



Hangzhou LinkZill Technology Co., Ltd.

Matrix Readout System (1K×1K) User Guide

V1.0

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Matrix Readout System (1K×1K) User Guide

Product Overview

The matrix readout system is mainly for collecting the current signal and imaging from the sensor array, which can support up to 1024*1024 definition. The matrix readout system can provide 1024 selecting signals, 2 DC bias voltages, and 1024 current readout channels. All current data will be transmitted to a PC terminal device through USB and converted to an 8-bit 256 grey level image based on the current intensity. The matrix readout system is very suitable for light or pressure monitoring with compatible thin-film transistor (TFT) array chip.



Parameter	Specification
L*W*H	329×173×30mm
Weight	1500g
Charging Port	DC005-2.5
Regular	1024 channel pulse voltage (row selecting signals), voltage range: -15V~+15V 1024 channel current readout, current range: 100pA~150nA (positive-only) 2 channel DC bias: -15V~+15V
Communication	USB
Terminal	PC (Windows 10 or higher)
Range	4 ranges (1nA/10nA/50nA/150nA)
Imaging	Imaging area: 8.7 * 8.7 cm Definition: 1024 rows * 1024 columns Grey level: 256
File saving types	Selected data by user: .CSV and video formats
Duration	>8 hours under room temperature
Refresh rate	PC: 0.5Hz on 150nA, 1024*1024 data per frame

Refresh Rate Description:

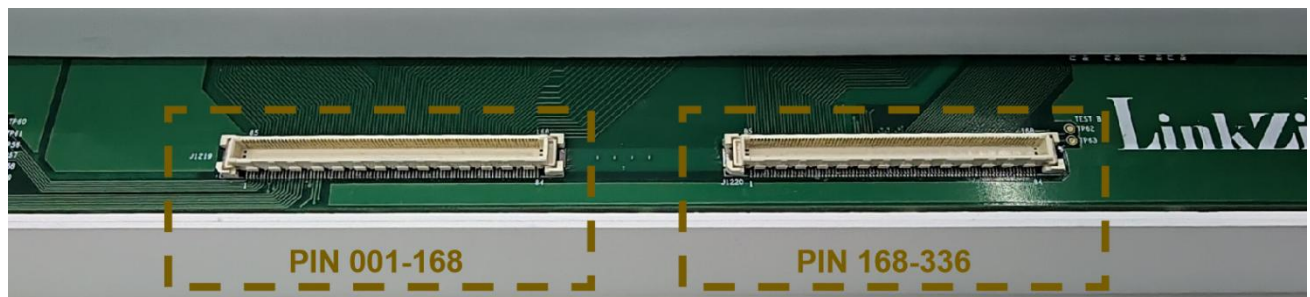
Range	Frame Rate (fps)	Period (ms)	Pulse Width of Scan (ms)
150nA	0.63	1581.04	1.55
50nA	0.33	2959.80	2.90
10nA	0.15	6262.20	6.12
1nA	0.05	17407.80	17.00

Product List

Name	Quantity
Host	1
Charger	1
USB Cable	1
User Guide	1
Three Guarantees Certificate	1

Pin Assignment Description

336 Pin FPC Pin Assignment (Left to Right):



Pin No.	001-006	007-008	009	012-015	018-021	024-027
Definition	Test Pin	Vss	Vcom	Row select drive signal CK	Column select multiplexing signal MUX	Row select drive signal GATE-IC
Pin No.	030	031	032	033	037-292	304
Definition	Von	Voff	Gate_VDD	Gate_GND	256 Current Readout Channels	Vcom
Pin No.	305-306	Remaining Pins				
Definition	Vss	Dummy				

1. Vss and Vcom are two DC bias voltages output, corresponding to Vss and Vcom in the PC software separately, with the voltage adjustable from -15V to +15V.

2. The “Von” and “Voff” in PC software correspond to the selected voltage and unselected voltage of the 1024 selecting signals separately, adjustable from -15V to +15V. Recommend to keep Von and Voff at the original settings of the system.

3. The 1024 current readout channels support positive current reading from 100pA to 150nA.

The specific details are shown in the figure below (1T0C refers to the TFT chip structure, for more information refer to "TFT Sensing Array Chips User Guide").

Voltage	Function	Suggest
Vss	Bias voltage applied on the cathode node of PD	1T0C: Vss must be positive value, PD current is related to Vss.
Vcom	Reserved bias voltage	1T0C: Not used here.
Von	Select voltage of TFT	1T0C: Range is from 1V to 15V and 15V is recommended for initial setting.
Voff	Non-select voltage of TFT	1T0C: Range is from -1V to -15V and -15V is recommended for initial setting.

