

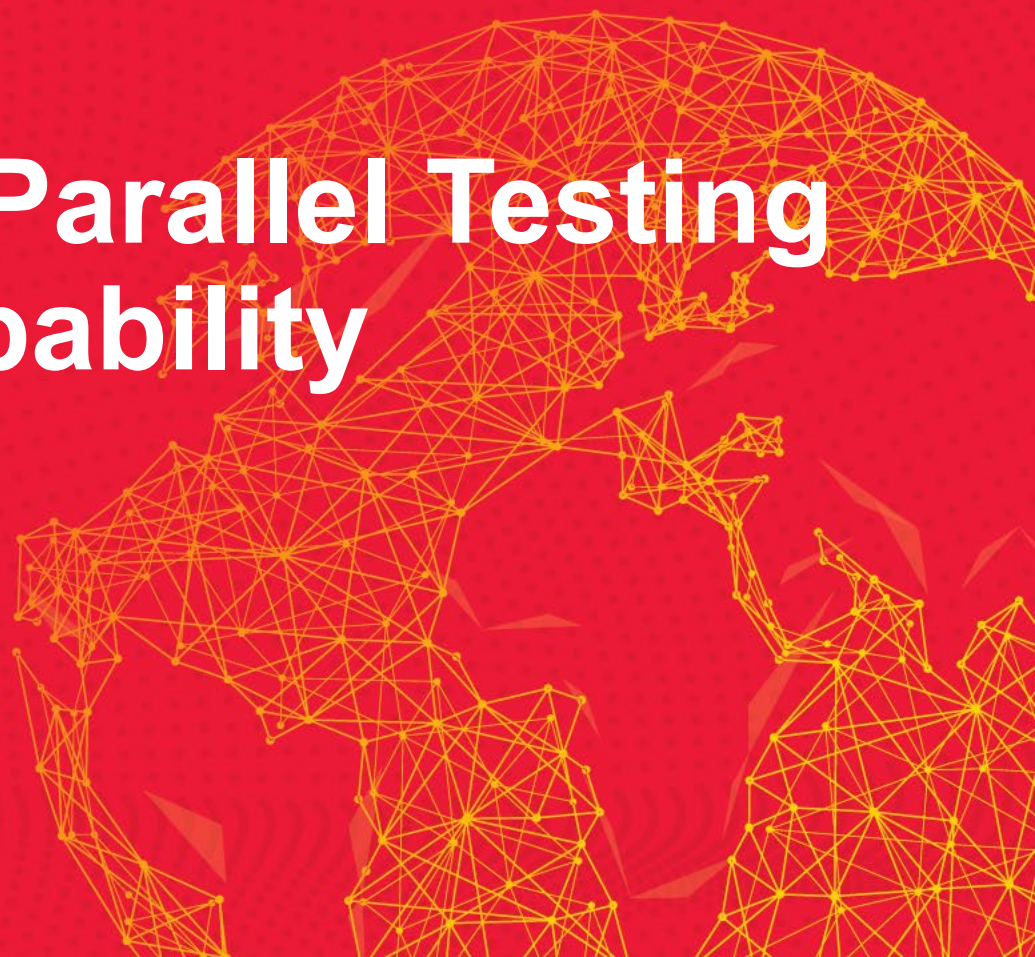


KEYSIGHT
WORLD 2019

The Next Generation of Parallel Testing with Functional Test Capability

AES Planner manager/ Keysight Technologies

Teong-Seng Koay



Trend as Opportunities

Increased use of panelized boards

- How many of you have seen customer's boards getting more and more units in a panel?

Pressure on production speed

- Is your customer's line speed getting faster and faster?

Dynamics of manufacturing

- Product mix getting higher and higher - are you getting more and more model changes?

Automation with functional test

- Integrating functional test into an ICT is common for simpler boards.
- With automated inline. What are the challenges?



Going Inline Automated



2010

Customized Inline
i1000D handlers
1200x700



2013

Small Foot Print
i1000D Handlers
850x900



2018

Keysight FlexiCore
Inline Handlers
850x1100

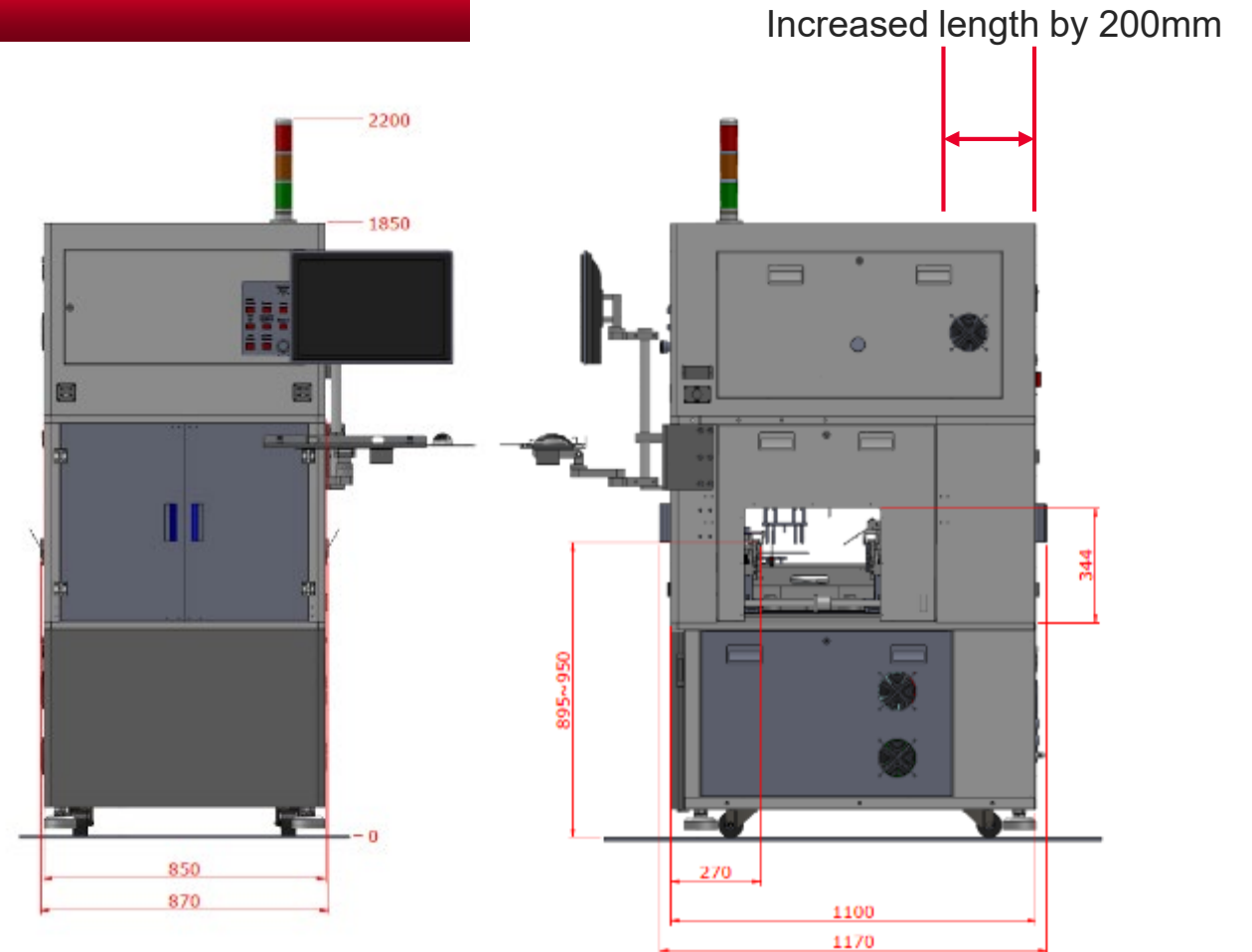
More than one hundred i1000 running automated inline testing

Introducing Keysight FlexiCore ICT System

SYSTEM DIMENSIONS



- No changes in height and width
- New monitor arm and keyboard tray



Keysight FlexiCore ICT System

SYSTEM OVERVIEW



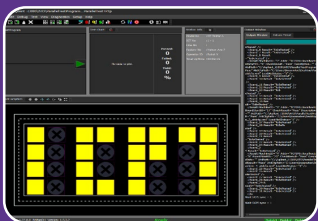
Parallel Test Architecture

- Higher Node Count than SFP today
- Flexible Parallel Test by 4



Functional Test Expansion

- Dual Stage for Top AND Bottom Fixture
- Built-in Instrument Rack



In-Circuit Parallel Test GUI

- Single Interface to control all modules
- Board graphics links directly into Schematics



Keysight FlexiCore ICT System

WHAT IT CAN MEAN TO YOU

Maximum Productivity

- Total node count of 2,560 nodes over 4 modules
- Modules can be combined or operated as standalone
- Automatic configuration upon test program load
- No physical hardware reconfiguration. Saves change over time

Minimum Hardware Cost

- Each Module supports up to 640 nodes
- Combined modules expand total node count by 2x or more
- No additional Control/Measurement cards required

Excellent Flexibility and Scalability

- True Parallel. Each module runs independently on single controller.
- Supports Heterogenous board types
- Modules combined or standalone runs in parallel

