Keysight Technologies
Flashing Station

Dedicated Platform for Flash Programming
of Industrial and Automotive Devices

Technical
Overview

Keysight's flashing station for programming
of industrial and automotive devices:

– Reduces cost of flashing
– Enables flexible flashing strategy and optimized line balance
– Saves flash programming time
– Wide range of supported target chips
– Flexible generic fixture platform
– Easily expandable
– Open system platform
– Turnkey solution
– Multi-UUT Flash-Sequencer software
– Flash-Sequencer software
– Reduced complexity
– Use in production
– Open interface to data bases and device control flow

KEYSIGHT
TECHNOLOGIES

Where to Program?

The purpose of flashing solutions is to program chips on the board-based target device (e.g. startup EEPROM storages) either by direct pin access of the chips' boundary pins or by utilizing the processor on the target board. Depending on the target device, the boundary scan architecture (JTAG) might alternatively be used for programming tasks. The success of programming gets verified through calculation of the checksum.

There are many possible locations to program the target device in the production line – which leads to the question: which one may be the most efficient? The answer to the question cannot be given in a simple postulate. It is dependent on the current application and includes considerations that have effects on the design of the production line and its logistics.

Table 1 shows the pros and cons of where to program. This may help the user to make decisions and/or to define a flashing strategy.

A flashing strategy does not have to be a static decision for one or another specific test step but may be very flexible and dynamic to be optimized according to production and specific product requirements.

Having a separate flash station can allow for both in-circuit test and functional test resources to be balanced. There can even be a dynamic balance when using the same flash programming components and methodology both on the ICT and the flashing station.
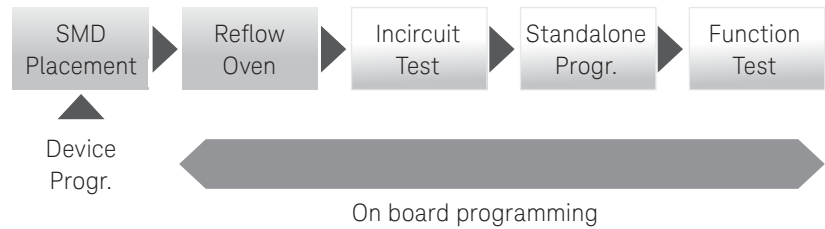

Figure 2. A schematic view of various key steps along a production line

Table 1. Pros and cons of where to program.

	Pro	Con
Chip-level pre-programming	– Direct access – No design limitations – Easy implementation – No disabling, no PCB conditioning	– Storage and logistics – Not flexible – Handling, UUT care required – Higher failure rate – More capital is bound in production
In-circuit test	– Saves additional test step – ICT ensures electrical test of board before flashing – Fixture with access to all probed nodes – Optimal usage of all fixture resources. – Panel or multi-UUT flashing possible	– Might require additional ICT tester capacity to meet line beat rate – Might require dual-stage fixture – Might require additional means (beyond standard ICT requirements) to ensure signal fidelity and robustness as well as repeatability – Can be complex to implement and support – Additional means and logistics to re-flash (customer/application-specific)
Standalone Flash Station	– Dedicated station with focus on optimized and robust setup for on-board flash programming – Simplified fixture concept with just the right resources and wires – Fixture can be leveraged from ICT fixture-generation process – Panel or multi-UUT flashing possible – Chip-level programming posible – Upgrade possibility to Functional Test Station	– Additional equipment – Additional process step – Additional floor space – Additional operations
Functional Test (FT)	– Might be just a simple add-on to FT fixture and test program – Saves additional test step	– Might require additional FT tester capacity to meet line beat rate – Might require additional means (beyond standard FT requirements) to cover flashing requirements

Keysight Flashing Station

The Keysight Technologies, Inc.Flashing Station-based solution comprises a system within a standard rack to be connected to a generic fixture platform.

The system's PC controller comes with the Test Exec SL Sequencer software which controls the flashing process and provides a programmer and operator interface. The basic instrumentations are the UUT power supplies, auxiliary power supplies for the flash devices and switching resources e.g. for automation purposes within the fixture. The system may contain further instrumentation in cases where functional tests are planned to be combined with the flashing process.