Operating Manual

1. PC Software Installation:

The after-sales staff will send the PC software to you by email.

2. Device Connection:

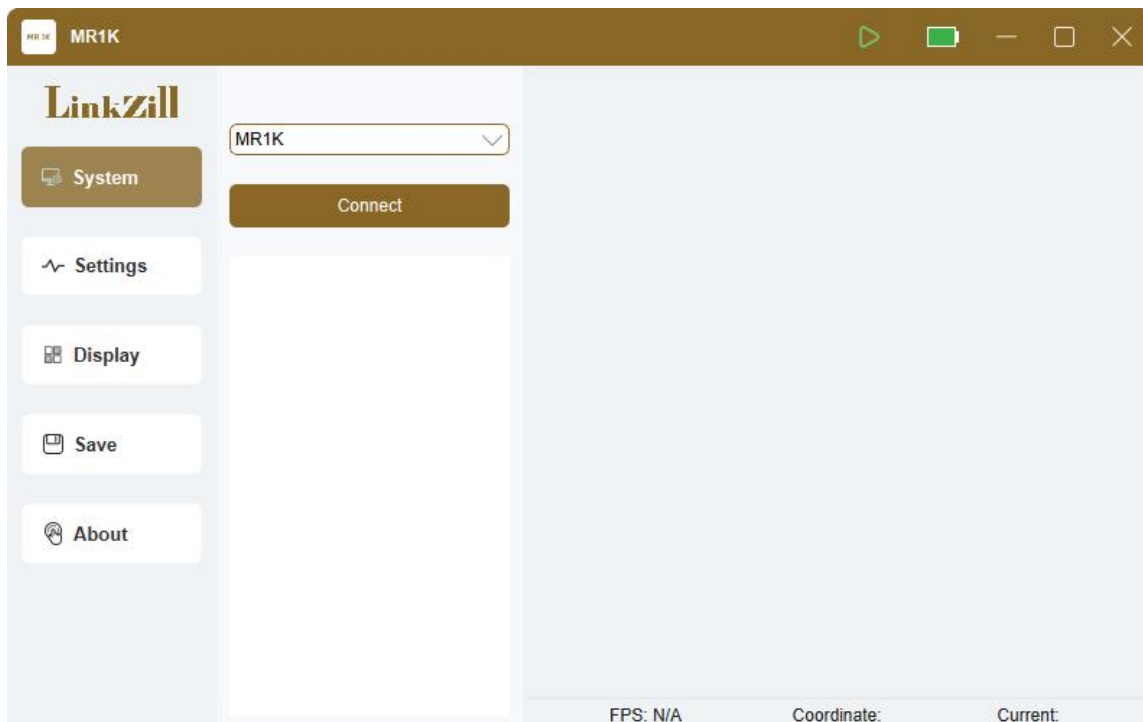
NOTICE: The following operation is based on a compatible 1K*1K photosensor (with OPD on TFT array).

- Before connecting the TFT array to the system, please make sure the Matrix Readout system is powered off.
- Flip the lid of the system and plug in the FPC. It needs to be pressed several times to make sure that the FPC is firmly inserted.
- Close the lid to hold the FPC.

3. Matrix Readout System Connection:

- Turn the power switch of the device to the "ON" and power on the device.
- Connect the device to the computer (PC) using a USB cable. Make sure both ends of the USB cable are correctly inserted into the device and the computer's USB ports.
- Open the application on the computer. If the connection is successful, the program device selection box will show the serial number of the device.

4. PC Software Introduction:



a. Menu Bar:

-  Start acquisition button: indicates that acquisition has not started.

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-  Stop acquisition button: indicates that acquisition is in progress.
-  Acquisition stop/reset status icon: indicates that the device is resetting and initializing after acquisition stops.
-  Power indicator icon: displays the battery level of the device in real time.
-   Switch between full-screen mode and window mode.

b. Display Area:

The blank area on the right is the display area, showing real-time photosensitive imaging.