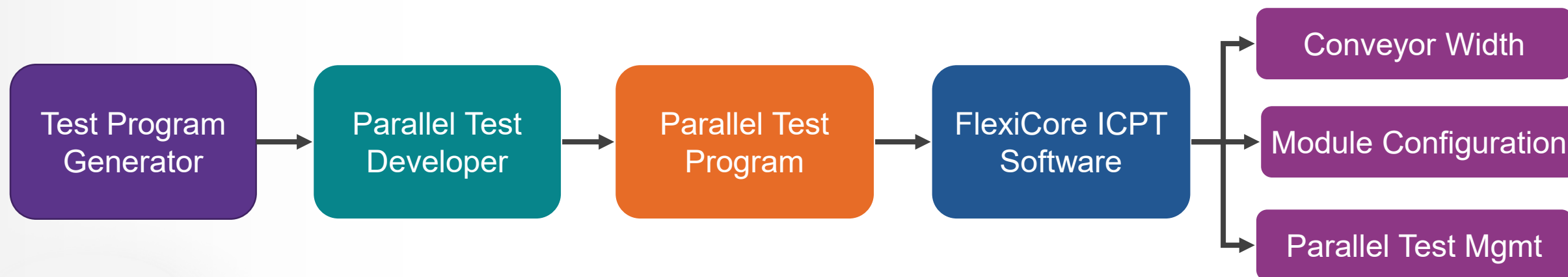


Keysight FlexiCore ICT System

MODULE CONFIGURATIONS

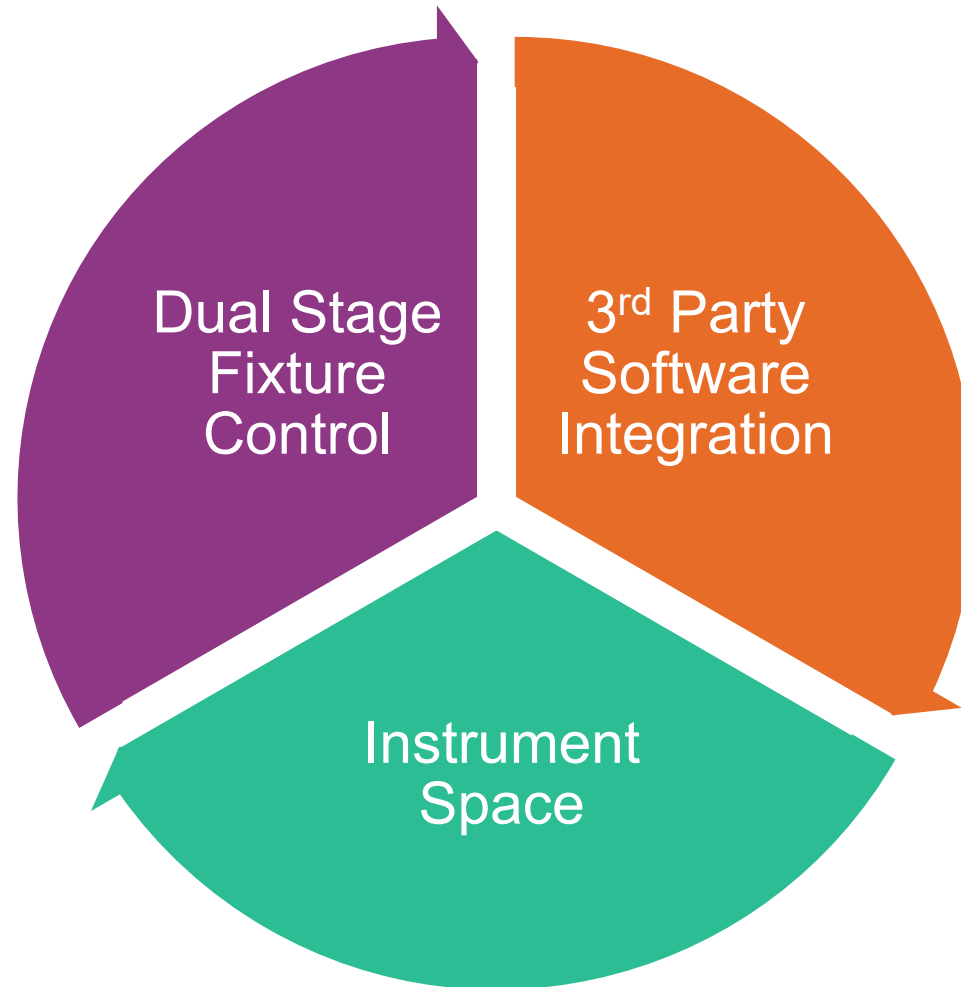
# of Test Engines	Module 1	Module 2	Module 3	Module 4
Single Core	2560			
Duo Core*	1920			640
Duo Core	1280		1280	
Tri Core*	1280		640	640
Quad Core	640	640	640	640

*Largest module must be at the front.



Keysight FlexiCore ICT System

GEARING UP FOR FUNCTIONAL TEST INTEGRATIONS



Ready for Functional Test Integration

HANDLER FEATURES

Pneumatic dual-stage press

- 1mm accuracy with newly designed pneumatic system
- ICT/FCT probes travel difference > 3.5mm

Dual stage fixture supports (Top and Bottom)

- Position Control press for Bottom Dual Stage
- Solenoid driver for Top Dual Stage

Automated conveyor width adjustment

- Conveyor width is recorded in the test program.
- When the test program is loaded, conveyor width is adjusted automatically.

Optimized for parallel testing operations

- SCPI-based handler control that can be controlled by TxSL or LabView

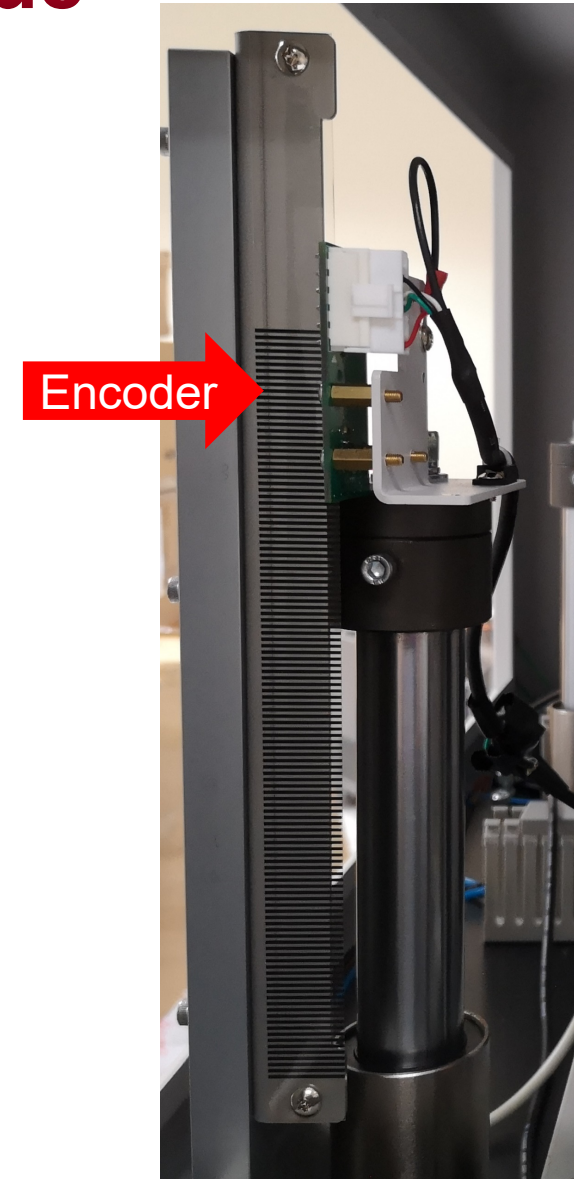
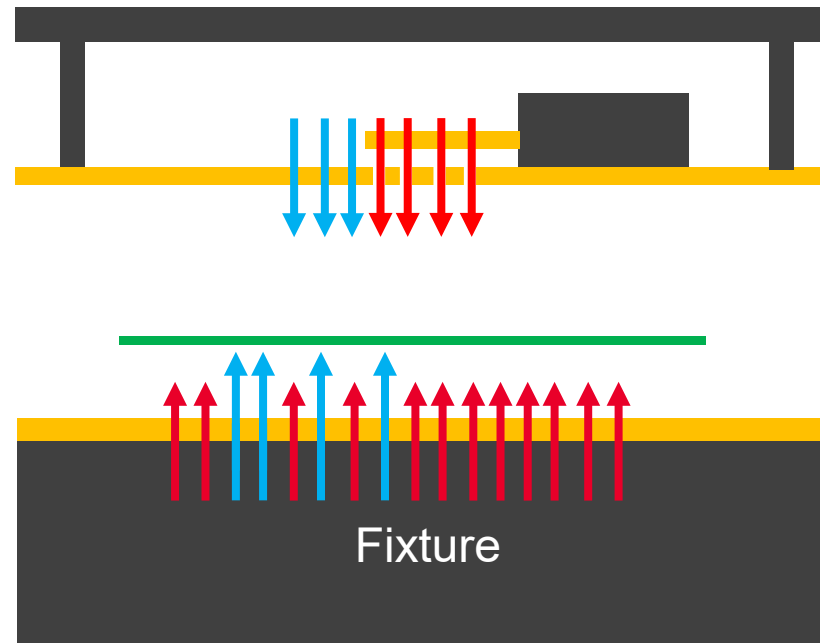
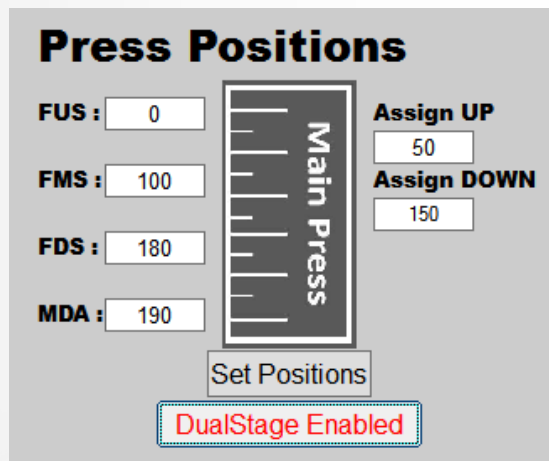
Space for functional test instruments

- Standard 19inch instrument rack included
- Up to 10U space available



Dual Stage Ready for Top and Bottom Side

- Dual Stage Enable
- Move Press to MDA
- Start Discharge + ICT test
- Move press to FDS
- Trigger Top DualStage
- Start FCT test + Discharge
- Move press to FUS

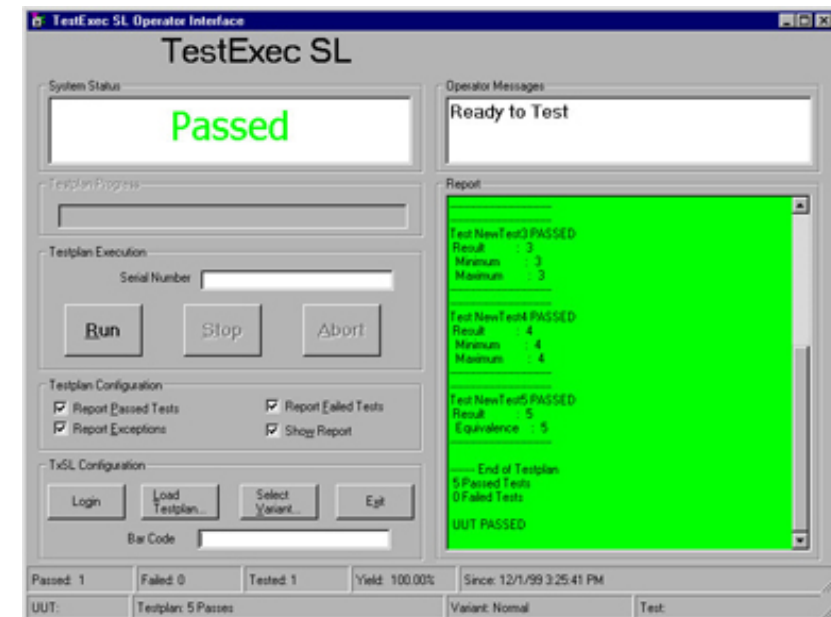
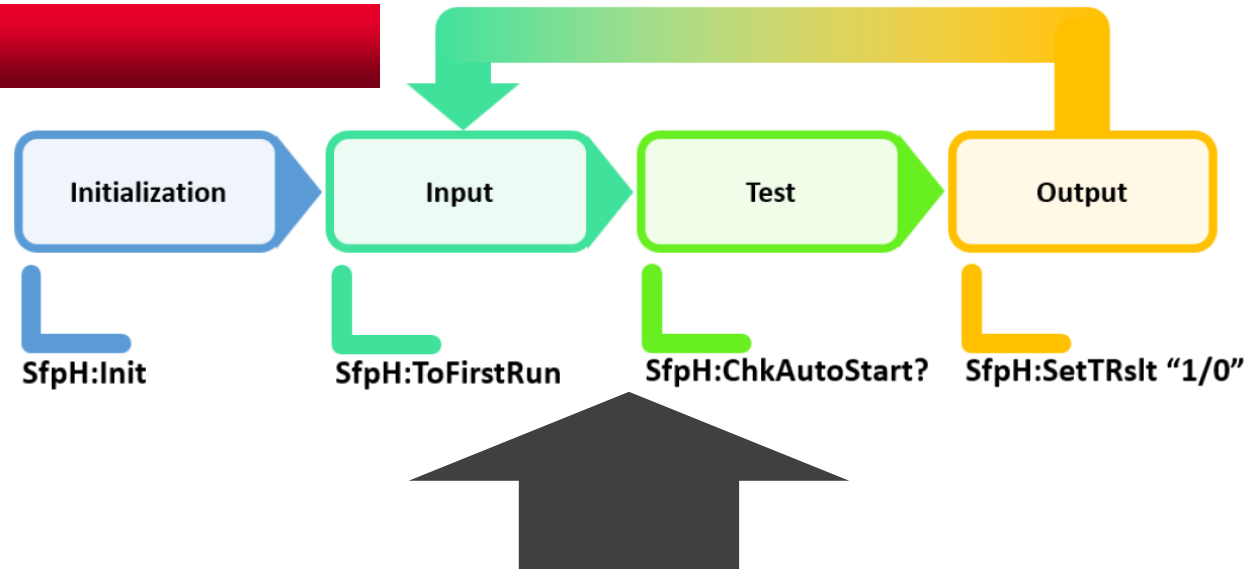


SCPI-Based Handler Control

HANDLER OPERATION CONTROL

- No worries about PLC programming
- SCPI commands provides an alternative way managing the test sequence via TxSL, LabView, etc.

