RapiTrim™-P-UV

Laser Resistor Trimming System for Special Applications

RapiTrim-P with UV (355 nm) Laser

The UV model is designed for multi-purpose and specialty applications. These include the trimming of thick and thin-film resistors with narrow kerf, or applications with additional processing capability for materials such as copper, polyimide, ceramic (green tape, stackups or fired), FR4 and others.

- Compatible with industry standard probe cards
- Designed for high-volume production
- Optimized for hybrid circuit and specialized chip trim
- High performance 4-axis prober with precision step-and-repeat substrate handler
- 300x300 mm vacuum chuck for large substrates and multi-up circuits
- Automatic run-time calibration for optimum process integrity
- Wide range of stack and magazine loader/unloader options

Designed for Next-Generation Circuit Trim and Test

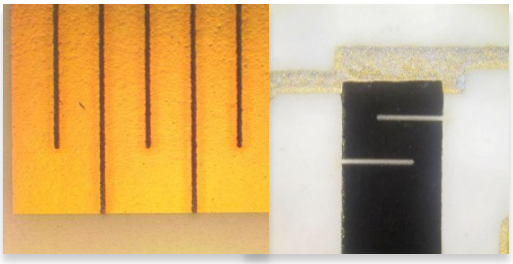
When your high-volume production needs are best served by a probe card system, RapiTrim is the system of choice. Incorporating the industry's highest performance probe card handler, ultra-rigid and high resolution XY motion stages, and modern user interface with automated run-time calibration, RapiTrim delivers the reliable 24x7 production solution you need. Trimming your next-generation products shouldn't be trusted to equipment designed decades ago.

Advanced ProSys™ Control Software

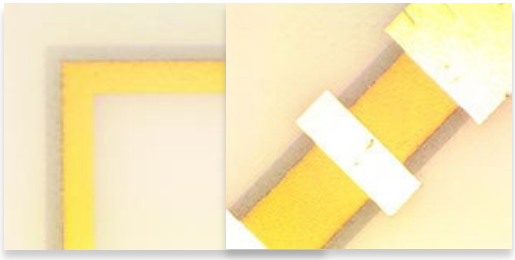
ProSys software allows for automated file conversion and job generation and provides a graphic display of the job features and process status. All machine setup calibration controls, job and process settings, vision and process map, status and diagnostic information are accessible with a single click or tap on the intuitive touchscreen user interface. Process tools allow precise control over laser energy, bite size, cut direction and trim limits.

Capabilities

- Thin film and thick film trimming
- Simple two-probe measurement to guarded probing with full Kelvin probing
- Active circuit trimming with integrated 4-channel measurement system or optional external instruments
- Flexible per-measurement setup for forced voltage or forced current. Measure voltage and current simultaneously on up to 4 Kelvin channels with real-time resistance calculation.
- Intuitive graphical Job Setup with automated DXF import and process sequence customization



Serpentine trims in thin and thick films.



Corner shave trim and symmetrical shave trim.

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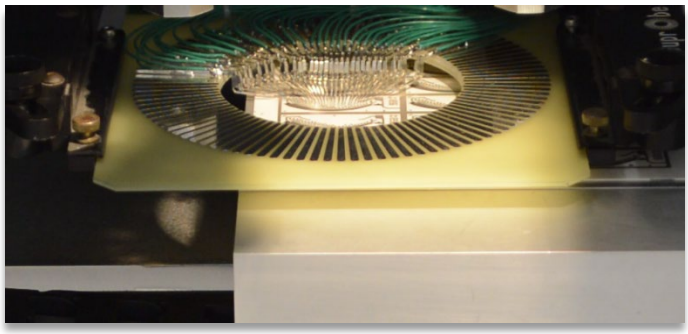
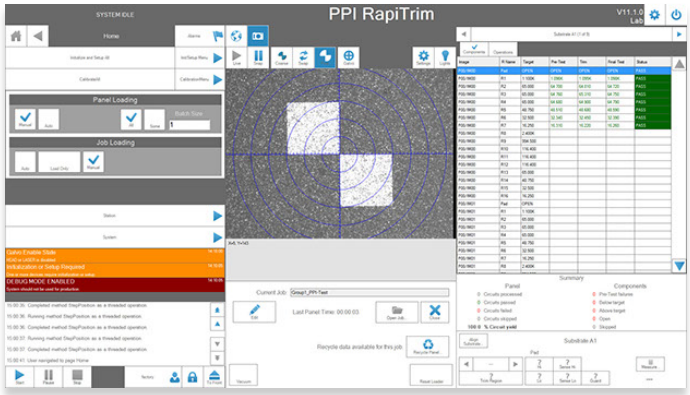
The RapiTrim™ Fixtured Solution

RapiTrim systems configured with probe card fixtures are ideally suited to volume applications. Standard probe card formats are supported, allowing portability of fixtures from existing equipment.

