WaferPro Express 2016.04
Key Features
What’s New in 2016.04

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Agenda

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- What’s New in WaferPro Express 2016.04
Key Features

– Easy Instrument and Probers Connectivity
– Quick and Powerful Test Plan Definition
– Extensive Library of Turn-key test algorithms
– Enhanced and Exclusive Support for Cascade Probers
– Python and PEL Programming for test customization
WaferPro Express (WaferPro-XP)

Easy to use, yet flexible and powerful software platform to control automated wafer-level measurements of devices and circuit components.

WaferPro Express unified software environment
Hardware Connections Window

Single window to manage all hardware

Each instrument owns a dedicated unit table and standard settings
Turn-key driver libraries
No programing when making standard measurements

- Over 50 turn-key instrument drivers
- Support for several probers, including Cascade Microtech and several others
- Support for Keysight and other common switch matrixes (E5250A, B2200A, etc.) and probe cards configurations, including Kelvin measurements

Customization of instrument, probers and matrix drivers is enabled via Python, PEL and C++ programming.
WaferPro Express is now the software platform for A-LFNA enabling easy setup for automated measurements, advanced data display and analysis.
Test Plan Definition

- Easy setup of die sequence at specific wafer and temperature
- Powerful wafer map tool defines wafer, reference die and orientation
- A single table lists the sequence of all devices and tests
Test Plan Run

- One-click test plan run

- Real-time monitoring and display of results, including custom OK/Not OK flag
Comprehensive Factory Test Library
Enables common tests on most devices

Factory turn-key test routines are available for most devices

Routines can be customized as needed

Python and PEL programming tutorials are available
Importing Routines from IC-CAP

- A test routine in WaferPro Express is equivalent to a generic IC-CAP DUT, or to an IC-CAP WaferPro measurement routine, including its measurement setups.

- Routines included in IC-CAP MDL or DUT files can be imported into the WaferPro Express library.

- Use the “Open…” button in the Routine Editor, select the file and use the dialog to select and import the routines.

- The routines highlighted in green are compatible with the selected Device Type. Select one or more routines and click “Apply” to import them into WaferPro-XP library.
WaferPro-XP & Velox 2.0

Supported probers

- Velox 2.0 is the new prober control software for Cascade semi and fully automated probers (SUMMIT, Elite300, CM300).

- Velox 2.0 is supported since WaferPro Express 2015.01 for all semi-automated probers, including legacy probers such as S300.

NOTE: WaferPro-XP does not support the fully automated version of the CM300 (VeloxPro)
Velox 2.0
Platform and Interface to WaferPro Express

– Prober control software, runs on Windows 7 on Cascade PC.

– New WaferSync interface allows WaferPro-XP and Velox communication (see next page)

– Velox Flyer:

– Velox Highlights:
  • http://www.cmicro.com/files/Velox_PH.pdf

– To know more about Velox 2.0 visit:
WaferSync interface

A new software architecture for wafer-level systems

– Cascade Microtech’s WaferSync is a jointly developed two-way communication link between WaferPro Express and Velox 2.0,

– It allows WaferPro-XP to control Velox and enables complete wafer map synchronization with easy and error-free information exchange, including wafer alignment, sites and dies information.
Benefits of Velox and WaferSync
A new way to control wafer probers

– No GPIB needed, WaferPro Express is installed either on the Cascade PC or on external Windows or LINUX PC controller (LAN connection).

– Full wafer map synchronization between Velox and WaferPro-XP, including dies, subsites, die reference system and home/reference location.

– Direct Import/Export of Velox subsite table to/from WaferPro Express

– Control of WinCal XE enables WaferPro Express to periodically monitor the stability of the RF calibration; thereby reducing the possibility that time is spent collecting inaccurate data during long test plan executions.

– Superior warnings/errors management. For example, WaferPro Express can detect when user manually moves location using joystick and prompt user to return to reference so that automation can be controlled.
Wafer map synchronization
Streamlines the process of setting up test plans

- After loading a wafer, Velox 2.0 automatically aligns the wafer by using pattern recognition and determines the actual wafer, die sizes and subsite locations.

- The Velox wafer map may be refined by enabling or disabling dies and selecting the reference die and location.

- Subsite/subdies locations (names and coordinates) may also be defined in Velox.