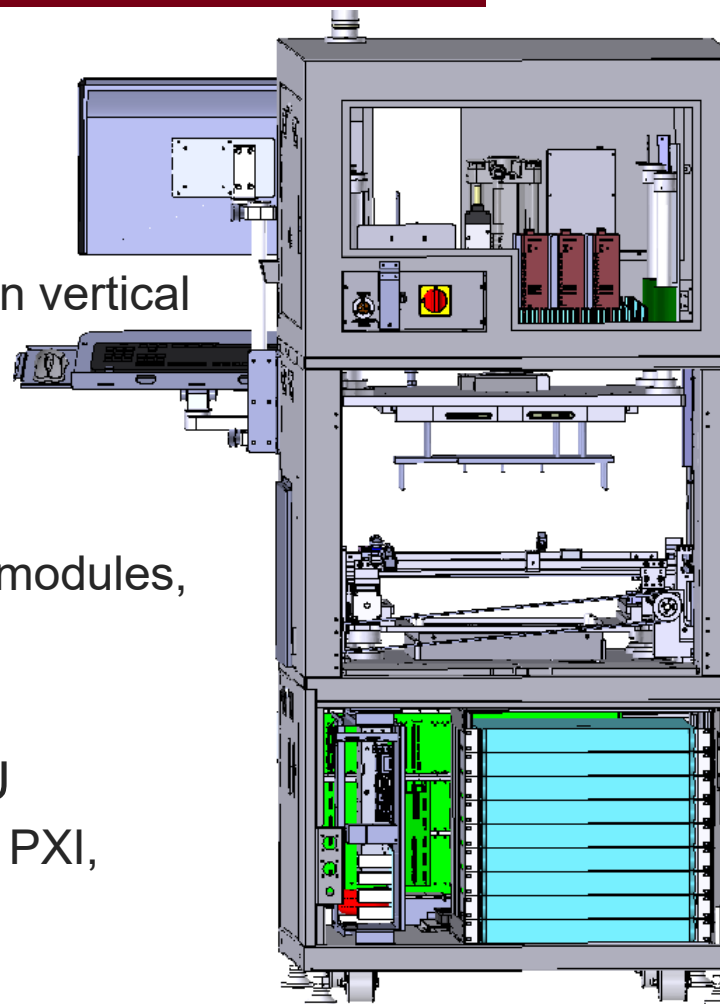
Commands	Explanation
*IDN	Identifies the handler
Init	Initialize the handler for loading
ToFirstRun	Initialize and start operation
CheckAutoStart?	DUT ready for test
ChkErr?	Check error status
SetTRslt	Set test results
RePress	Recycle press for retest



FlexiCore Parallel Test Chassis

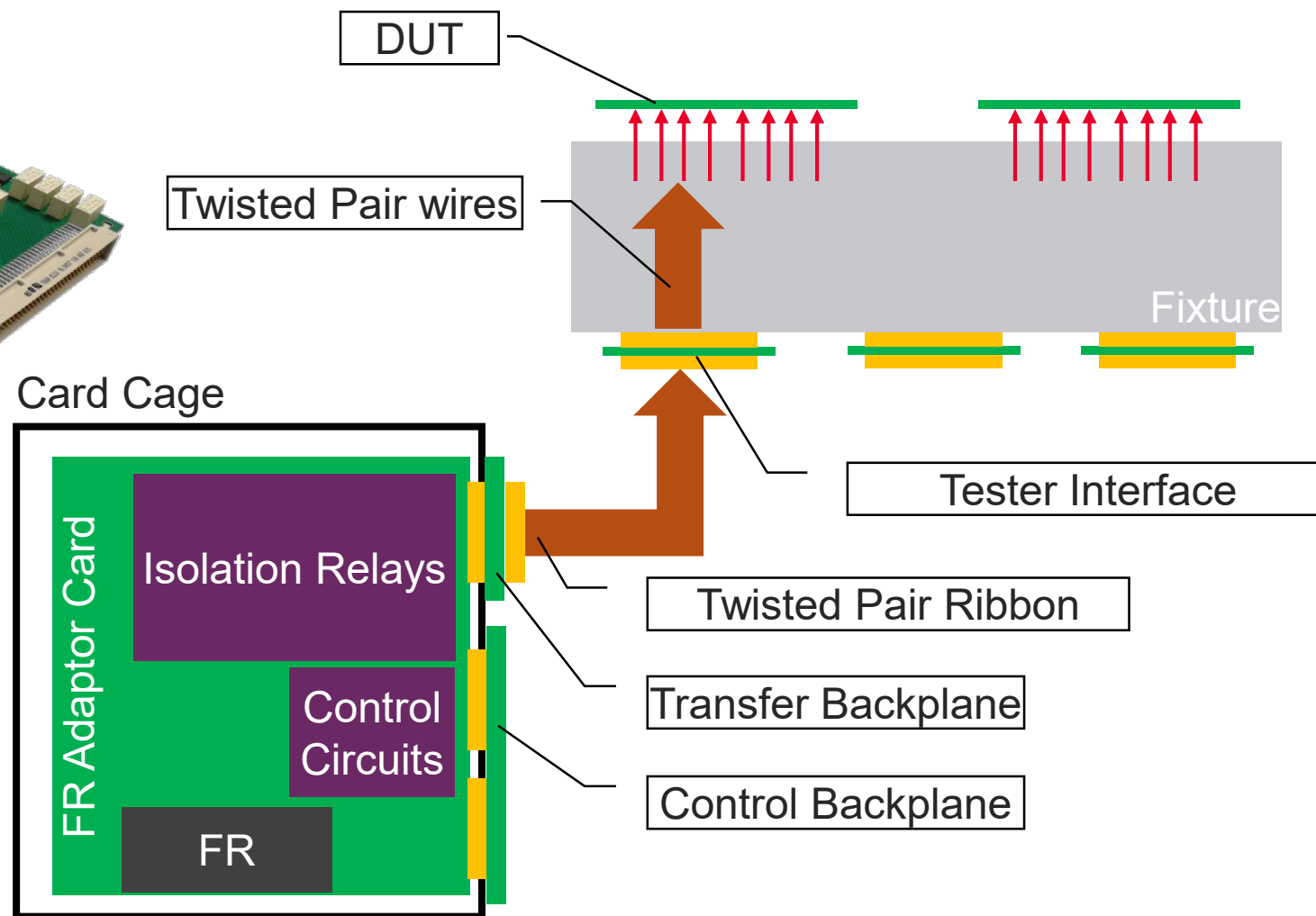
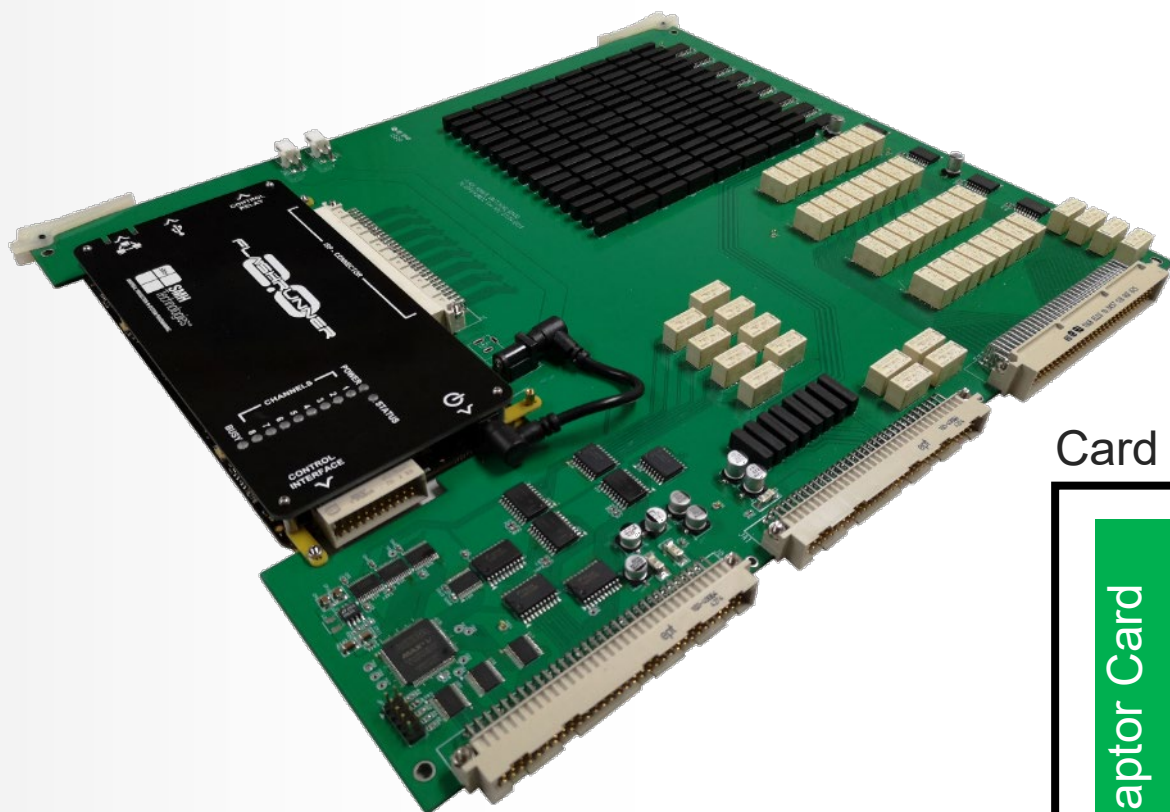
SPACE IS WHAT YOU HAVE

- Top section of the system
 - 200mm x 473mm x 500mm (H)
 - Half-rack instruments, 19-inch instruments in vertical
- Middle section of the system
 - 320mm x 700mm x 500mm (H)
 - Potential instruments - Flash programming modules, LED test modules, communication modules
- Mounting rack - power socket, breaker, 10U
 - For standard 19 inch instruments (DUT PS, PXI, Counter, E-Load, DMM)



FlashRunner Adaptor Card

FLEXICORE INTEGRATION



FlexiCore Flash Station

HANDLER CONTROL PANEL

3rd Party software (TestStand,etc) controls system operation through Handler Control Panel Application.

