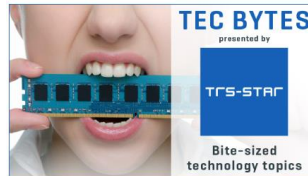




TFS-STAR

## Components & System Solutions

Smart sensor emulation for FPGA based systems



electronics4U

With the TEC BYTES webinars, TRS-STAR offers you bite-sized technical tidbits.

TRS-STAR customers are cordially invited to this free training opportunity.



<https://www.trs-star.com/en/mediathek/webinars>

## On-Demand Webinars require registration Tec Bytes on YouTube does not require registration

### On-Demand Webinars



#### Introduction to FPGA design with Efinix

Presenter: FH-Prof. DI Dr. Markus Pfaff (CEO & Co-Founder P2L2),  
Andreas Schwarztrauber (CEO TRS-STAR)

Language: English

PDF Flyer

Register

### Tec Bytes on Youtube



#### Design Flow (Tutorial)

Presenter: Harald Werner

Duration: 0:21:56 h

Language: English

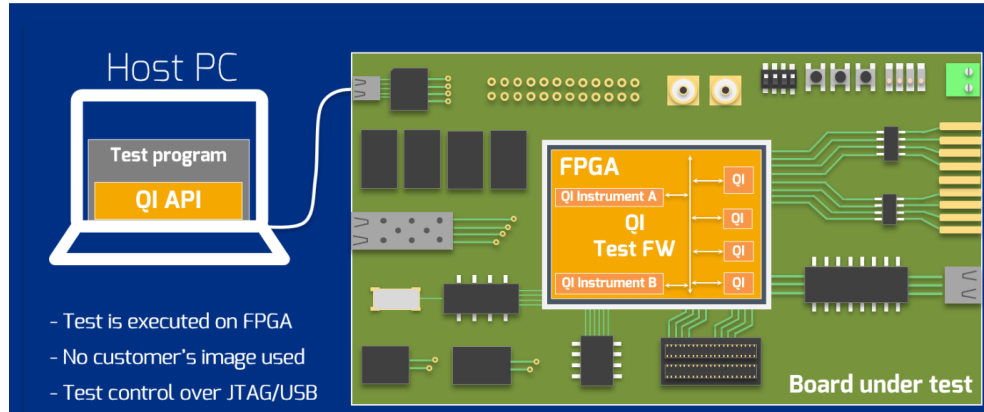
## Introduction to Quick Instruments



### Quick Instruments

#### Test framework for FPGA board quality control

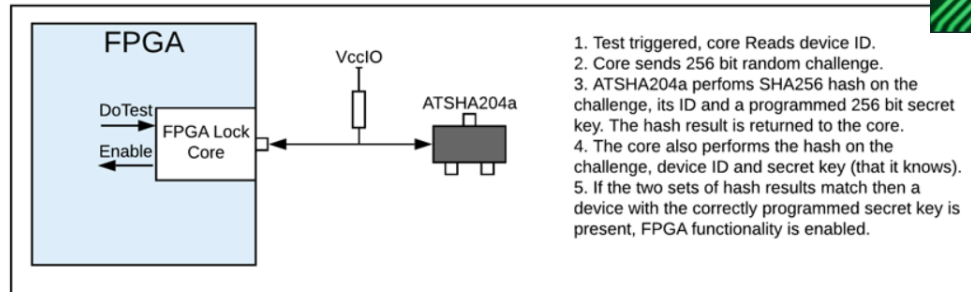
**Quick Instruments (QI)** is a test & measurement framework that loads itself into on-board FPGA for test, validation or programming purposes. The role of instruments is to verify PCBA hardware infrastructure: on-board interconnections and communication with peripheral components. In this way, every PCBA board can be checked for defects and stability issues. All instruments are pre-compiled for a target board and are being executed from test platform using predefined templates.



## Prevent Overbuilding and secure your design with the FPGA Lock IP

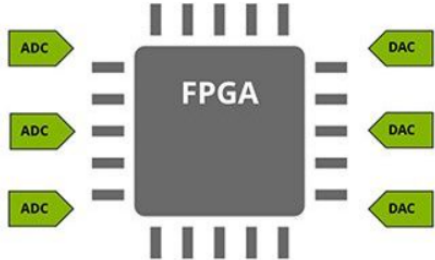
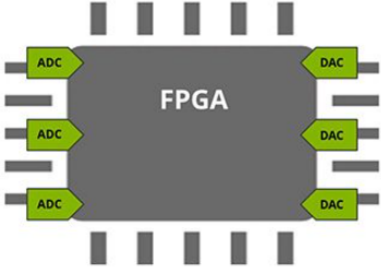
The FPGA Lock is a small FPGA IP core that prevents overbuilding and cloning of your FPGA-based systems and consequently protects your revenue. It can also be used to guarantee hardware integrity in Safety Critical, Medical or Military/Defence applications.

