TiF-MEMRiSTOR Measure Kit – Quick Start Guide –

Description

The present device "Measure Kit Caro" demonstrates the capabilities of the TiF-Memristor component. The novel Memristor device provides a non-linear behavior in parameter space $U(t) \sim I(t)$ as well as a temporal dependency of both variables. The latter provides an unique persistent memristor state, which can be utilized to store and read out information. The Measure Kit itself intents to understand the new component.

We – the team of TECHiFAB – like to get into touch with you. Let's discuss the application of this novel memristive component and talk about new capabilities.

Scope of Delivery

(i) Measure Kit Controller; (ii)TiF-Memristor Chip Carrier, containing TiF-Memristors; (iii) UBS-A→USB-C Cable; (iv) Quick Start Guide

Main Features

Memristor Chip Carrier (MCC) The Measure Kit is shipped with a MCC which can hold up to 16 TiF -Memristor devices. It provides a reverse polarity detection.

Individual Chip Evaluation Each individual TiF-Memristor cell can be characterized by a transient I-V cycle measurement. This is performed by an integrated sweeping voltage procedure.

Voltage Controlled Memristor Control The Measure Kit attaches a potential difference to the TiF-Memristor, while limiting the current. This ensures a safe operation of the memristor devices.

Easy to Use GUI The graphical user interface (GUI) enables insights operating a TiF-Memristor. It also allows to store the measured data.

Single USB Supply The Measure Kit is completely powered via USB Connection. Basically this connection is backward compatible with USB 2.0

Basic Operation

1. Plug in the TiF-Memristor Chip Carrier (MCC).
2. Connect the Measure Kit Controller with your Computer, the indicator LED lights up red. If not, turn the MCC. The Measure Kit enumerates a virtual COM-Port on Windows-mashines, and it attaches a USB-Drive with further information.
3. Start GUI - Program. The red indicator LED changes to green. The Measure Kit is now connected and ready for operation.
4. Operate Memristors
   (a) select stepping
   (b) select voltage range
   (c) select current clamping
5. (Optional) Store acquired data.

Technical Specification

Table 1: Maximum Electrical Characteristics

Item	Value
Temperature Range	$0 \ldots 30\,^{\circ}\mathrm{C}$
Power Dissipation	$< 2\,\mathrm{W}$
Power Supply	USB $5\,\mathrm{V}$

Operating memristive devices efforts different scales of current measurement. Therefore three different selectable current ranges are implemented, according to the Table 2. The driving voltage is set by the Measure Kit with a accuracy of about $10\,\mathrm{mV}$. The circuit is "pre-calibrated", which means, the desired precision is reached at approximately room temperature ($298\,\mathrm{K}$).

Table 2: Memristor Control

	Item	Value
Current	Range	$0 \ldots 40\,\mu\mathrm{A}$
		$0 \ldots 400\,\mu\mathrm{A}$
		$0 \ldots 4\,\mathrm{mA}$
	Resolution	$12\,\mathrm{bit}$
	Accuracy	$< 1\,\%\mathrm{FS}$
Voltage	Range	$-10 \ldots 10\,\mathrm{V}$
	Accuracy	$10\,\mathrm{mV}$

Precautions

Special precautions shall be undertaken to prevent damage to the delivered devices (Measure Kit and TiF-Memristor Chip Carrier) from:

- Electrostatic Discharge (ESD)
- Temperature and Heat
- Sun Irradiation

It could be, that the Measure Kit surface becomes warm. That is a normal condition due to the precision electronics inside.

Read the data sheets of the TiF-Memristor and its Memristor Chip Carrier to set up the Measure Kit Controller device properly.

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