Operations controlled through **Handler Control Panel** application

- DUT Handling
- Fixture ID using RFID
- FlashRunner Adaptor card switching

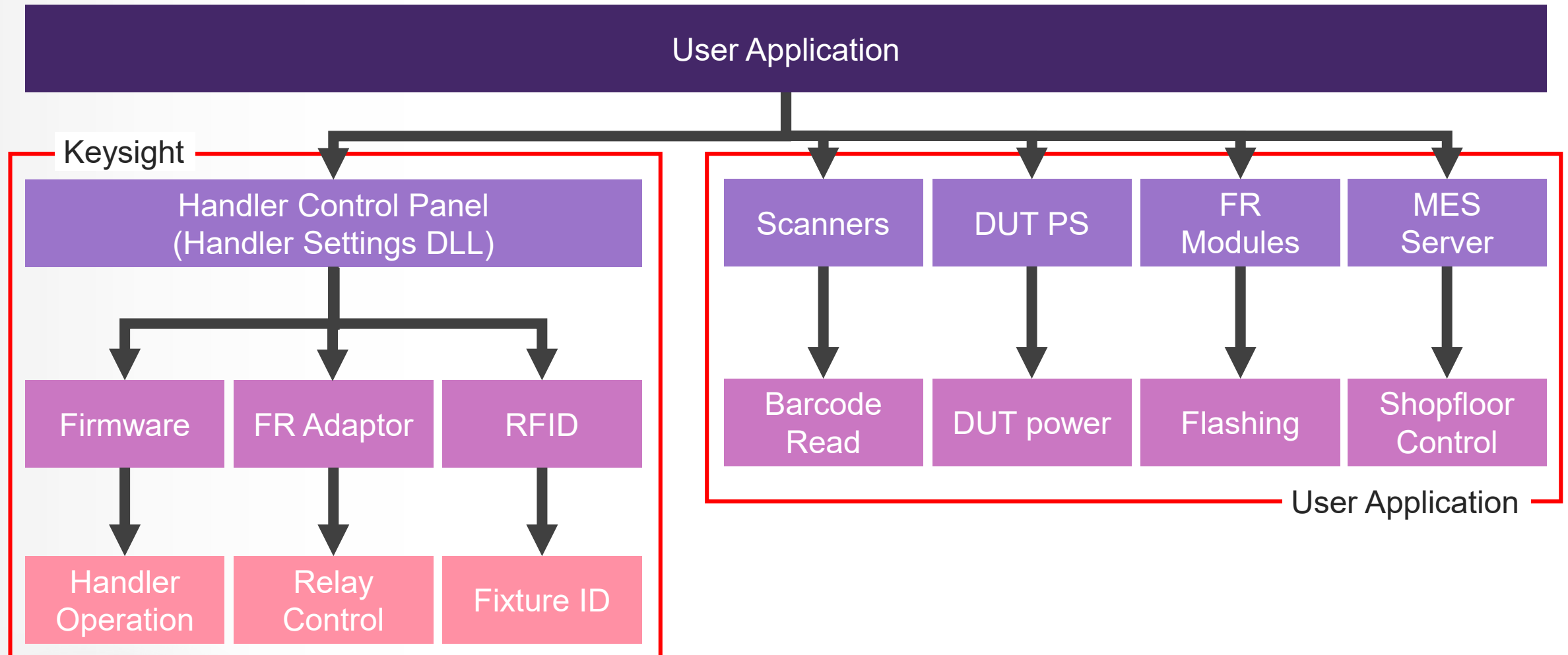
Other operations to be controlled directly from 3rd party application

- Barcode Scanning and Verification
- DUT power supplies control for Power up/down
- FlashRunner programming operations



FlexiCore Flash Station

SYSTEM BLOCK DIAGRAM



FlexiCore Flash Station

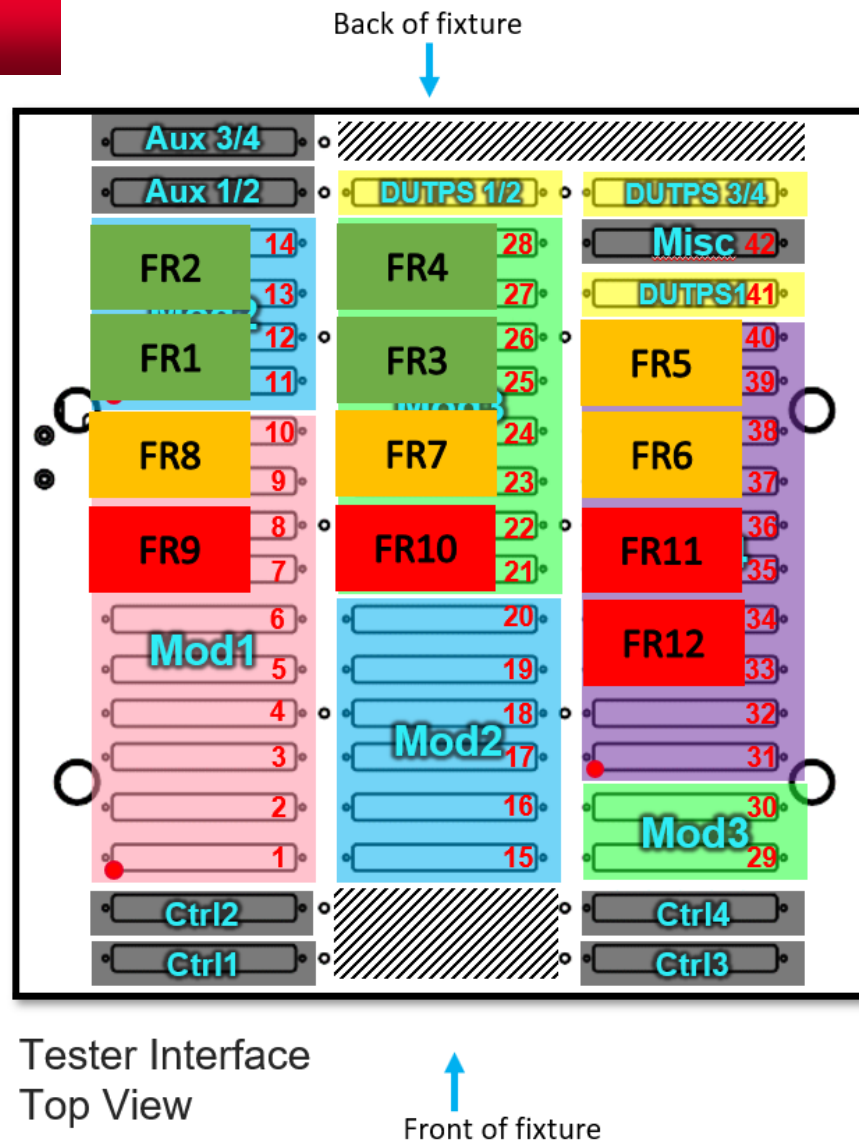
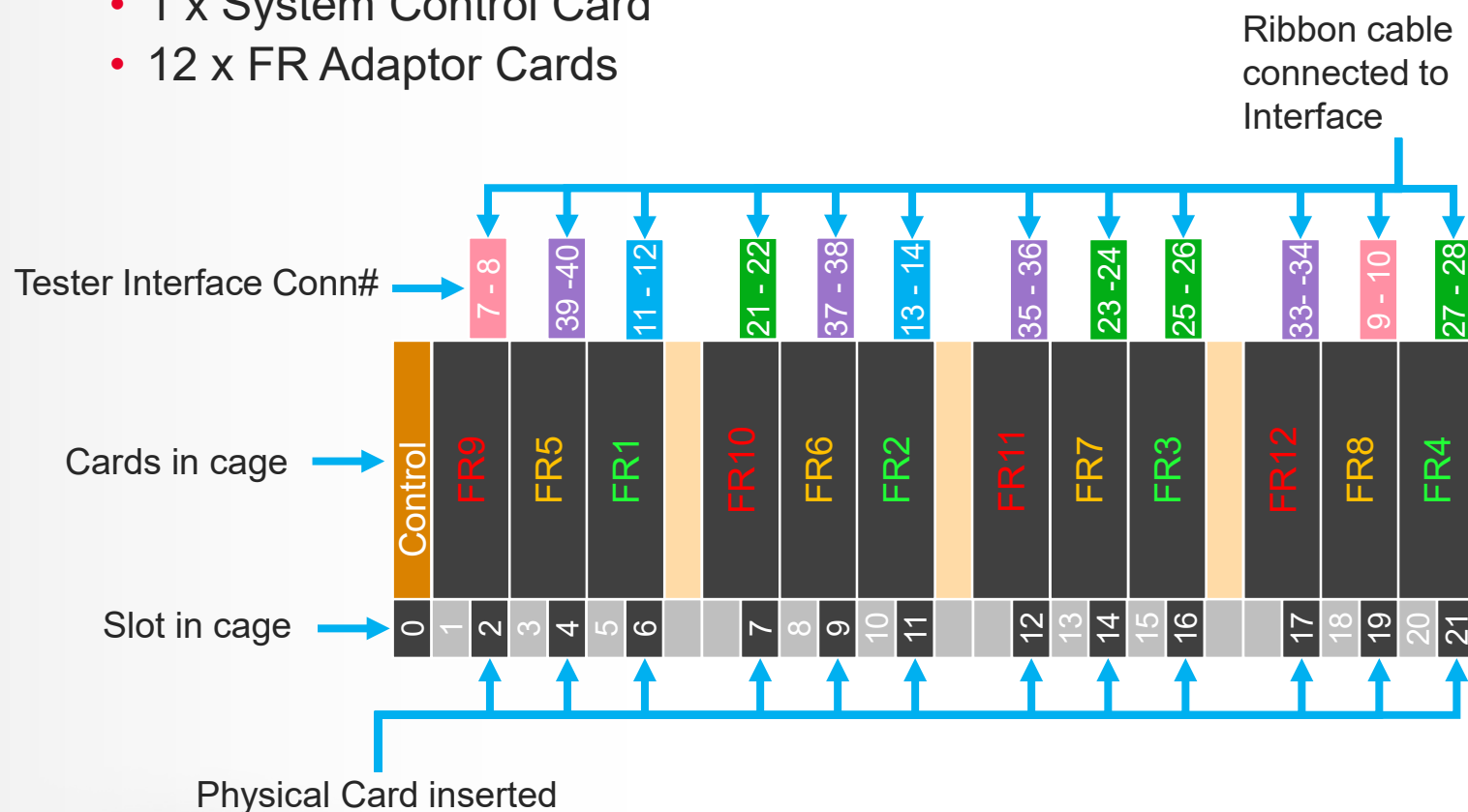
DIFFERENCE FROM STANDARD FLEXICORE

	FlexiCore Flash Station	FlexiCore Parallel ICT Test system
System Software	Handler Control Panel Application <ul style="list-style-type: none"> • Handler Profile Manager • Handler Settings DLL External Test Sequencer Application manage operation using SCPI commands via Handler Control Panel App.	Handler Control Panel Application <ul style="list-style-type: none"> • Handler Profile Manager • Handler Settings DLL In Circuit Parallel Test Application (ICPT) Medallist i1000 Software Application
Handler Firmware	Dual Board Staging Firmware	Single Board handling
Scanner	Option to include 2 scanners (MicroScan) Scanner mounting on Fixed Rail. Additional brackets provided Software scans when DUT at Stopper position	Option to include 1 scanner(MicroScan) Scanner mounting at input of system Scanning on the fly
CardCage Hardware	1x System Control Card at Module 1 FlashRunner Adaptor card based on order config Twisted Pair ribbon cable for FR Adaptor card slot SMH 4ch/8ch FlashRunner module based on order config	1x System Control Card per module activated 1x Measurement card per module activated Pin cards available based on order configuration Standard flat cable wiring for all pin card slots
DUT Power supplies	DUT PS(Option 761) unit based on order configuration Output connected to Tester Interface directly. Option of LAN or USB control for DUT PS	DUT PS unit available based on order configuration Output connected to N6700 Relay board. USB control for DUT PS only.
LAN Switch/Router/Cable	16 port Switch/Router for FR Module, DUT PS, Scanner, etc LAN cables pre-routed based on order config	None
RFID Unit	1x DR300 RFID unit (Controlled via Handler Control Panel) 10x RFID Tags	None

FlexiCore Flash Station

MODULAR CARD CAGE (MAX CONFIG)

- Cardcage configured for Single module operation
 - 1 x System Control Card
 - 12 x FR Adaptor Cards