 Nial Stewart Developments Ltd  
FPGA & High Speed Digital Design



## Implementing ADCs and DACs in digital FPGAs



Standard Approach	MLE Mixed Signal FPGAs
<ul style="list-style-type: none"><li>• Discrete active components required to extend the FPGA with analog I/Os</li><li>• Increased parts count and PCB footprint</li><li>• Additional effort required to ensure simultaneous time-synchronous data processing</li></ul>	<ul style="list-style-type: none"><li>• No active peripheral components, analog I/Os are directly integrated into the FPGA</li><li>• Reduced parts count and PCB footprint</li><li>• Enables simultaneous and time-synchronous sampling, direct and straightforward</li></ul>
	



## SmartWave

Communication (I2C,  
SPI, UART, GPIOs)

Emulation  
(corner cases)

## Demos

FPGA + Sensors

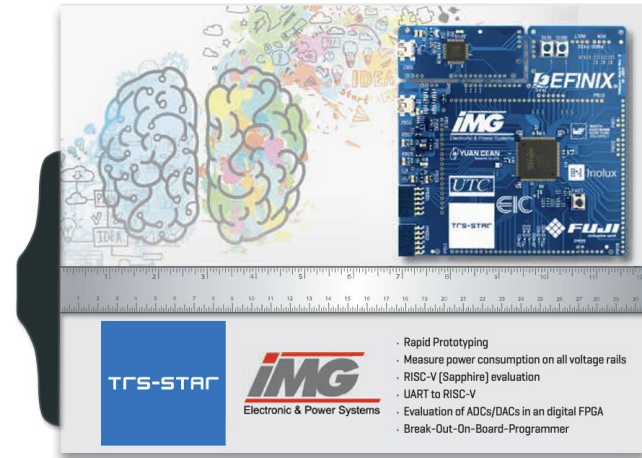


## Timeline:

- NOW T\*Square T20-100 Education Board\*
- NOW T\*Square T20-144 Education Board
- 11/24 T\*Square Ti60-256 Education Board  
\*) with 16 Mbit integrated SPI-Flash
  
- Rapid Prototyping
- Measure power consumption on all voltage rails
- RISC-V (Sapphire) evaluation
- UART to RISC-V
- Evaluation of ADCs/DACs in an digital FPGA
- Break-Out-On-Board-Programmer

TFS-STAR

Be creative with T\*Square Boards





# Where to find more information

<https://www.trs-star-shop.com/index.php/en/fpga-en/evalboards-en/product/t-square-t20-144-education-board>

## TFS-STAR



## FPGA

Eval-Boards



T\*Square T20-144 Education Board

UVP: ab 59,99 €  
(71,39 € inkl. MwSt.)



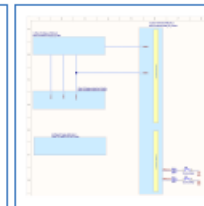
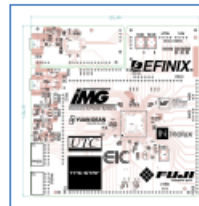
Product brief

