

Generic Instrumentation Toolbox

A reconfigurable, domain-specific toolbox for the rapid prototyping of microfluidics solutions.

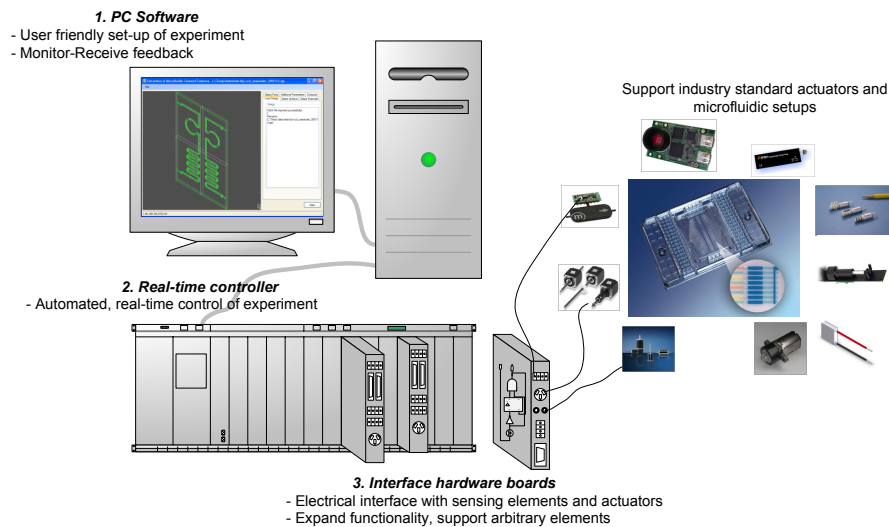
The toolbox (i.e. a parameterized set of tools) provides researchers and instrumentation professionals with the means to perform rapid-prototyping of different solutions with minimal effort in a domain-specific manner without having to deal with generic platforms and tools.

The Generic Toolbox consists of three primary submodules: *the application software*, *the Real-time controller* and *the electrical interfaces (interface hardware boards)*

The *application software* runs on a typical PC, providing user-friendly access to a flexible description of the assays to be executed and the configuration on which to execute them. It is based on an extensive open language, called AssyML (Assay Modeling Language). The user may define the protocol of the experiments, monitor and control the progress and the outcome, associate various actuators and sensing elements, define and process the geometry and characteristics of new microfluidic chips.

The *Real-time experiment controller* monitors and controls the operation of the actuators and sensing elements of the system in real-time. It is based on machine vision technology allowing for the automatic control of the movement of liquids in the chip by sensing their position, speed and volume.

The toolbox supports a modular expansion of its functionality by plugging various *electrical interfaces* with sensing elements and actuators, based on the customer specific needs. The company will develop and distribute several interface hardware boards covering the majority of the application domains. The user can select the appropriate for his/her application boards and may purchase additional in the future to support new applications. In addition, the company offers services for designing customized interface hardware boards for covering specific customers' needs.



Components of the Generic Toolbox

The toolbox offers concrete and substantial advantages to users, having the following **characteristics**:

- **Generic**: supports easy integration and control of "virtually" any actuator and sensor.
- **Specialized**: comes with out-of-the-box support of typical actuators and sensors most commonly used in the biomedical market.
- **Configurable**: Setup and adjust the control and parameters of devices attached to the system.
- **User-friendly**: design and setup experiments and assays utilizing actuators and sensors connected on the system through a user-friendly graphical interface. No specialized electronics or software background is required.
- **Modular**: comes with a wide list of expansion modules supporting different application domains (motor-controls, syringes, pumps, etc.). Select your target application and acquire the appropriate hardware expansion modules to support it. If your target domain changes expand with appropriate modules. Reconfigurable firmware and software ensures plug-and-play functionality of the modules.
- **Scalable**: Add several modules or connect several generic-toolboxes together.
- **Flexible**: Setup any experiment and have the real-time controller reconfigured to execute it.
- **Powerful**: Execute several parallel operations (e.g. control of several PIDs and closed control loops), computational intensive tasks (e.g. machine vision for fluidic control) and data post processing real-time on the reconfigurable hardware platform.

The **market** for the Generic Toolbox involves:

- Research institutions working towards the development of new assays for various molecular and other diagnostic tests.
- Instrumentation companies that develop complete biomedical instrumentation solutions, which involve micro-fluidics components.
- Research departments of pharmaceutical companies.