

# UNIVERSAL SYSTEM OF MODULAR LAB EQUIPMENT DESIGNED WITH VACUUM ELECTRONICS IN MIND

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## ABSTRACT

Any research and development work in the field of vacuum electronics requires a variety of measurement equipment pieces to establish a test rig. Oftentimes, it happens to be that the rig consists of many devices originating from many manufacturers, using multiple incompatible software solutions. Moreover, building test equipment with many standalone devices causes a great deal of inconvenience. Most of the equipment suited for vacuum electronics measurements can deliver hazardous voltages. A rig should provide a lockout switch disabling all of the unsafe voltages on demand, which is not the case in most of the setups built using off-the-shelf devices. There also exist issues of synchronizing multiple measurements to take place at the same time. Such problems can be mitigated by using standardized, modular lab equipment.

The authors of this paper, with their peers from Wrocław University of Science and Technology, have addressed those problems by developing a prototype modular test equipment, called “EuroMeasure”[1]. So far, the following modules have been built: 2-channel DDS generator, 6kV CV power supply, 4-channel 5.5 digit voltmeter, and 4-channel  $\pm 200\text{V}$  precision power supply. The voltmeter is characterized by 340 ppm reading + 56 ppm range accuracy in the 10V range, as well as 100 $\mu\text{V}$  resolution[1]. The power supply’s accuracy is 0.055% of set voltage + 20mV [2]. Each of the listed devices exists in a quasi-Eurocard compatible standard. Each of the cards is detected automatically and requires no intervention. The whole system is operated by custom software that allows versatility and provides SCPI drivers for non-EuroMeasure devices.

## References

- [1] J. SOBKÓW Master’s Thesis, Wrocław University of Science and Technology, 2024 p. 15
- [2] J. SOBKÓW Master’s Thesis, Wrocław University of Science and Technology, 2024 p. 28

C:Vacuum Microelectronic and Nanoelectronic Devices  
A2:Vacuum-Microelectronics and Vacuum-Nanoelectronics Technologies  
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