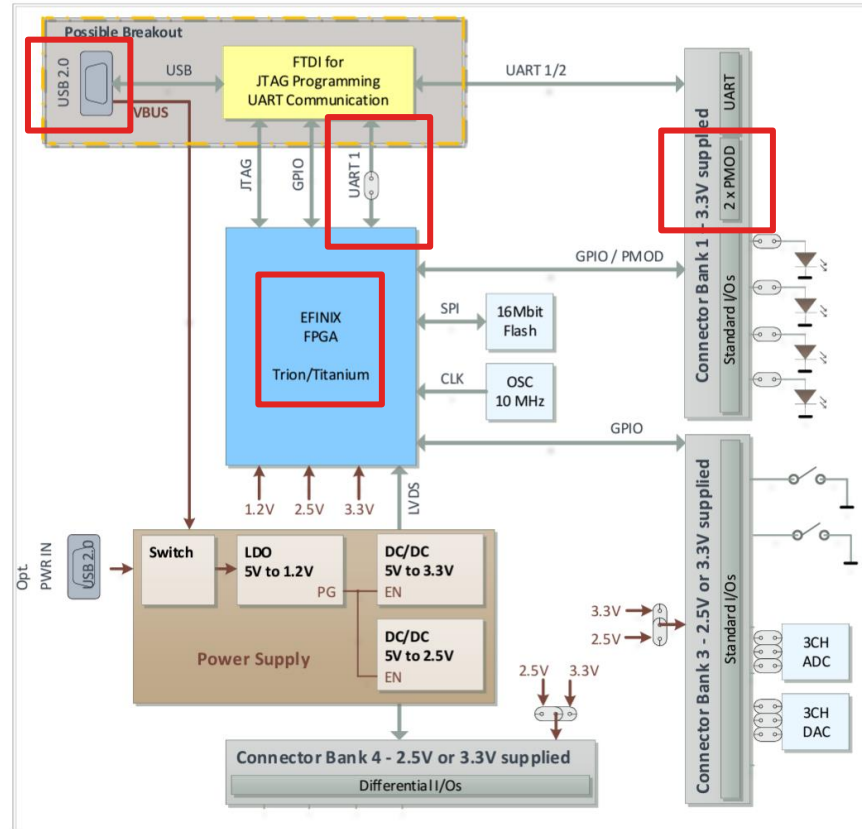


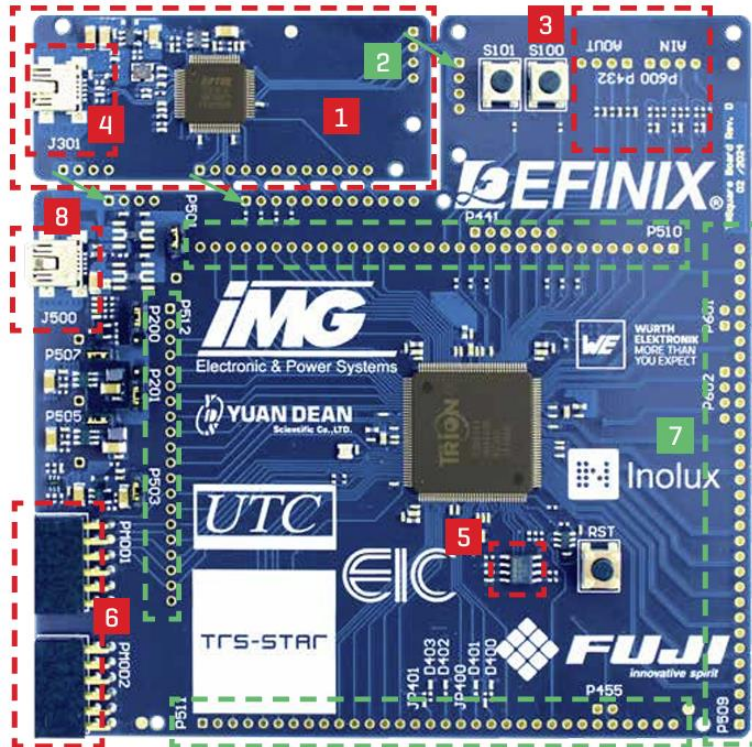
Product Documentation



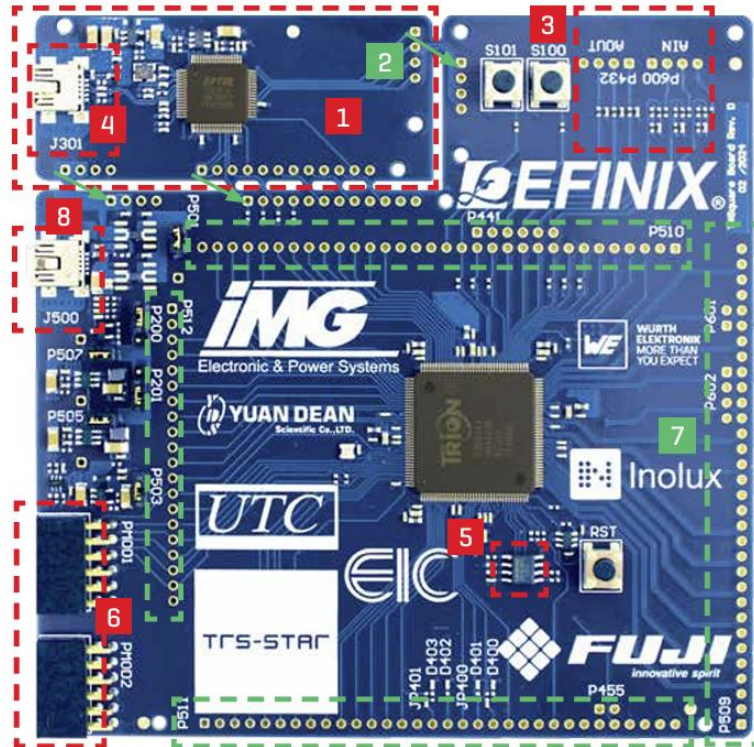
Reference Design







- 1 Break-Out-Board with Programmer  
Break-Out to use it for your own boards
- 2 There is still the option to continue to use the programmer in combination with the T\*Square Education Board
- 3 External R-C-circuitry allows implementation of ADCs and DACs in a digital FPGA, using LVDS-Buffers for sigma-delta-ADCs
- 4 A UART allows communication with the RISC-V Sapphire Soft-Core that can be implemented in the FPGA Core fabric



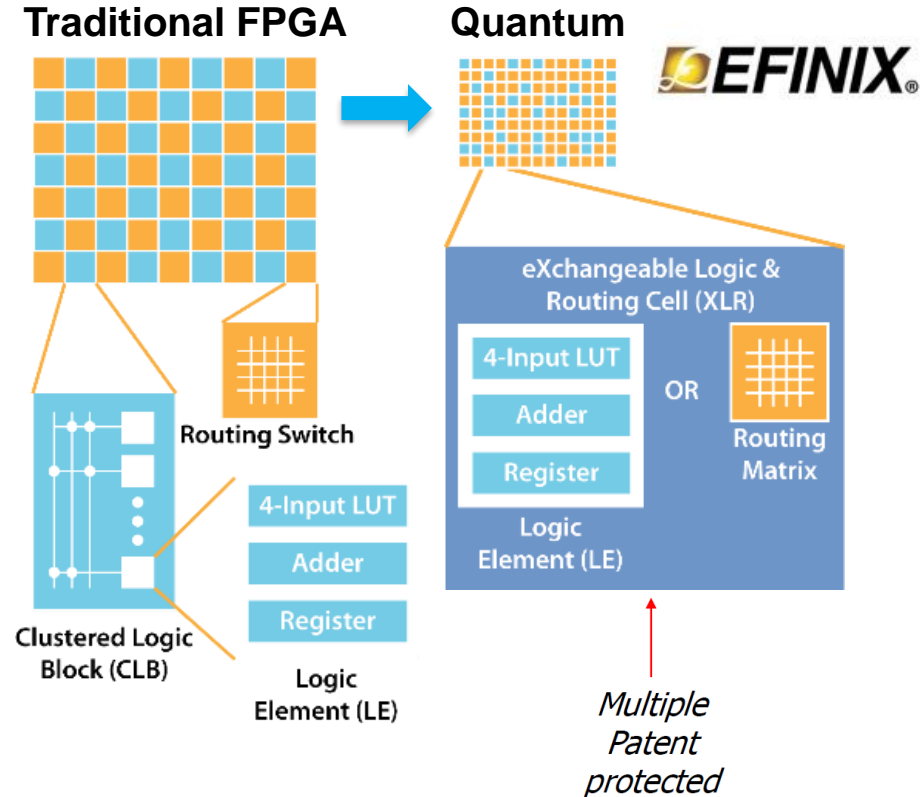
- 5** The PCB allows to mount either 100-pin LQFP [with integrated SPI-Flash] or 144-pin LQFP [with external SPI-Flash]
- 6** 2 x PMOD interfaces allow attaching PMOD daughter cards
- 7** Post connectors [included, but not mounted] can be mounted on the top or bottom of the T\*Square education board to connect your own basedboards or daughter cards
- 8** Alternative USB-Connector for Board Power Supply, when Break-Out-Programmer [1] is removed

## Quantum FPGA Technology from Efinix

XLR eXchangeable Logic or Routing Cell  
(the decision is made at compile time)

### Resulting in Advantages over traditional FPGAs

- Optimal resource usage -> smaller dies
  - ✓ Cost benefit
  - ✓ Small packages -> less PCB real estate -> compact systems
  - ✓ Less transistors, shorter routing -> **less Power Consumption** -> less cost
- 7 layers of metal vs. 12+ layers -> reduced NRE cost
  - ✓ Cost benefit, **more flexibility to adjust to customer needs**
- Single architecture scalable to 1 Mio+ LEs
- Standard process and Silicon process agnostic
  - ✓ Could be transferred to other fabs
  - ✓ **Short Leadtimes, even during allocation!**



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Language: English



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