M181 LCR Meter

User Manual (Rev. 0)

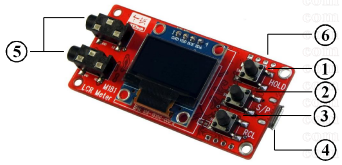
Modle: **M181 LCR**
PCB: 109-18100-00D
Firmware: 113-18101-040 or newer

Product contents:

1 **M181 LCR Meter**
2 **Measurement probes**
3 **USB cable**

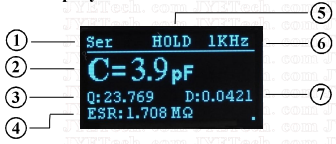
1 Get Started

Buttons and Connectors



1 **HOLD button** – Freeze/de-freeze screen
2 **P/S button** – Select circuit modes
3 **RCL button** – Select primary parameters
4 **USB connector** – Power supply, data transfer, and firmware upgrade
5 **Probe connectors** – Connecting measurement probes
6 **Serial port** J4 – LVTTL level com port

Screen Displays



1 Circuit mode (serial or parallel)
2 Primary parameter
3 Secondary – Q
4 Secondary – ESR
5 HOLD indicator
6 Measurement frequency
7 Secondary – D

2 Basic Operations

Power on and off

Power on Connect the device to a USB power source with the USB cable
Power off Disconnect the USB cable

Make measureements

1 Select the primary with the RCL button
2 Select a circuit mode with the P/S button
3 Connect the probes with the component to be measured. Read results on the screen.
4 Press the HOLD button can freeze the readings. Press the button again will de-freeze and measurements will resume.

Change frequency

Holding down the RCL button for 2 seconds will toggle the frequency between 1KHz and 100Hz.

3 Zeroing

Open zeroing

1 Keep the probes open (do not connect to anything)
2 Hold down the HOLD button for 2 seconds

Note: Open zeroing improves the accuracy of high impedance measurements by removing the impact of stray parameters.

Short zeroing

1 Firmly keep the probes be shorted
2 Hold down the HOLD button for 2 seconds

Note: Short zeroing improves the accuracy of low impedance measurements by removing the impact of stray parameters.

4 Serial Data Output

The measurement readings are output serially from the port J4 (LVTTL level) and the USB virtual comport.

Note: A driver for the CH340 USB-Uart converter is required to received the data through the virtual comport.

Serial transmission format:

The serial data are transmitted in 8N1 format at a baudrate of 115200bps.

Serial Data Format

1 For each measurement one data line is output. Each data line consists of multiple fields.
2 All the data fields are ASCII strings separated by commas.
3 All the numbers are in decimal base.
4 All impedances are in the unit of ohm (Ω) with 3-digit fractions
5 Capacitance is in the unit of micro-farad (μF) with 7-digit fractions.
6 Inductance is in the unit of micro-henry (μH) with 1-digit fraction.
7 Impedance angle is in the unit of degree (°) with 3-digit fractions.
8 Q and D are with 4-digit fractions.
9 A data line is terminated with one CR character (0x0D) and one LF character (0x0A).

The table below shows the format of a data line.

Field #	Definitions	Remarks
1	"Rs", "Rp", "Cs", "Cp" "Ls", or "Lp"	Primary and circuit mode
2	Primary reading	
3	Q	Secondary Readings
4	D	
5	ESR	
6	|Z|	Primitive measurements
7	Θ (impedance angle)	
8	Rs	
9	Xs	
10	CR(0x0D) and LF (0x0A)	Line end marks

5 Firmware Upgrade

Tools required

1 Flash Loader Demonstrator from ST. This application can be downloaded at https://www.st.com/en/development-tools/flasher-stm32.html
2 USB cable with micro-USB plug

Steps:

1 Download and install Flash Loader Demonstrator to a PC.
2 Download and install a driver for CH340 USB-Uart converter.
3 Download the firmware to be upgraded from www.jyetech.com.
4 Short the jumpers Jp1 and Jp2 with solder.
5 Connect the M181 meter to the PC with a USB cable.
6 Start Flash Loader Demonstrator. For the details of how to use this tool please refer to "WAVE2: How to upgrade firmware" (https://jyetech.com/wp-content/uploads/dim_uploads/WAVE2_HowToUpgradeFirmware.pdf).

Note: 1) Select "STM32_Med-density_128K" at the pull-down list for Target.
2) Do not do global erase to the chip. Otherwise critical data will be lost.

7 After the firmware has been written, disconnect the USB cable and remove the shorts on JP1 and JP2.
8 Power up the meter again, Check if the firmware has been correctly upgraded.

6 Specifications

Display	
Primary	R, C, L
Secondary	Q, D, ESR
Circuit Mode	Serial, parallel
Measurement ranges and accuracy	
R, |Z|	0.1Ω – 10MΩ
C	1pF – 10000μF
L	1μH – 20H
Q, D	0 – 10000
Θ	-90° – 90°
Accuracy	About 1%
Measurement conditions	
Frequency	100Hz, 1KHz
Voltage	0.6Vpp
Miscellaneous	
Connection	Kalvin 4-wire
Ranging	Fully automatic
Zeroing	Open, short
Serial data output	Yes
P.S. voltage	5V
P.S. current	100mA @ 5V
Dimensions	66 x 32 x 19mm (2.6"x1.26"x0.75")
Weight	23g (76g with probes)

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