The fixture architecture has two elements: the Fixture-Base (containing platform support and flash instrumentation) and the UUT Adapters (both solutions are possible here: bed of needles or functional test adaptation).

This design encapsulates the position of the flash devices precisely at the place where they should be: in the base fixture. This allows the most flexible distribution of the expensive flash equipment on the production line and an assembly close to the UUT in order to guarantee short signal paths. Additionally this approach provides basic functionality for the integration of one or several flashing technologies.

The exchangeable UUT adapters allow easy administration of different UUTs. This framework architecture essentially ensures that the UUT elements and fixture base units can remain as distinct components in the entire system. This allows the cost of UUT adapters to be kept at a minimum and yet enable the UUTs to benefit from the functionality of the fixture base and test system.
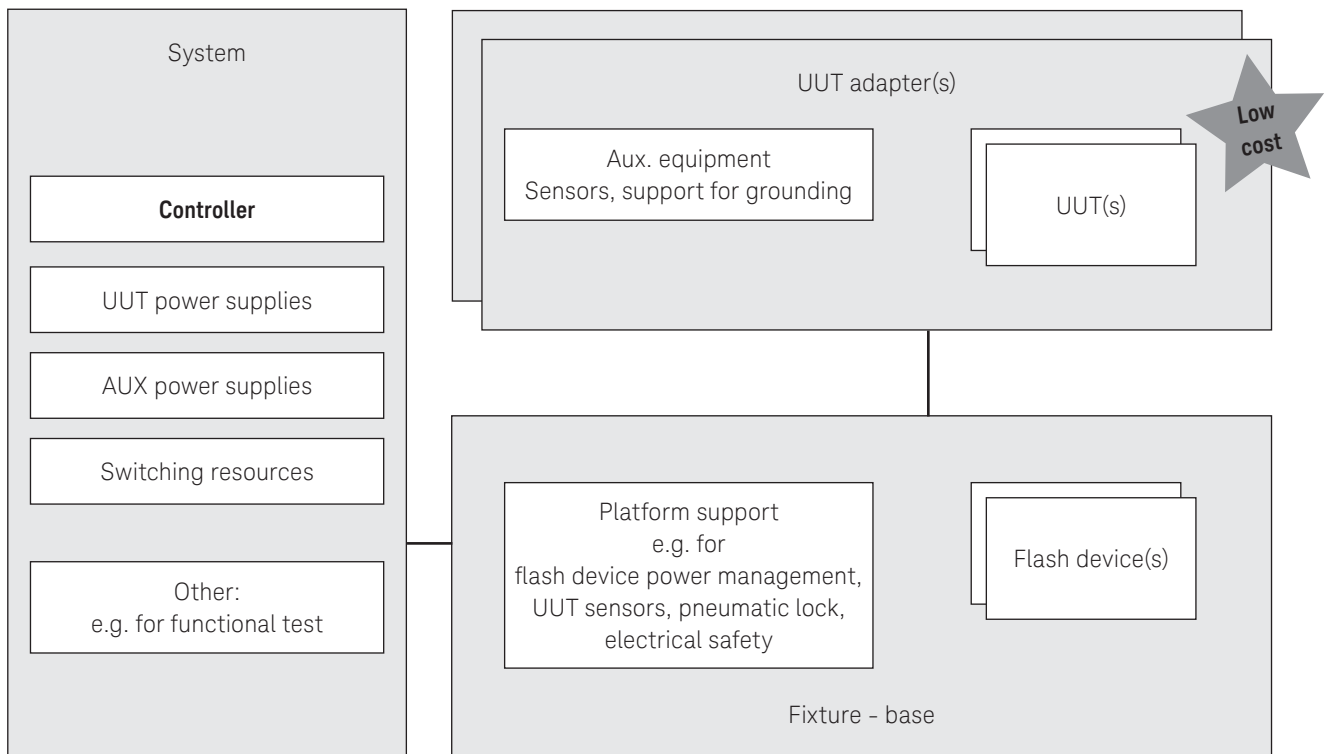
Figure 3. Architecture overview of the Keysight Flashing Solution

The Keysight TestExec SL Software Reduces Development Time

The TestExec SL software comes pre-installed on the industrial PC (IPC) and is ready to be uses for software development. It provides a complete test development and test execution environment which also allows you to organize and order tests, reconfigure the test parameters, profile the execution speed and debug tests. The software also provides an efficient and effective structure for developing the test plans and sequencing for flashing tasks.