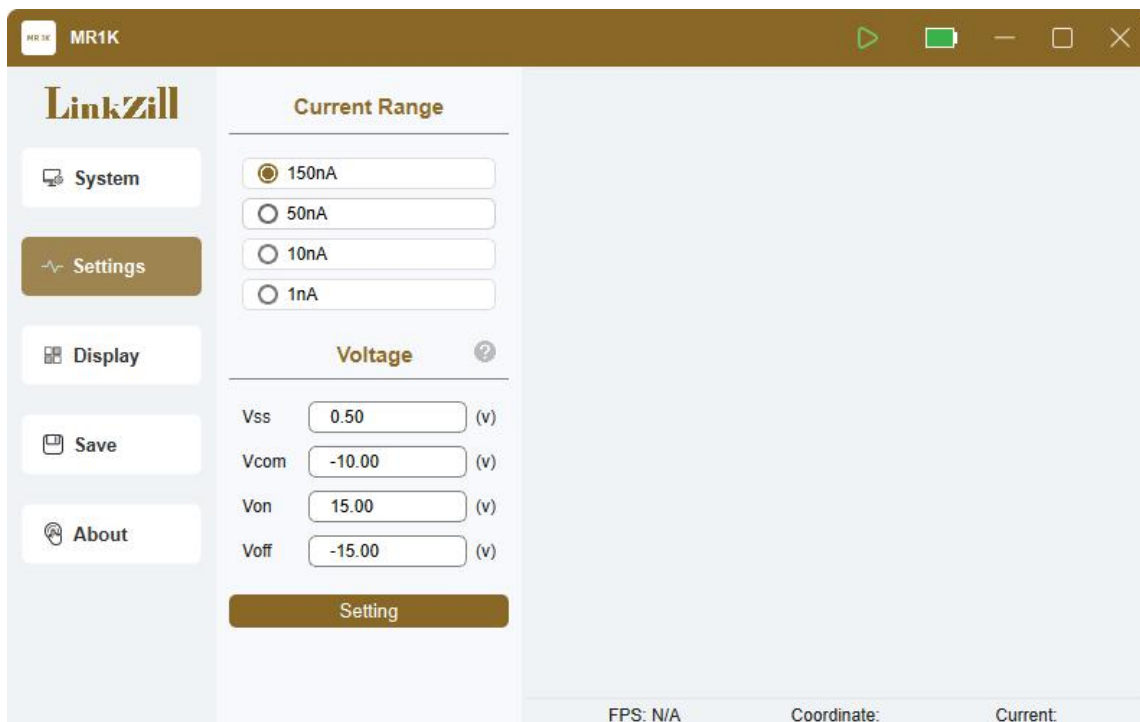
From left to right, the lower area displays the real-time frame rate, the coordinates of the selected pixel, and the real-time current value of the selected pixel.

c. System:

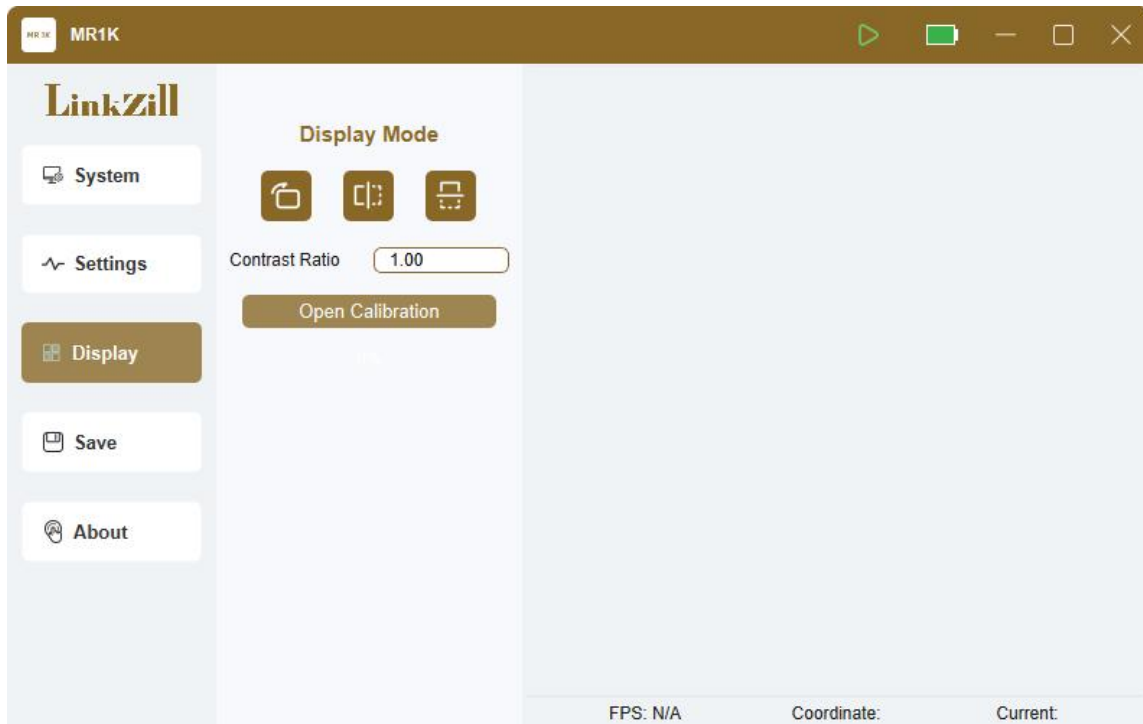
-   Connect/Disconnect the device.

d. Settings:

- Set the current range and operating voltage. After entering the parameters, click the  button to apply them.