Keysight FlexiCore ICT System

FIXTURE DIMENSION

Enables Larger DUT size

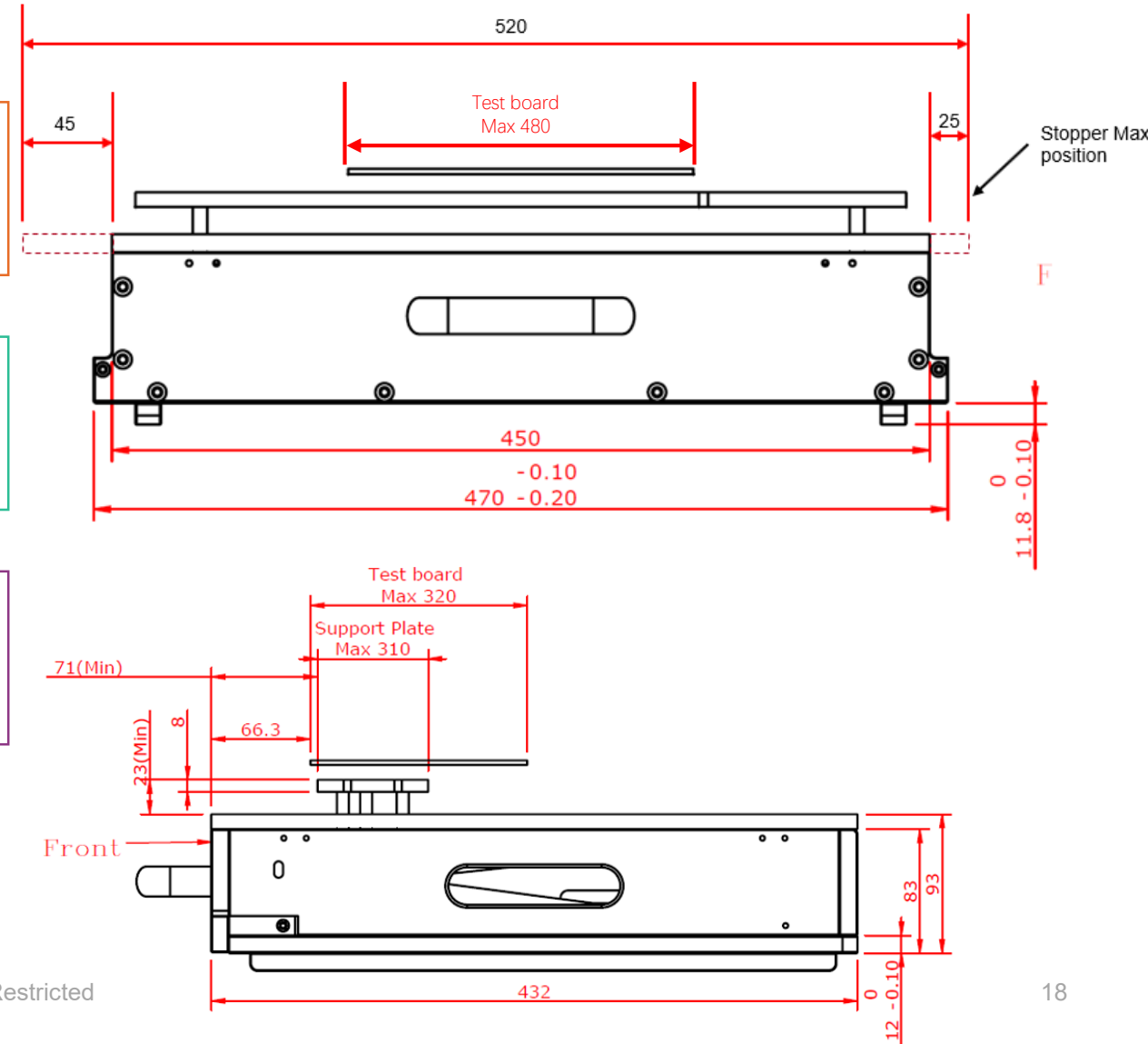
- 480 x 320mm
- Probe plate extendable up to 520mm

Great Clearance

- Top 150mm
- Bottom 40mm

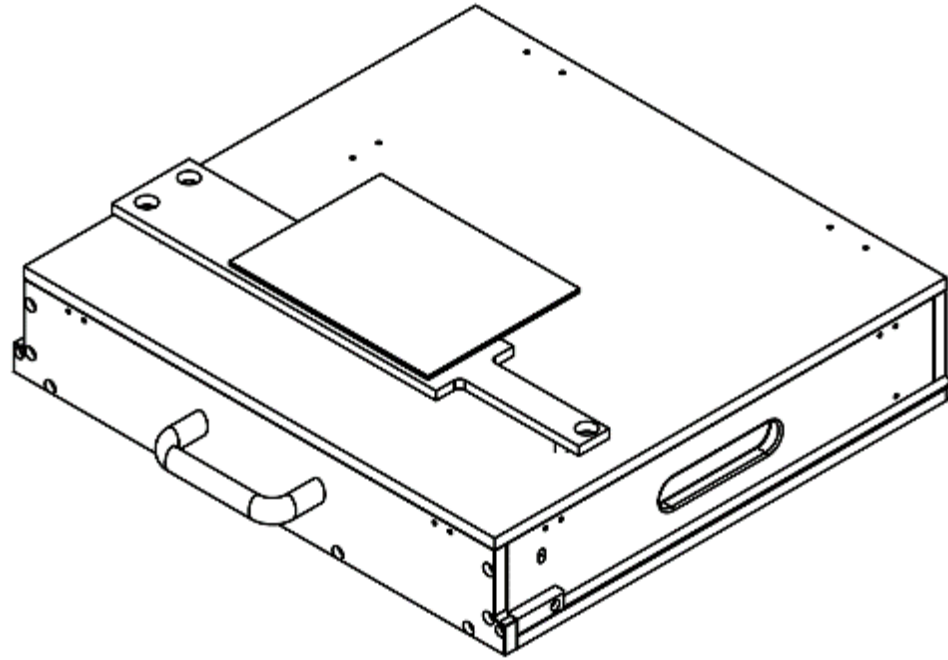
Auto Conveyor

- Auto Width Adjustment
- Clearance for edge access

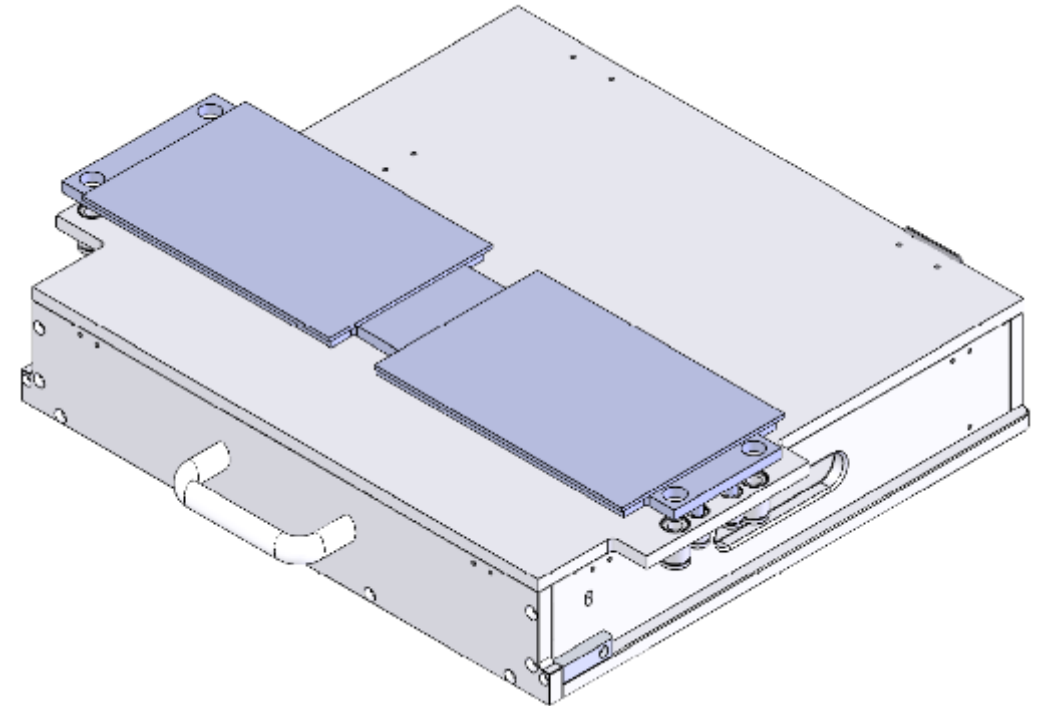


Keysight FlexiCore ICT System

FIXTURE TYPE



Standard FlexiCore Fixture
Supports DUT up to **430x320**mm

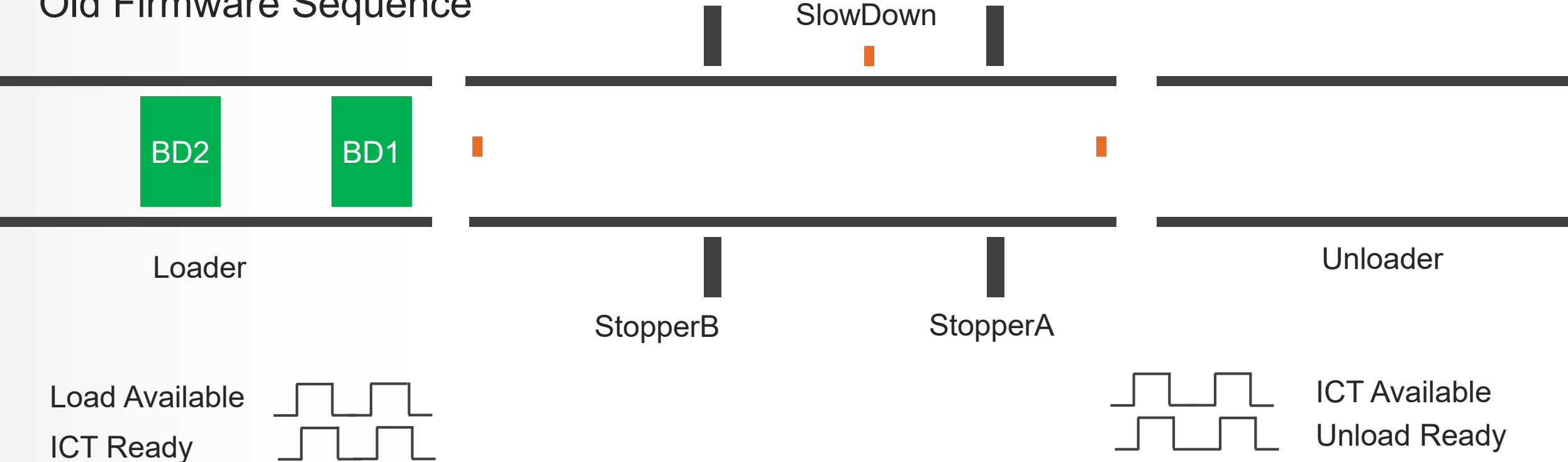


Extended FlexiCore Fixture Design (Customised)
Supports DUT up to **480x320**mm Single board
Supports DUT up to **220x320**mm/bd Dual board

