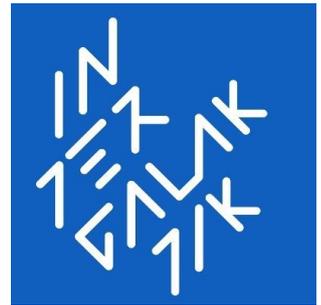


Production testing automation for open hardware ULX3S board

The Customer

ULX3S FPGA development board is designed and manufactured in Croatia as a result of cooperation between the Radiona.org makerspace, the [Faculty of Electrical Engineering and Computing \(FER\)](http://Faculty of Electrical Engineering and Computing (FER), University of Zagreb), University of Zagreb and [Končar-INEM](http://Koncar-INEM). The ULX3S board was designed by Radiona's member Davor Jadrijević in response to the need for a compact, robust and affordable development FPGA platform equipped with a balanced range of built-in additional components and expansion ports, while fully covering the needs of the "Digital Logic" course at FER. Following the successful Crowd Supply campaign, [Intergalaktik d.o.o.](http://Intergalaktik d.o.o) took over the further production and distribution of ULX3S boards.



The Challenge

For ULX3S boards testing, there was a so-called "self-test" firmware that checked the functionality of sections such as ADC, DAC, switches, keypad, SDRAM, RTC, LEDs, SD card, Flash memory, etc. The test results were displayed on a connected monitor and via the serial port. However, the self-test was used only after the PCBA contractor delivered the finished ULX3S boards, so all subsequently found problems could not be corrected immediately in production, but defective boards had to be returned for repair, which slowed down the production cycle and made it more expensive.

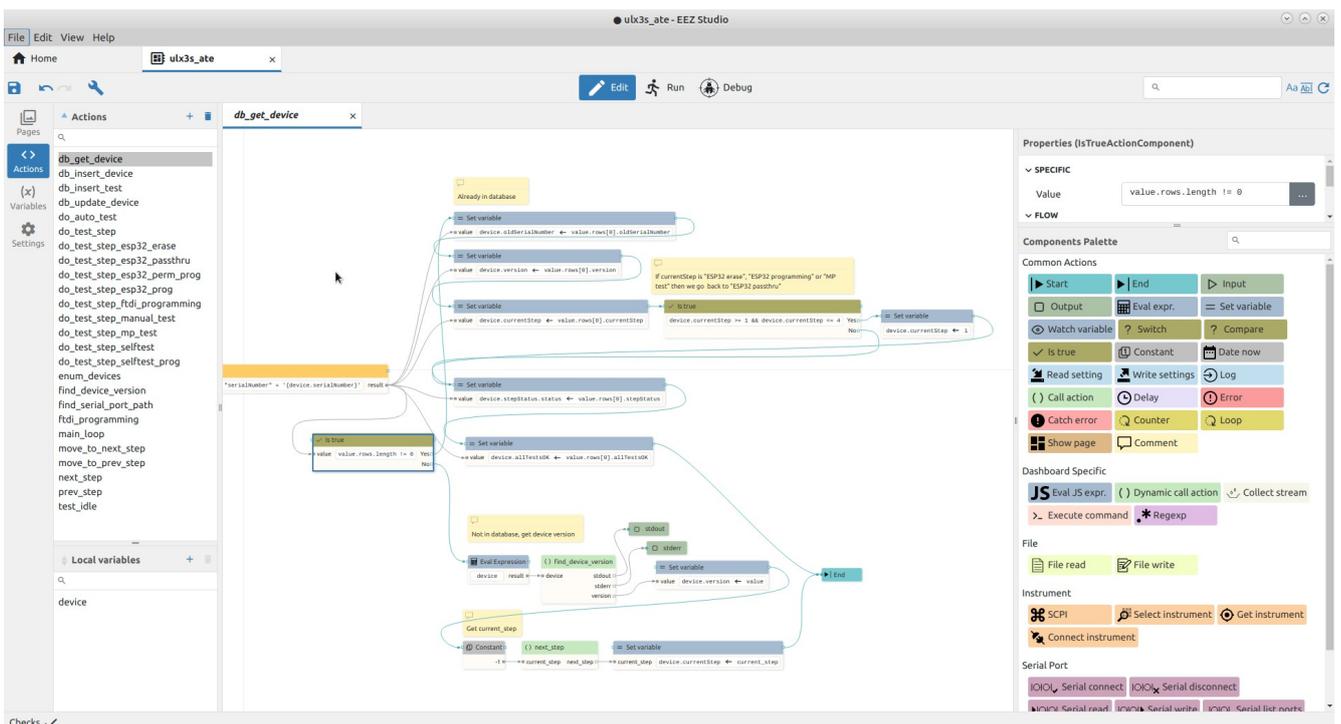
The use of the self-test procedure in production is a problem because it requires advanced knowledge of the ULX3S board, as well as certain preparatory actions. Additionally, even if the production tester is adequately trained, the self-test command line interface leaves more room for human error which increases the chance that the boards will not be properly tested.

A simpler, GUI-based test procedure is preferred with storing all relevant data and test results in one place in order to speed up the whole process and reduce the possibility of error due to the human factor.

The Solution

Selected EEZ Studio is an open source cross-platform (Linux, Mac, Windows) low-code development tool that enables programming and management of Test & Measurement (T&M) equipment using various interfaces and standardized SCPI commands.

Recently added flow editor, offers quick creation of test scenarios using flowchart like visual programming (i.e. flow).



Widgets:

- Terminal
- Markup document viewer (Help page)
- Various standard widgets (e.g. buttons, checkboxes, input fields, etc.)

Business results

Testing automation has enabled faster testing, more reliable ULX3S boards data collection as well as reduced testing costs. The boards delivered by the PCBA contractor do not require additional testing, which shortened the delivery time to end customers. Created EEZ Studio *flow* can be easily upgraded and modified to test future versions of ULX3S but also new [ULX4M](#).