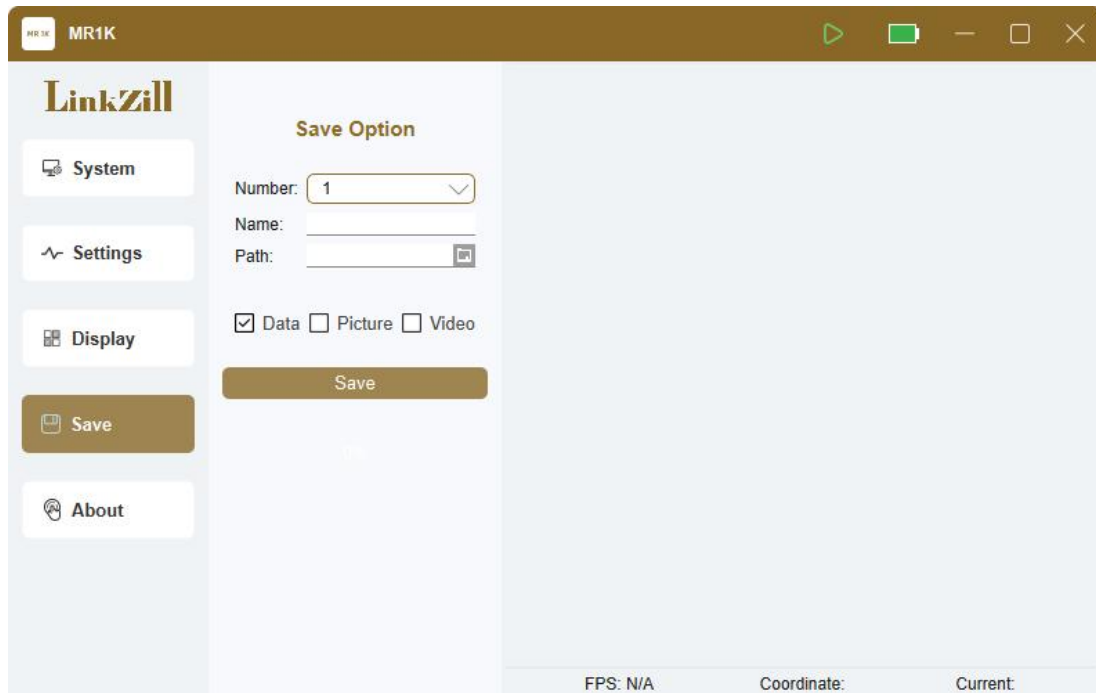


e. Display:



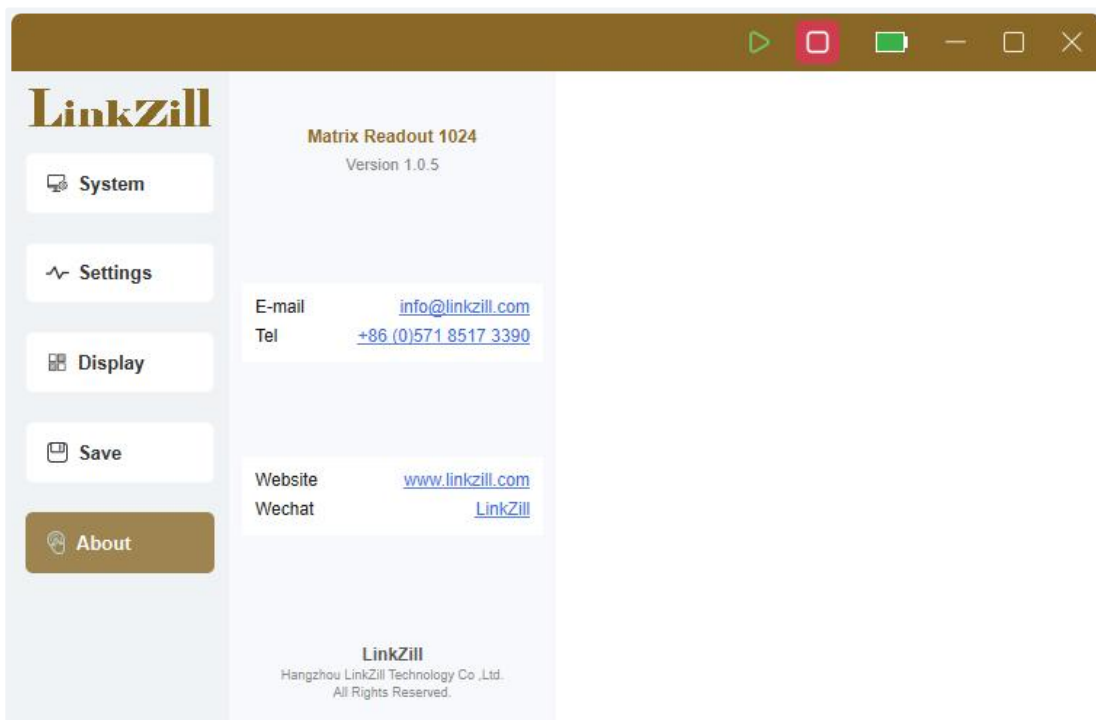
-  Rotate the displayed image.
-  Mirror the displayed image horizontally.
-  Mirror the displayed image vertically.
- **Contrast Ratio** Contrast setting: Increase the display contrast of the image. The range is 1.00-100.00. This function is used to quickly find a suitable current range.
- **Open Calibration** Enable/disable image calibration. NOTICE: Use this function only while acquiring images.
- **Full-ON** Perform independent 255 grayscale calibration for each pixel. After ensuring that the array sensor is in an unobstructed state, click the "Full-ON" button to record the current at this moment, corresponding to the 255 grayscale signal (white).
- **Full-OFF** Perform independent 0 grayscale calibration for each pixel. After ensuring that the array sensor is in a blocked state, click the "Full-OFF" button to record the current value at this moment, corresponding to the 0 grayscale signal (black).

f. Save:

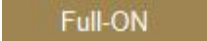


- Click the **Save** button to save data according to the selected options:
- “Number” (number of frames to save; manual input is supported);
- “Name” (file name to save; an English name is required);
- “Save Path” (save file address; the path needs to be in English);
- “Data”, “Picture”, and “Video”: save types (multiple selections allowed).

g. About: Software version and company contact information.



5. Usage Process:

- a. After confirming that the system is connected to the computer, open the MR1K program. The appearance of the device name in the function area indicates a successful connection. Then click the  button to start the device.
- b. Enter Settings, set the current range and voltage, and click the  button to confirm. A successful setting pop-up window will appear after the settings are applied. (NOTICE: These settings cannot be changed during acquisition.)
- c. Click the  button to enter the acquisition state (the button  changes to the  button, indicating that acquisition is in progress). To change the current range or voltage, click the  button first. (The button  changes to the  icon while acquisition is ending and the device is being initialized. After it changes back to the  button), enter Settings, change the corresponding settings, and click "Setting". A successful setting pop-up window will appear.
- d. During acquisition, click  to enable calibration.  and  will appear below. When the TFT device is completely unobstructed, click  to perform 255 grayscale calibration. After calibration is successful, block the device completely and click  to perform 0 grayscale calibration. Grayscale adjustment can only be performed during acquisition. Remove the obstruction only after the calibration success pop-up appears. **The calibration data is saved in the Logs/calib folder under the project root directory.**
Note: To recalibrate, repeat the steps above. Recalibration is required whenever any parameter (Current Range or Mode) is changed to ensure image quality.
- e. Place an opaque object above the light array sensor (visible light imaging), and the system will display the shape of the object in real time. Click the  button to pause the test.
- f. Enter Save, select the number of frames, save name, save path, and save type, and then click the  button. Wait for the progress bar to complete and data export to finish (saving can only be done in acquisition mode). The saved data types are CSV, images, and videos. The CSV data is divided into two parts, current (nA) and grayscale (0-255), and each frame contains the data of 1024*1024 points. The grayscale data will change with the calibration current.

Warnings:

-  Please do not use the matrix readout system while charging to avoid disturbance. Do not use the system in complex electromagnetic environments (e.g. within 2 m of power strips and powered devices). Please keep the testing environment, subject, and fixture clean and dry.
-  Please use the original charger to avoid damage.
-  The charging indicator is red when the system is charging and changes to green when the battery is full.

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It takes about 8 hours to fully charge the system. To avoid damaging the system, please unplug the charger when the system is fully charged.

⚠ Please do not use the system in hot or humid environments. Do not throw the system into fire or water to avoid damage or explosion.

⚠ Please do not bash or drop the system from height to avoid damage.