FlexiCore Single Transfer DBS

ONE SMEMA CYCLE ONE BOARD

Old Firmware Sequence



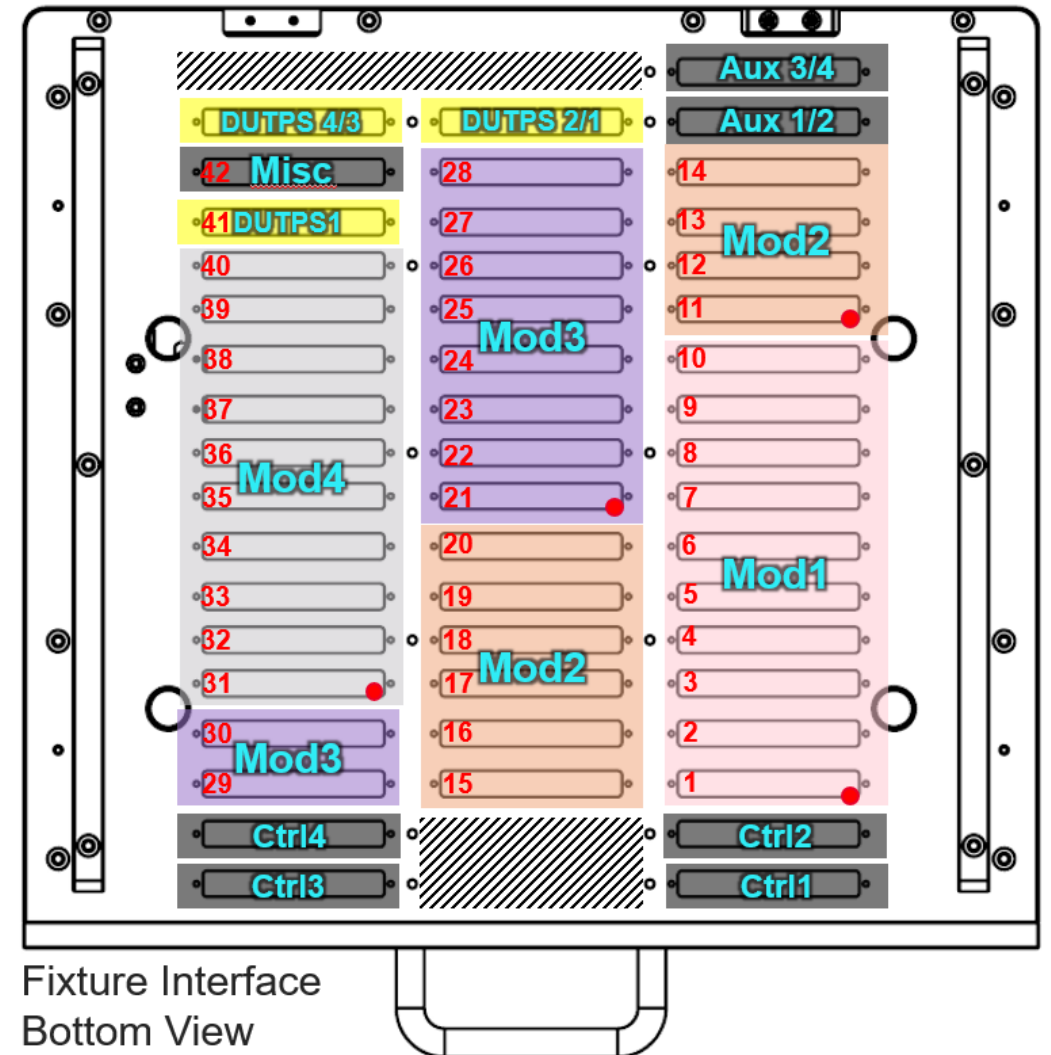
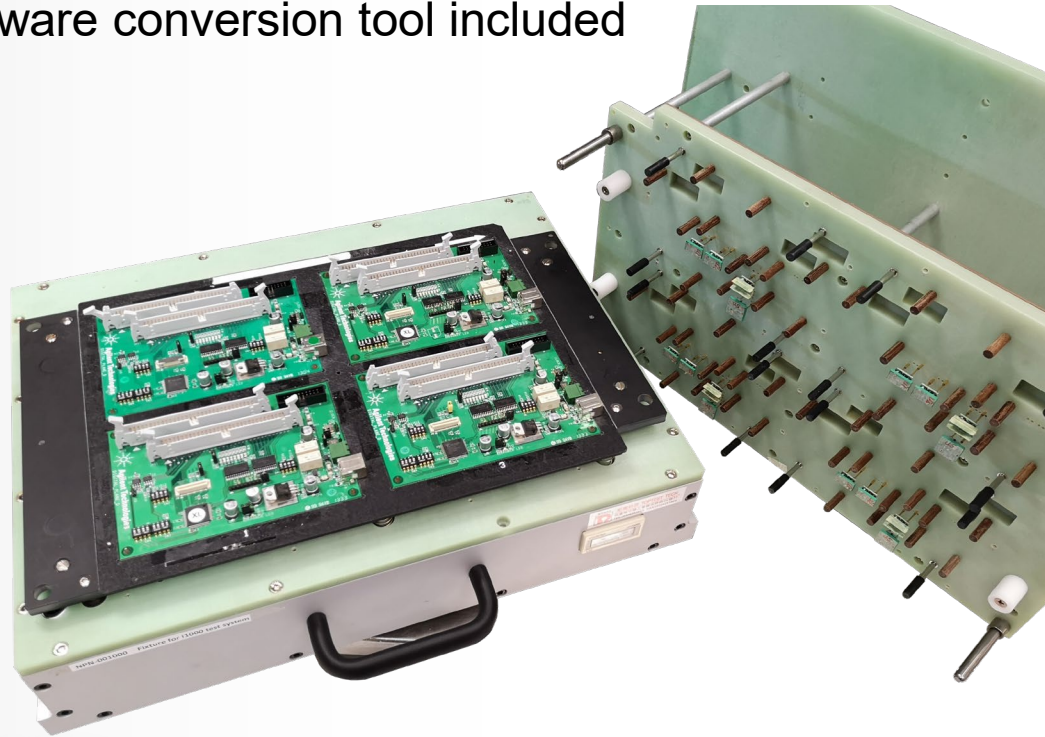
Keysight FlexiCore ICT System

FIXTURE COMPATIBILITY

SFP fixture – 1664 nodes with single DUT PS

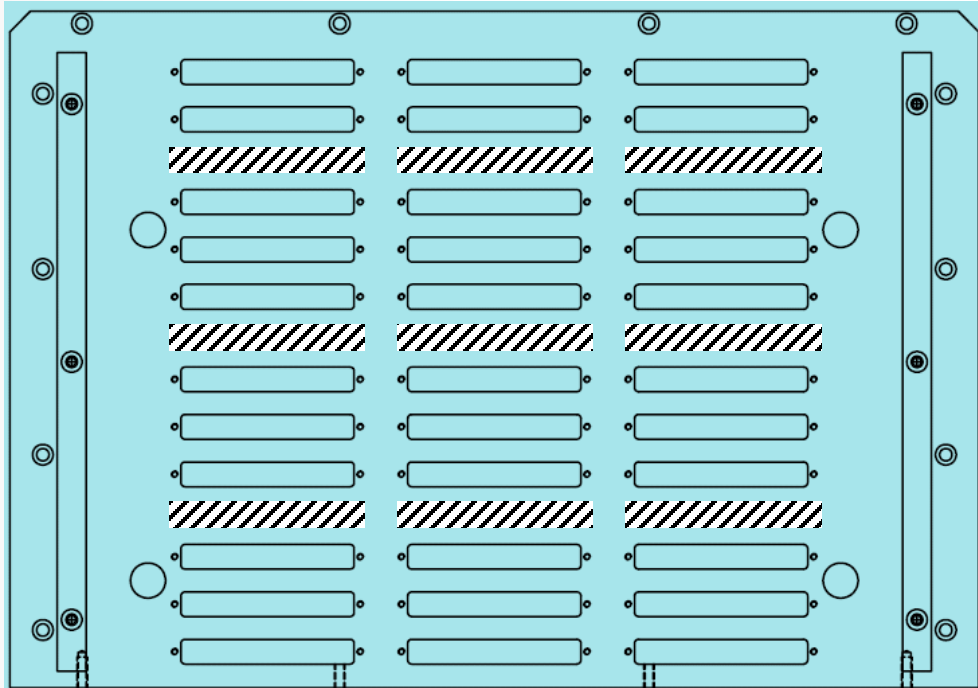
FlexiCore fixture – 2560 nodes with max 4 DUT PS