PPI's advanced probe handler with 4 axis servo control provides the industry's highest speed step-and-repeat performance for ultimate throughput. Accuracy and repeatability are guaranteed through high resolution optical feedback on all axes. Profiled motion trajectory control improves probe tip placement and contact precision.

Systems can also be configured with custom probe fixtures for unique applications in both passive (simple resistor) trim and active (or functional) trim situations.





Custom part fixturing for hybrid circuits or specialized substrates

Optional fixtures may be designed in collaboration with the customer and supplied with the system. This includes custom multi-up fixtures with locating and insulated pockets and vacuum hold-down. Other more sophisticated solutions with backside probing and part clamping are available for active trim applications.

Standard Features

Intuitive graphical user interface with ProSys operating software.

Advanced beam positioning, probe handler, and laser pulse control provides high throughput, accuracy, and process stability.

High accuracy measurement system with 4 channel real-time current and voltage simultaneous sampling.

Auto-calibration functions for beam position, probe position and laser power ensure accuracy and repeatable quality.

Extensive system diagnostics continuously monitor all critical components and machine performance.

Sealed beam delivery protects optics from process debris, extending component lifetimes.

Touch screen operation (full HD size).

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Software Features

Simplified operator interface - load substrates and job, then just press Start.

Process map - visualize all job components in map or camera. Clearly see immediately what and where the process is, in real time, including pass / fail indication.

Visualize trims and markings in the map or camera overlay on actual resistors.

Process multi-up, panelized, or individual fixtured substrates.

Laser scribed marking for serialization and circuit pass / fail status.

Intuitive cut tool editors speed trim library setup.

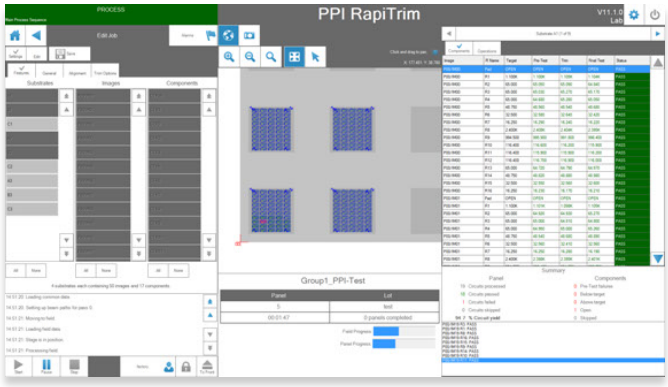
Engineering / technician process development aided by visual cut testing interface

Trim profile graphing for detailed process analysis.

Multi-user, multi-role configurable password protected access to parameters, maintenance, and advanced functions

Maintenance Tracker keeps log of all system maintenance and history and provides prompts at maintenance intervals.

Full system diagnostics and data logging for enhanced product support and predictive maintenance.



Trim and Test Results

Easily view detailed results for each component.

Data logged by substrate serial number, providing off-line historical data review and tracking and statistical data report generation.

Job Creation

Create jobs through an interactive graphical map of components, circuit features, alignment targets, and trims.

Extensive DXF and IPC-D-356 file import support automates and speeds job creation.

Resistor location, orientation, values, and limits are auto defined.

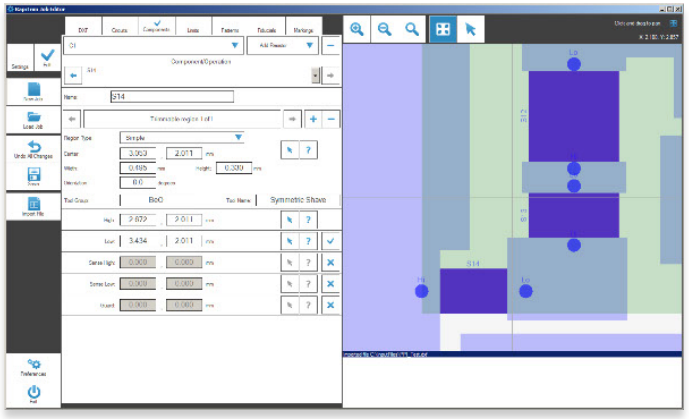
Probe test points can be automatically defined from DXF metallization information.

Interactive graphical process library editor - no programming required.

Trim and measurement tools can be shared by resistors of different sizes and orientations, minimizing setup steps.

Full trim program with settable min / max cut length limits.

Independent control of laser pulse energy, repetition rate and bite size.



External Instrument Support

The trim controller can interface to external instrumentation for passive and active trim operations using standard LAN (LXI) interface. Such instrumentation can be digital multimeters, source-measure units, signal generators, power supplies or external loads.

Switching Matrix

In addition to standard probe switching functions to access the DUTs, the integrated signal routing switch provides expanded functionality for active trim, external test equipment, and specialized measurement applications.