Several key features in the TestExec SL help the user to reduce software development time:

1. The Flashing Station's topology and wiring are completely mapped to the TestExec SL software, enabling the user working on a UUT-centric abstraction layer with ease of test development.

2. Streamlined test execution is enabled by a simple hierarchical structure leveraging advanced executive tools which include advanced sequencing and test flow controls, as well as debugging tools.

3. Increased productivity is enabled by the throughput multiplier that enables parallel multiple-UUT flashing for higher throughput. The Test Profiler helps to evaluate and analyze post-testing performance.

4. Integrated test efforts are enabled by the Open architecture using Microsoft® COM standard for easy sharing. Data logging and reporting with customizable format for database systems are available.
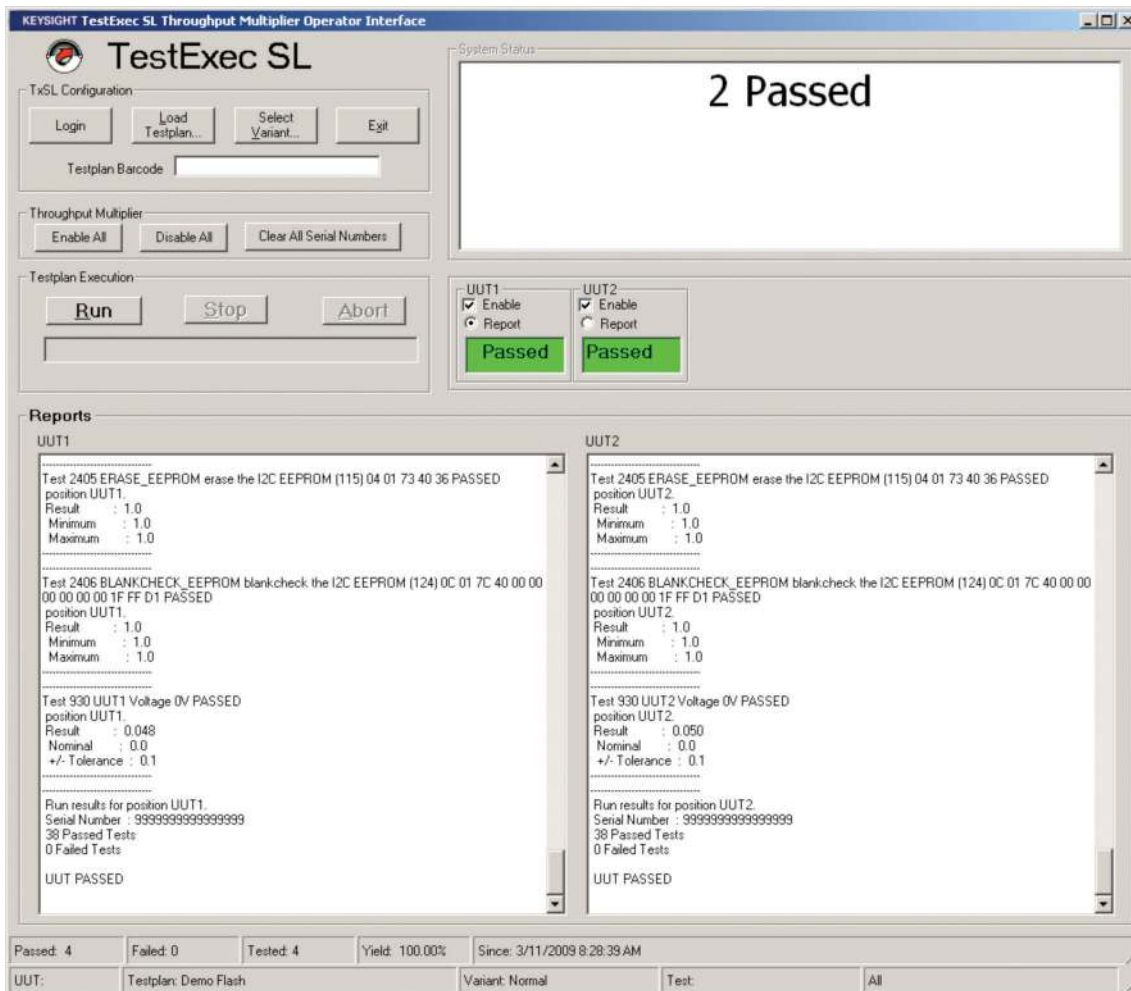