Software conversion tool included

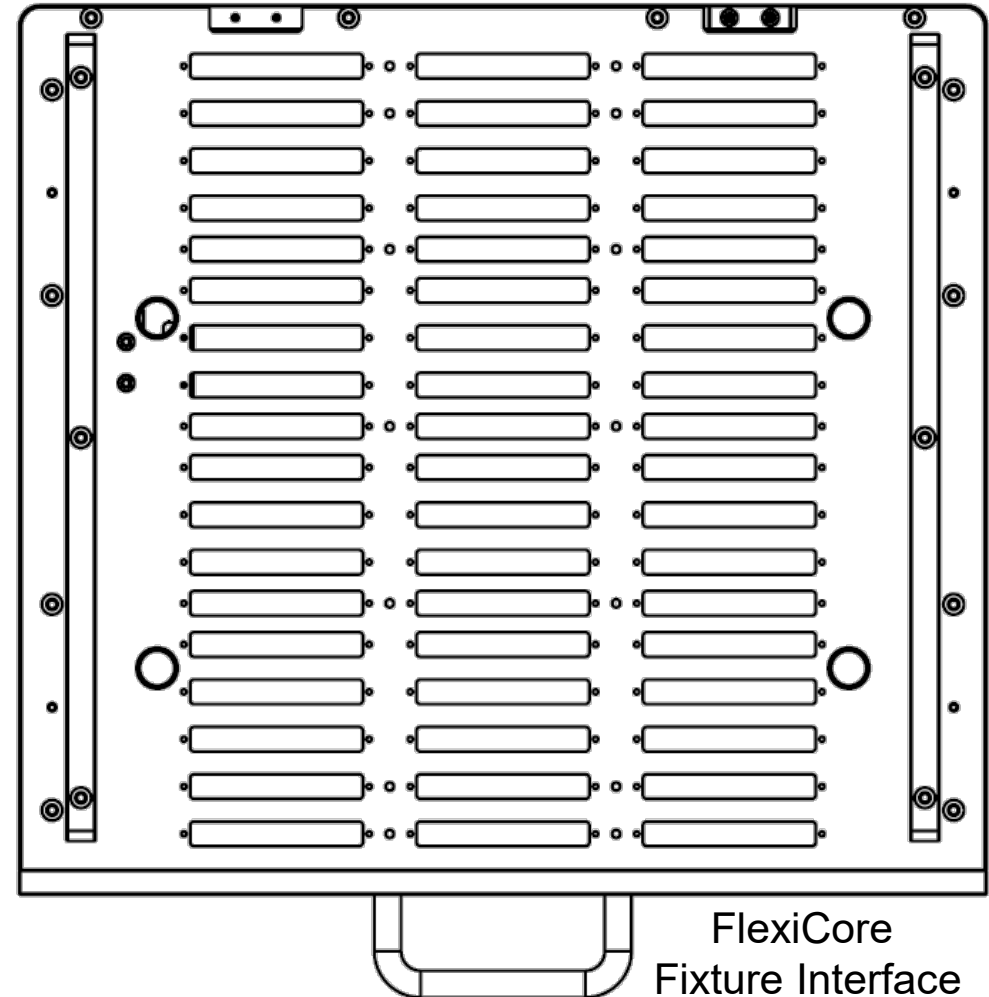


Fixture Interface Compatibility

COMPATIBLE FLEXICORE INTERFACE



SFP Fixture
Interface

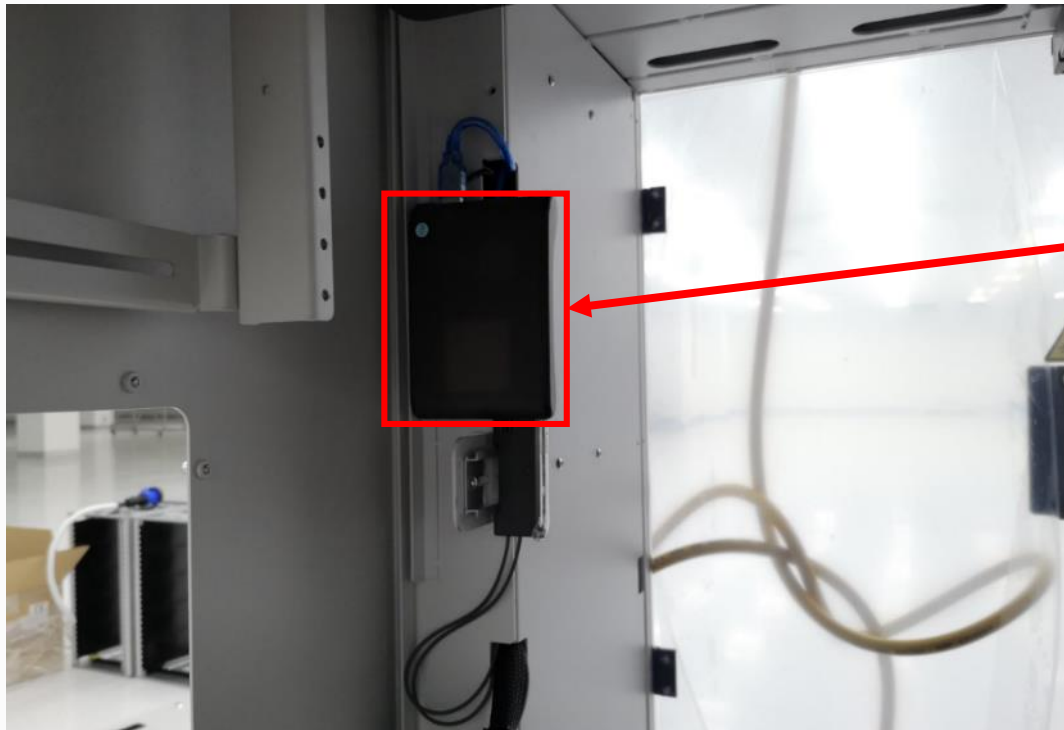


FlexiCore
Fixture Interface

RFID for FlexiCore

HARDWARE MOUNTING

Mounted at rear left column facing the front
Reader connected directly to USB port of PC Controller



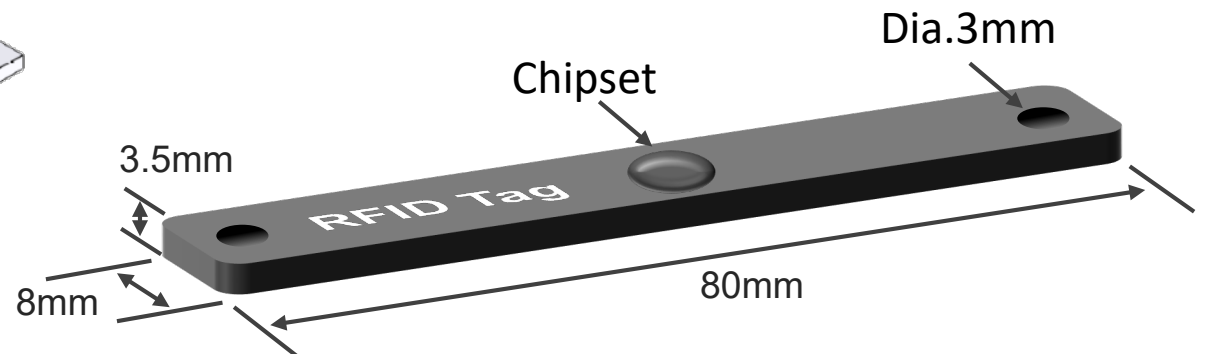
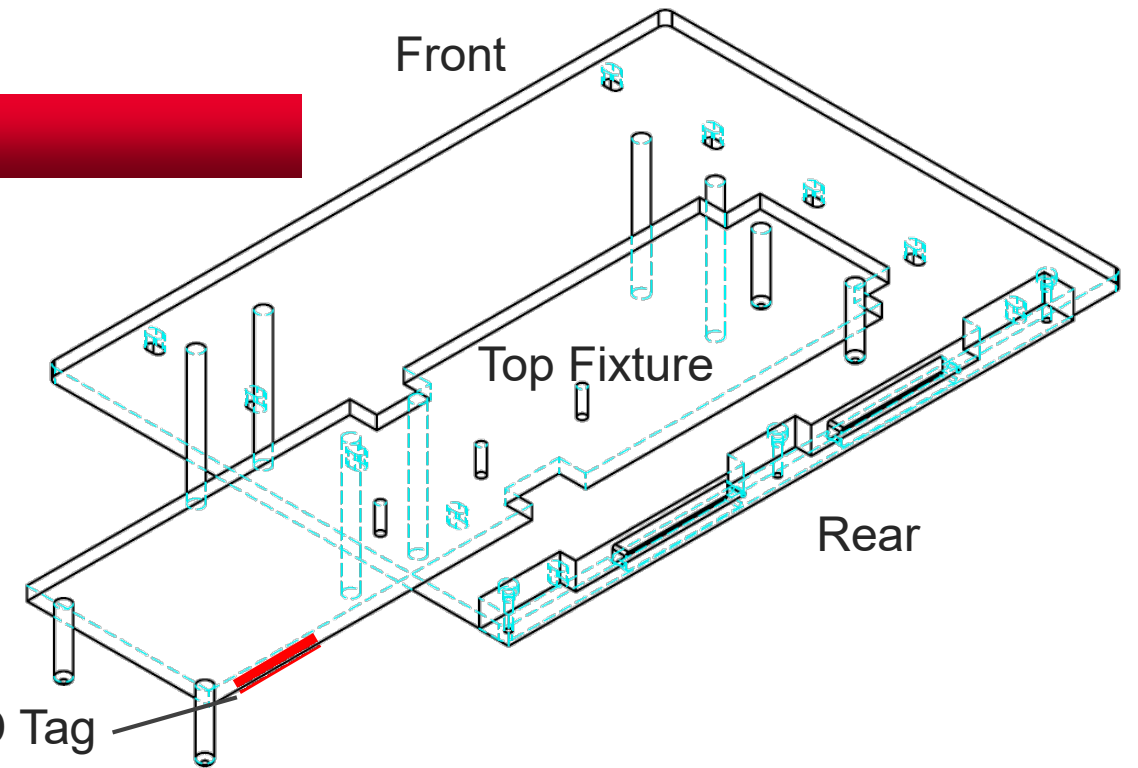
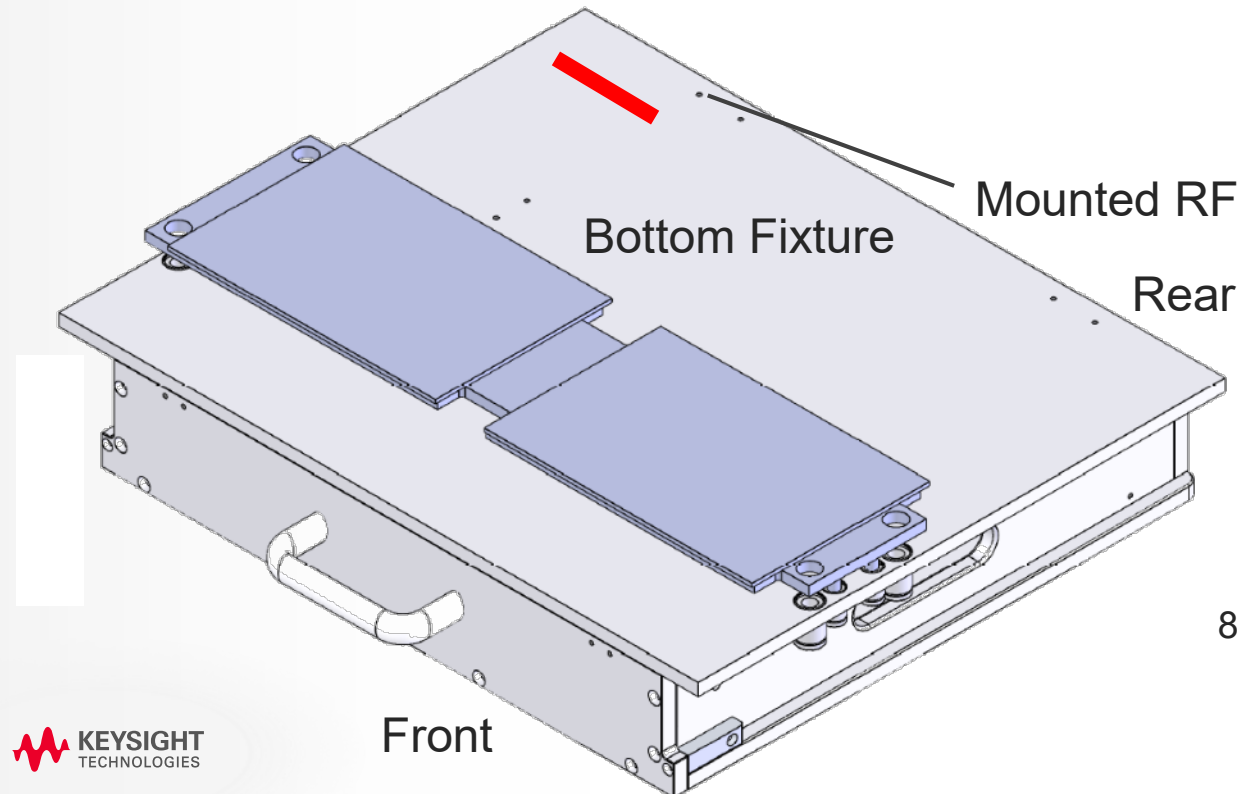
RFID for FlexiCore