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RapiTrim Specifications*

Trim Types and Accuracy

- Single-plunge, double-plunge, L, L-Vernier, scan, serpentine, and custom multi-leg cut types
- Typical trimmed resistor distribution <1% (3 sigma), material and trim type dependent
- Advanced laser pulse control optimizes process consistency and minimizes substrate damage

Optical System

- High reliability fiber laser or DPSS laser. Air cooled, long lifetime, 355nm wavelength.
- Spot Size: 10 - 50 µm.
- Automated laser power calibration with integrated power meter
- Automated vision system for precision alignment with scaling, offset, trapezoidal and rotation compensation
- Low mag camera field: 20 mm
- High mag camera field: 3 mm, <2um resolution
- Through-lens vision for probe alignment
- Beam scanning field: 50x50 mm (25um spot size or larger)
- Beam placement accuracy 15 µm (3 sigma) over 300x300mm process area
- Beam position resolution <0.5 µm
- Telecentric scan optics on precision z-axis focus stage with 0.5µm resolution

Mechanical System

- Precision linear motor XY stages with linear

Probing

- Standard 165mm (6.5 inch) probe card, other formats optional
- Z Travel: 15mm
- Z resolution: 0.5 µm
- Servo controlled Z velocity and acceleration
- Roll and pitch adjustment: +/- 1 degree
- Roll and pitch resolution: <5 µRad
- Rotation: ±5 degrees
- Rotation resolution: <5 µRad
- Automated roll, pitch, Z and rotation calibration

Measurement System

- Fully programmable force voltage or force current
- Resistor range: 0.1 Ohm to 1 GOhm
- Ratio trim and guard functions
- Resistance measurement accuracy:
  Low Range (<10 Ω): ±0.05% (±0.05% / R)*
  Mid- Range: (10 Ω to 1 MΩ) ± 0.05%*
  High Range (>1 MΩ): ± 0.05% ± 0.02% per MΩ*

- Voltage Source Ranges and Measurement Accuracy:

Range	Resolution	Accuracy (% FSR)*
±20V	80 µV	+/- 0.01%
±2V	8 µV	+/- 0.01%

- Current Source Ranges and Measurement Accuracy:

Range	Resolution	Accuracy (% FSR)*
4uA	30 pA	+/- 0.1%
40uA	300 pA	+/- 0.05%
400uA	3 nA	+/- 0.01%
4mA	30 nA	+/- 0.01%
25mA	200 nA	+/- 0.01%

Part Handling

- Part handling up to 300x300mm on system vacuum chuck
- Easy access sliding doors with two hand safety operation (manual load models)

Software

- Auto-import and job creation from DXF
- Automatic substrate vision alignment
- Configurable part marking and serialization
- Automatic system run-time calibration
- Windows® based user interface with multi-level password protection
- All measurement data logged as part of normal operation
- Real-time system diagnostics and health logging
- Internet connection allows factory personnel to provide remote support

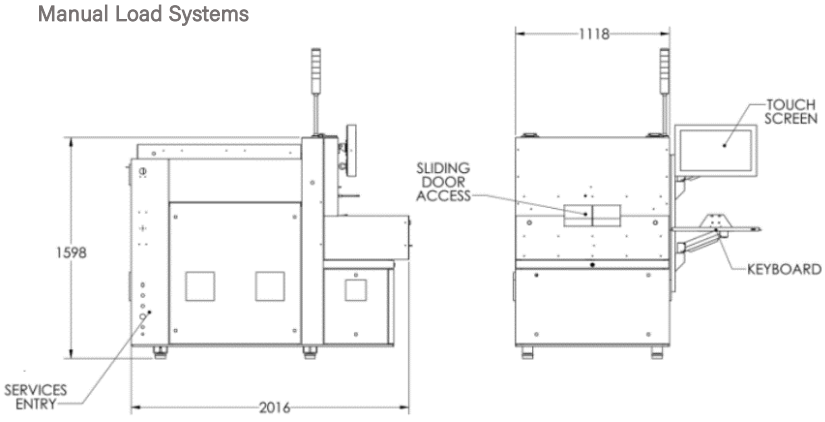
Options

- Automatic stack loader / unloader
- Magazine loader / unloader
- Optional network interfaces
- Automated barcode reading functions and job creation / loading
- Custom fixturing
- External instrument support
- Switching matrix expansion

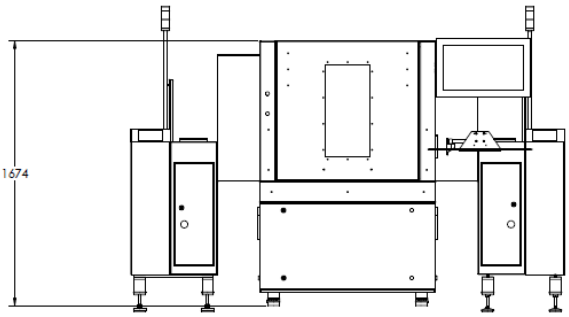
Facilities Requirements

- Electrical: 200-240VAC, 1ph, 30A, 50/60Hz
- Exhaust: ablation debris removal through 38mm diameter duct.

Manual Load Systems



Auto-Load Systems



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