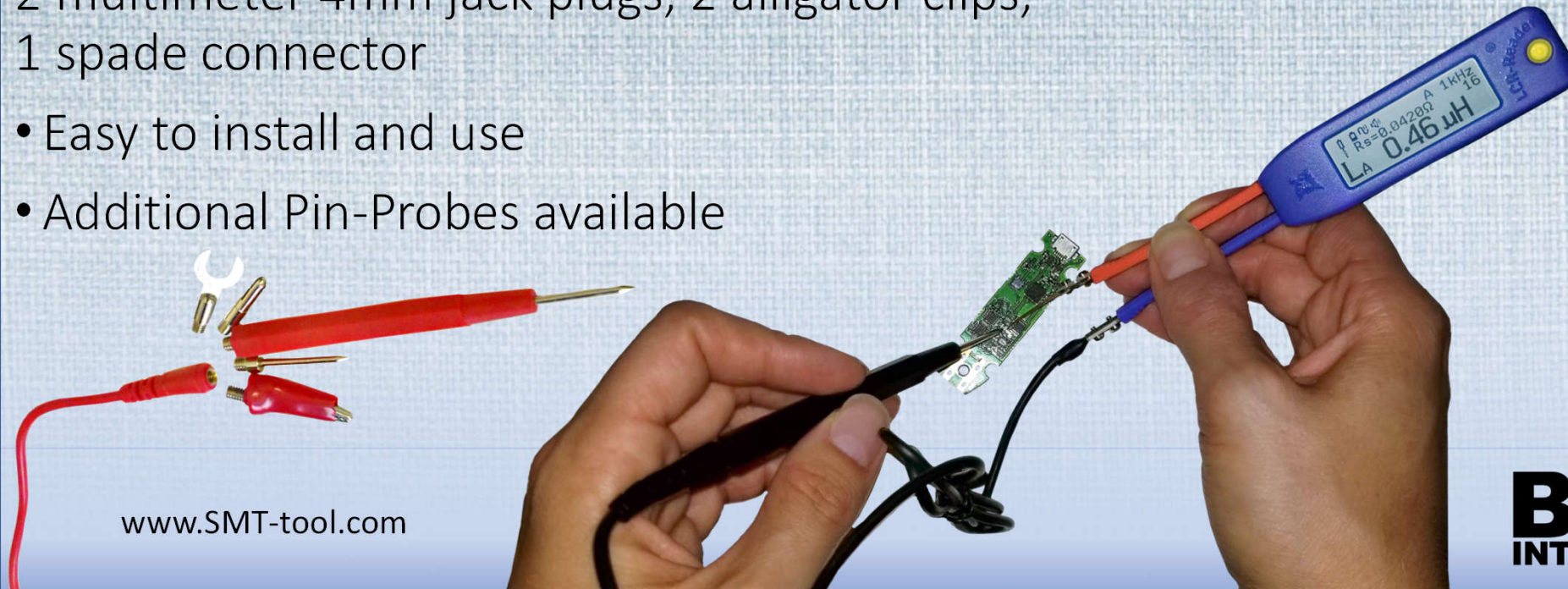


# LCR-Reader Kelvin Probe Connector

LCR-Reader Kelvin Probe Connector extends the reach of the multimeter and becomes a full probe station.

Comes with 7 attachments: 1 long pin-probe, 1 medium pin-probe, 2 multimeter 4mm jack plugs, 2 alligator clips, 1 spade connector

- Easy to install and use
- Additional Pin-Probes available



# LCR-Reader<sup>®</sup>-MPA

Available from the LCR-Reader Store  
and Amazon Marketplaces in USA,  
Canada, UK, and Europe