Figure 4. An example of a 2-UP operator user interface in parallel flashing mode

System Platform Overview

Keysight TS-5040 entry test system

– 0.75 m rack
– E3858A power distribution unit
– Rack fan assembly for 220 V system
– TS-5400 family industrial PC controller
– Microsoft® Windows® XP Professional
– TestExec SL software installed on TS-5400 controller

N6700B 600 W modular power supply mainframe options/modules	N6700B 400 W modular power supply mainframe – Large selection of plug-in modules: 50 to 300 W each – Up to four plug-in modules – Basic, low cost modules – High performance modules for UUT power – Precision modules for parametric needs N67xx modular power supply mainframe options/modules – N6700B – 400 W, four slot modular – N6701A – 600 W, four slot modular – N6702A – 1200 W, four slot modular
Custom options	– Additional hardware – Additional PC cards – Cables and/or PC board for UUT interface/interconnect – Custom mass interconnect – Other custom options as defined and agreed

For more information on functional test instrumentation, please consult the Data Sheet *Keysight TS-5040 Entry Functional Test Rack for System- and Self-Integrators* (literature part number: 5989-7943EN).

Fixture Platform Overview

Fixture base

– Generic Fixture Platform for multi-UUT testing
– 1-UP or 2-UP
– Pneumatic cover lock
– Counters: e.g. for needle actuation
– Preparation for four UUT power supplies per test position
– Roller station table with monitor mount
– Fixture base ID

UUT adapters

– Cover closed sensor
– UUT present sensor
– Adapter ID
– Test point grounding

Key Features and Benefits

Reduced cost of flashing	Fastest flashing solution through dedicated design, hard- and software
Saves flash time	Multi-UP fixture enables parallel fixture loading and parallel programming useful for parallel or dual well flash modes
Flexible generic fixture platform	Exchangeable low cost UUT probe plate enables a wide range of supported target devices. Use one platform for multiple projects.
Easily expandable	Prepared to support different flashing or programming technologies. Currently supported Program devices: CSMs UniCom II+, Spectrum Digital XDS510 USB Plus and i3070 flash cards. Architecture is open for additional custom solutions.
Open system platform	Possible to be combined with functional test
Turnkey solution	System, fixture, flash instrumentation, software and application engineering out of a single hand
Flash-sequencer software	TestExec SL relieves effort on software development. Provides Multi-UP Environment.
Reduced complexity	"Just enough" approach minimizes undesired side effects and increases ease of use and maintenance
Use in production	Robust system and fixture mechanics. Diverse utilities like pneumatic lock and UUT sensor prevent operator mishandling.
Open interface to data bases and device control flow	Text Exec Sequencer software provides an extensive ActiveX for remote interfacing and an open structure to include third party software libraries
CE compliant and EMC qualified	EN 55011:1998 + A1:1999 CISPR 11:1997 (mod.) + A1:1999, Group 1, Class A conducting emissions

Supported Target Families

The following list contains the currently supported target device families. For support of a certain device or device families currently not on the list, please contact Keysight. Keysight is continuously adding more devices to the list and can offer customized implementation models to suit your needs.