- Thanks to the new WaferSync link between WaferPro Express and Velox, wafer map information are automatically synchronized with a click of a button. All wafer map data, including subsite definitions will be automatically transferred to/from WaferPro Express.
Automated RF calibration verification

Increased efficiency

- A problem that may lead to measure inaccurate data is that at higher frequency (e.g. above 40 GHz) calibration may not be stable because of temperature or system instabilities (e.g. cables).

- By linking to Cascade’s WinCal XE software via WaferSync, WaferPro-XP automatically monitors the RF calibration during the test plan.

- When the calibration stability test fails, WaferPro-XP stops the test plan execution and sends an email notification to the user and pauses the plan. The user recalibrates and resumes the test plan execution.
WMS system level verification
With Keysight Verification Standard (KVS)

To verify that newly installed measurement systems are working properly, Keysight introduces a new component called Keysight Verification Substrate (KVS). KVS has standard devices that are measured after RF calibration. Each KVS is fully characterized at the factory.

WaferPro Express helps WMS specialists to verify systems by measuring and comparing data to KVS factory data. A dedicated window guides the user through the verification procedure.

For more info, visit: www.keysight.com/find/wms
Python and PEL programming

Enabling extensive customization

Programming can be used to:

– Customize data monitoring

– Calculate/extract specific figure of merits from sweep data

– Customize data display and analysis

– Implement specific measurement algorithms (e.g. new drivers)

Each test routine provides a dedicated programming window where users can implement custom algorithms using Python or PEL. These can be executed in addition to or replace internal algorithms and drivers.
What’s New in 2016.04

- New factory device types, test algorithms and examples
- New PEL and Python tutorials
- Support for running partial test plans
- Enhanced link to Cascade Microtech Velox 2.x (UI improvements and fixes)
- Up to 3X speed improvements in B1500A and other drivers
- Several UI, functionalities and programming improvements
- WaferPro Express is now a 64-bit native program on both supported Windows and LINUX platforms.
New factory types, test algorithms and examples

New MOSFET Routines:

- **WPro_MOSFET_DC_basic_py** -> provides a simple example using Python to calculate Vth, the first function get_VTH_py_local implements the calculation directly in the function, the function get_VTH_py_lib calls the implementation in the library, which is in the waferpro Python module implemented in the $ICCAP_ROOT/iccal/lib/python directory

- **WPro_MOSFET_DC_basic2_py** is a more complex example where the measurement routine, WPRO_EXECUTE is implemented in python

- **Wpro_MOSFET_DC_basic3** implements an adaptive algorithm where the Vg_start in the second IdVd setup is dependent on the Vth extraction in the first setup.

- New examples for HEMT, FET and HEMT have been added as well
New centralized repository folders for factory and users functions

New Centralized Repositories:

- The folders PEL_Lib and Py_Lib can be used to store centralized versions of PEL and Python functions. This is particularly useful for PEL.
- Python functions can be saved into a separate .py module and then used in any Python function.
- Python modules are saved in the `$ICCAP_ROOT/iccap/lib/python` or alternatively the environment variable PYTHONPATH must be set to point into a local directory where the py file is saved.
New PEL and Python tutorials

PEL_Examples:
- Simple instrument drivers written in PEL. These drivers can replace or be used in conjunction with internal drivers.
- Wpro_PEL_Ex_Programming includes several examples of PEL transforms showing PEL syntax, functions, etc.

Py_Examples:
- Concept of Local and Global function
- Examples of function using classes, functions from the iccap.py module

Py_Tutorial:
- Includes a full python tutorial for new python users. This tutorial content is from www.python.org
Running Partial Plans

In the Test Plan Start Confirmation dialog, check the “Use Run Controller” checkbox. This enables the Test Sequence table. The sequence shows the results of a previous run. User can select an entire wafer, full dies or single devices for execution.

*** Make sure that probe height has been correctly set in Wafer Site of the probe.
Where to find information about WaferPro Express

– WaferPro Express Home and release Page:
  • www.keysight.com/find/eesof-waferpro-express
  • http://www.keysight.com/find/eesof-waferpro-express2016.04

– WaferPro Express Brochure:

– WaferPro Express How-to video on wafer-level measurements
  • https://www.youtube.com/watch?v=agELxTCbR90