TAG MOUNTING ON FIXTURE

One tag for each Top and Bottom fixture

Tag mounted with Chipset side facing back of fixture

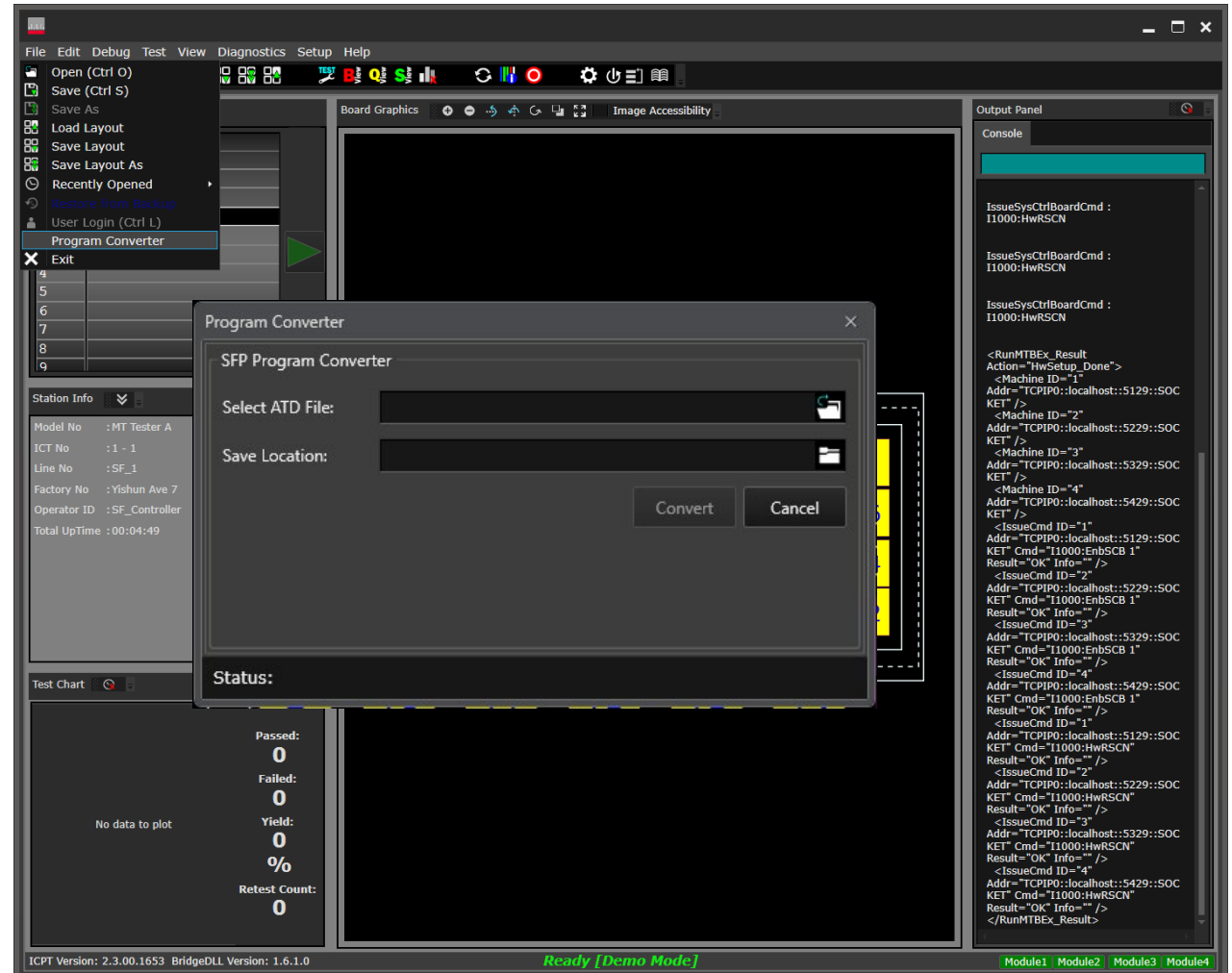
Must not be blocked by any conductive material



Test Program Conversion tool

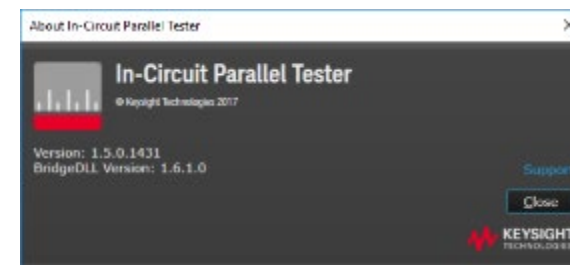
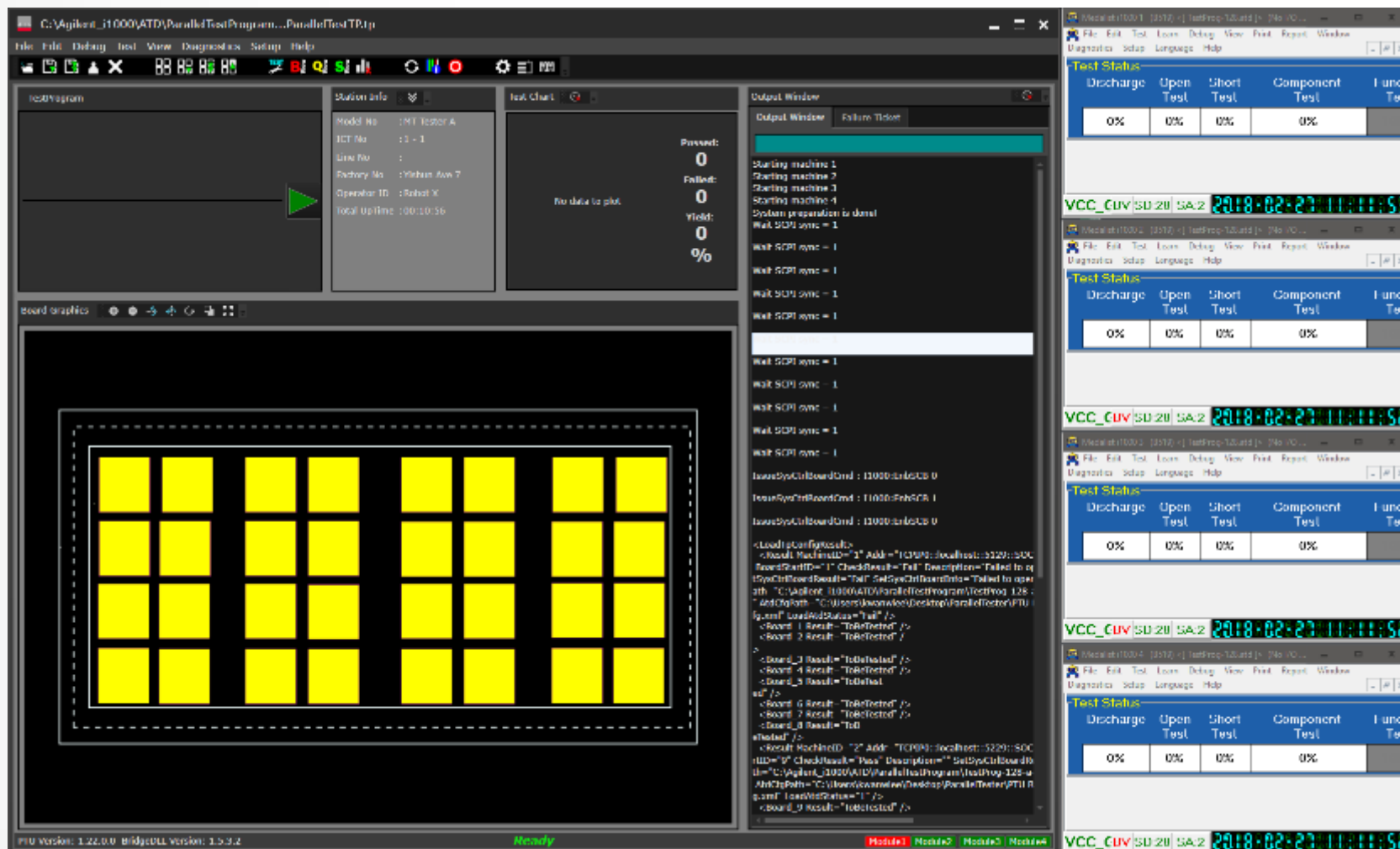
PROGRAM CONVERSION

- For existing SFP test programs to run on FlexiCore systems.
- Built-in with the Parallel Test In-Circuit Test software
- Test Resource numbers reallocated
- Conversion is done in a couple of clicks
- Conversion is one way from SFP to FlexiCore



The New Parallel In-Circuit Test UI

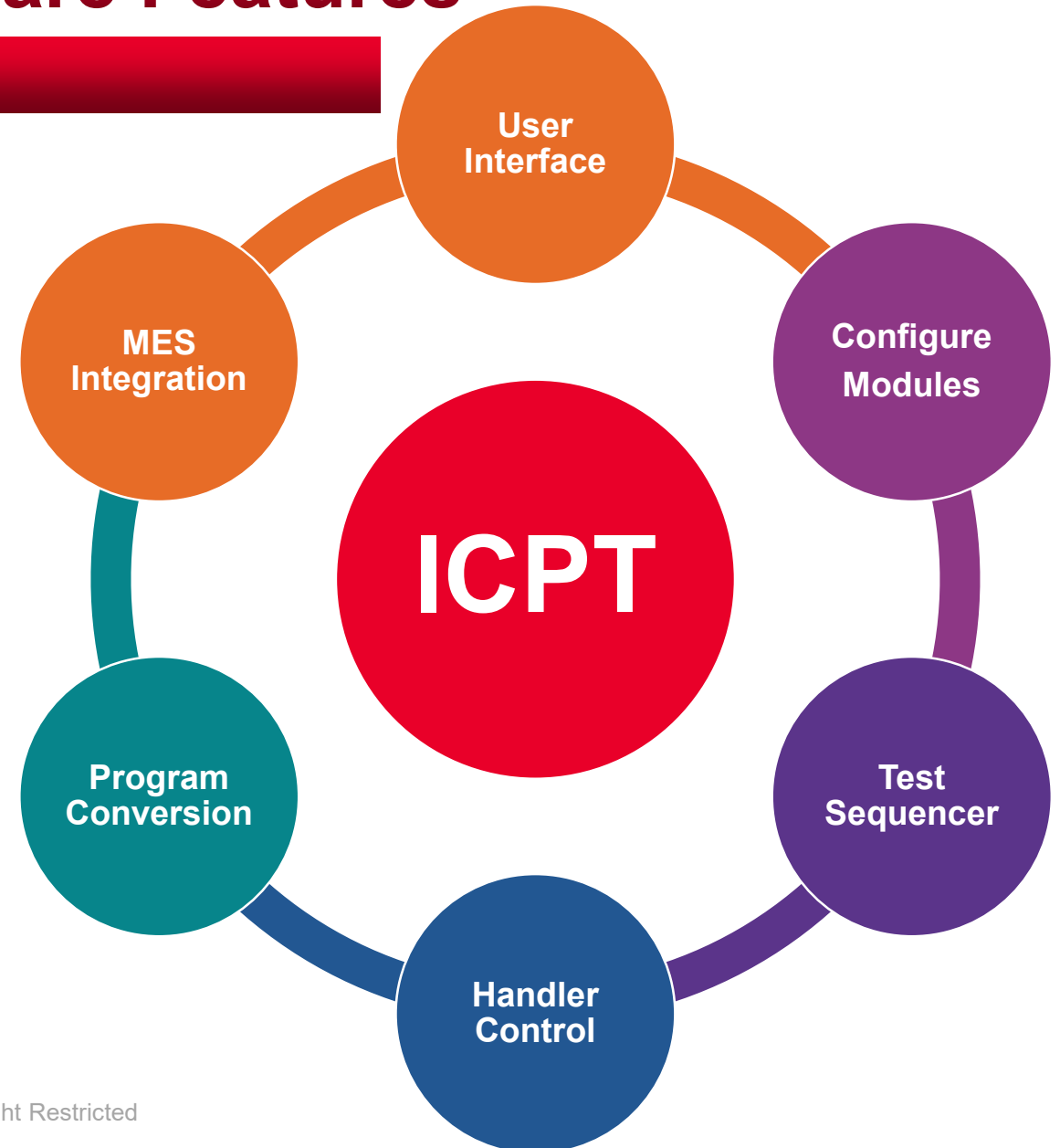
IN CIRCUIT PARALLEL TEST



In-Circuit Parallel Test Software Features

IN CIRCUIT PARALLEL TEST

- Controls test operations, MES integration, and board handler sequence
- Module split and merge actions
- Module parameter settings
- SFP test program conversion
- Customizable operator interface



Keysight FlexiCore ICT System

SPECIFICATIONS

	Specifications
Dimension	850mm (W)* 1100mm (D)* 1900 (H)
Conveyor height	895mm – 995mm
PCB edge	3mm
Max PCB size	480mm (L)* 320mm (W)
Top side Clearance	100mm
Bottom side Clearance	40mm
PCB weight	3kg
Conveyor direction	L → R, R → L, L → L, R → R
Conveyor speed	300mm/sec ~ 500mm/sec
PCB exchange time	6 seconds
Fixture Action	Press-down, Dual Stage
Press Pressure	6kN ~ 8kN, (6kg/cm ² ~ 8kg/cm ²)
Max node count	2,560
Max # of Cores	4
Core Merge	Yes, Software configurable



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