Supplier	Target Family
Freescale	HC705, HC908, S08, S12, S12X, HC12, ColdFire, PowerPC, ARM, DSP, Hybrid DSP
Renesas	R8C/Tyny, M16C, M32C, H8/300, H8/300S, H8SX, SH2, SH3
ST	ST10F, ST72C, ST72F, ST72Lite, ST9, ST10, ARM7, uPSD, DataFlash, EEprom
Microchip	PIC12C, PIC12F, PIC16C, PIC16F, PIC18F, EEprom
NEC	78K0, 78K0S, 78K0R, V850ES, V850E1, V850E2
TI	MSP430, TMS320, TMS470
Atmel	AT Tiny, AT Mega, AT90, AT8x (8051based), AT91SAM, EEprom, AT26, AT45 DataFlash
Infineon	C166, TRICORE, EEprom
Fujitsu	MB95, MB90, MB91
Samsung	SAM8RC, SAM8RCRI, CALM16, EEprom, Nand Flash
AMI	ASIC with Flash
Micronas	CDC16

Key Specifications

Rack size	0.6 m width x 0.75 m height x 0.95 m depth
Power	230 V AC, single-phase, 50/60 Hz, 15 A max
Conformity	Complies with EN 55011:1998 + A1:1999 CISPR 11:1997 (mod.) + A1:1999, Group 1, Class A conducting emissions

Contact/Pricing/Custom Solutions

This brochure provides basic information about the Keysight Flashing Solutions. Please contact Keysight's Systems Solutions team for more detailed discussions, to request pricing information and talk about customized applications.

myKeysight

www.keysight.com/find/mykeysight
A personalized view into the information most relevant to you.

www.axiestandard.org

AdvancedTCA® Extensions for Instrumentation and Test (AXIe) is an open standard that extends the AdvancedTCA for general purpose and semiconductor test. Keysight is a founding member of the AXIe consortium. ATCA®, AdvancedTCA®, and the ATCA logo are registered US trademarks of the PCI Industrial Computer Manufacturers Group.

www.lxistandard.org

LAN eXtensions for Instruments puts the power of Ethernet and the Web inside your test systems. Keysight is a founding member of the LXI consortium.

www.pxisa.org

PCI eXtensions for Instrumentation (PXI) modular instrumentation delivers a rugged, PC-based high-performance measurement and automation system.

Three-Year Warranty

www.keysight.com/find/ThreeYearWarranty
Keysight's commitment to superior product quality and lower total cost of ownership. The only test and measurement company with three-year warranty standard on all instruments, worldwide.

Keysight Assurance Plans

www.keysight.com/find/AssurancePlans
Up to five years of protection and no budgetary surprises to ensure your instruments are operating to specification so you can rely on accurate measurements.

www.keysight.com/quality

Keysight Technologies, Inc.
DEKRA Certified ISO 9001:2008
Quality Management System

Keysight Channel Partners

www.keysight.com/find/channelpartners
Get the best of both worlds: Keysight's measurement expertise and product breadth, combined with channel partner convenience.

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at:
www.keysight.com/find/contactus

Americas

Canada	(877) 894 4414
Brazil	55 11 3351 7010
Mexico	001 800 254 2440
United States	(800) 829 4444

Asia Pacific

Australia	1 800 629 485
China	800 810 0189
Hong Kong	800 938 693
India	1 800 112 929
Japan	0120 (421) 345
Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Other AP Countries	(65) 6375 8100

Europe & Middle East

Austria	0800 001122
Belgium	0800 58580
Finland	0800 523252
France	0805 980333
Germany	0800 6270999
Ireland	1800 832700
Israel	1 809 343051
Italy	800 599100
Luxembourg	+32 800 58580
Netherlands	0800 0233200
Russia	8800 5009286
Spain	0800 000154
Sweden	0200 882255
Switzerland	0800 805353
	Opt. 1 (DE)
	Opt. 2 (FR)
	Opt. 3 (IT)
United Kingdom	0800 0260637

For other unlisted countries:
www.keysight.com/find/contactus
(BP-07-10-14)

KEYSIGHT
TECHNOLOGIES