Multi-purpose Bi-directional PC Interface for Printed Electronics Systems

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CSEM has recently developed a multi-purpose bi-directional PC interface which allows the electrical characterization and driving of electronic matrix e.g. sensor (optical, chemical) arrays, imagers, display backplane, memories, etc. Its reading/writing capabilities, multi-channel addressing and Current-to-Voltage conversion not only help testing and optimizing the above mentioned electronic systems, but also ease the development of their dedicated custom driving units. The developed platform is here demonstrated to interface CSEM's first imager made of organic photodiodes (OPDs, 64 ppi resolution).

CSEM's TP-10 is an example of a fully automated testing & data analysis platform extracting electrical parameters of single thin-film devices, such as: transistors, diodes, resistors, capacitors and inverters. It was mainly designed for fast screening of new materials dedicated to printed electronics.

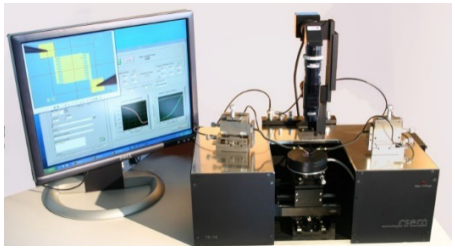

Figure 1: CSEM's TP-10 automated prober for single devices.

In addition to this well-recognized custom-made measurement platform for single thin-film devices, CSEM has developed another platform capable to drive sensor arrays, imagers, display backplane, memories, etc. This new platform is a multi-purpose bi-directional PC interface (see Figure 2) which comprises: i) a substrate holder with a non-permanent electrical interconnection, ii) a PCB with row drivers and a multiplexing system, iii) data acquisition instruments and iv) a PC user interface. Multi-channels addressing and Current-to-Voltage multi-channels conversion are possible.

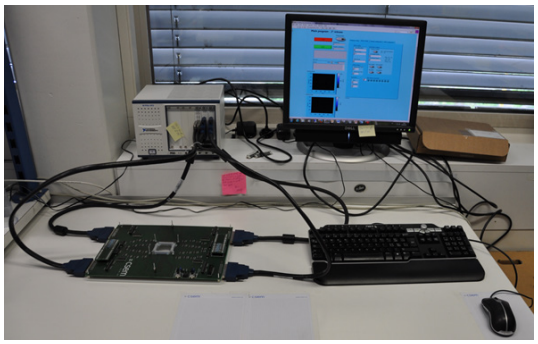

Figure 2: CSEM's multi-purpose bi-directional PC interface platform.

The platform specifications are summarized in Table 1.

Table 1: Overview of the platform specifications

Channels	Range
32 analog inputs	-10V / +10V
16 voltage outputs	-10V / +10V
16 current outputs	0.1 / 20 mA
56 digital inputs / outputs	5V
Addressable matrix	Up to 512 x 512

As an example using this platform CSEM could address its first organic imager (photodetector array). The imager is made of a 32 x 32 organic photodiode (OPD) array and was tested with a printed grid on top of it as target (see Figure 3).

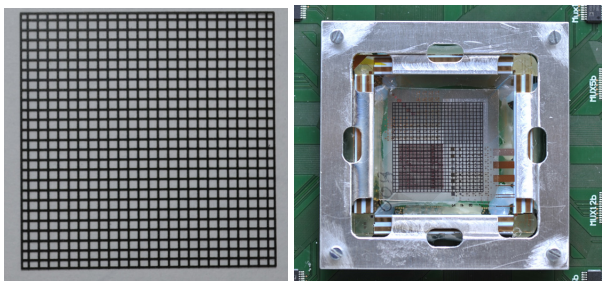

Figure 3: The target (left) and the 32x32 OPD imager (64 ppi) mounted on the platform for testing (right).

The measurements (Figure 4) show color lines representing the grid of the target as a voltage difference with respect to the reference voltage image acquired without the target.

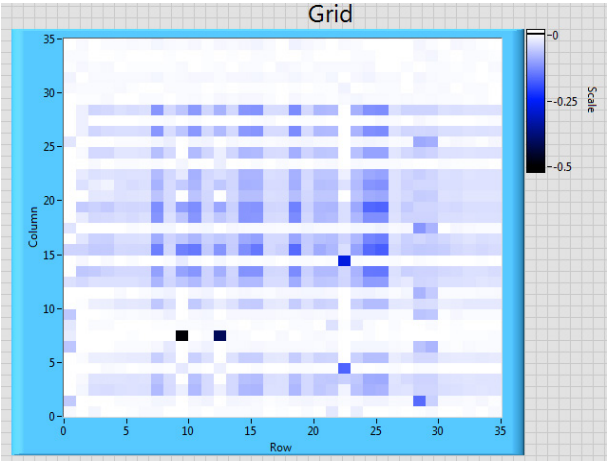

Figure 4: Visualization of the imaged grid target.

Last but not least the elements (hardware and software) of this multi-purpose platform can serve as a starting point for developing custom driving units dedicated to a particular device type (either imager or display) with particular specifications (e.g. number of rows/columns).

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