# Diagnostic Laser Cutting Systems

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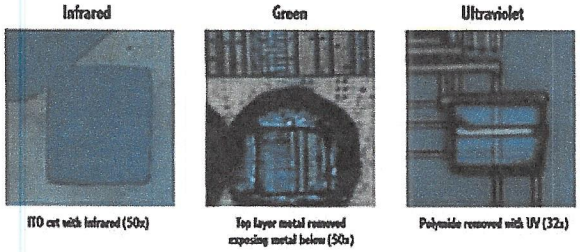
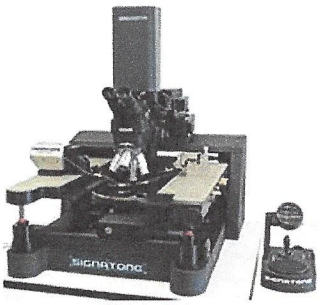



Signatone offers two series of solid state lasers for use in semiconductor diagnostic cutting applications, the *EzLaze* and the *QuikLaze Lasers*. The *EzLaze* is a single shot laser with a 5 Hz burst mode and the *QuikLaze* is a water cooled laser that can fire at a constant rate of 1 to 20 Hz.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The *EzLaze* and the *QuikLaze Lasers* are available in versions that can output one, two, or all three of the laser light frequencies that are offered, i.e., IR (1064 nm), green (532 nm), and UV (355 nm). The applications that the *EzLaze* and the *QuikLaze Lasers* are designed for include the removal of topside passivation and dielectric layers, removal of metal from metal covered areas, trace cutting and material trimming.

**The Most Common Applications Include:**

- Cutting traces to repair, isolate, or disable parts of a circuit.
- Removing topside layers to expose traces that are beneath metal, oxide, nitride or other materials, to enable micro-probing of the circuit

**Other applications include:**

- Removal of topside to improve resolution when probing with an e-beam system
- Trimming resistors in a low volume or engineering mode
- Marking areas within a device to show where focused ion beam cutting is to be performed.

The lasers mount onto the Mitutoyo FS-60 Finescope Microscope or the Ready Products A-Zoom Microscope and can be used on a micro-probing station or as a stand-alone laser.

All lasers include:

1. A spot marker with an adjustable aperture for sizing cuts from 50 microns square (maximum) down to 1 micron square (2 microns square on 1064nm IR lasers).
2. High and low power ranges with 1000 increments in each range. An LED indicates the power level setting.
3. Remote firing via a hand held trigger or a or foot pedal.
4. An RS-232 interface for remote computer driven operation using Signatone Solutions Windows software.
5. An eyepiece safety filter.

**EzLaze Laser**

The *EzLaze Laser* provides users with the capability to perform a wide range of laser cutting operations for semiconductor design verification and failure analysis as well as LCD repair applications. With the **New Wave Research Advanced Beam Delivery System (ABDS)**,* the **LCS** and **QuikLaze Single and Multi-Wavelength Systems** are the only laser cutting systems that combine the flexibility of multiple-wavelength operation with the convenience of a single-wavelength instrument.

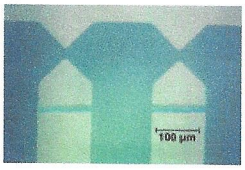
A user selectable, panel-mounted switch allows the user to easily select wavelengths of 1064nm (infrared), 532nm (green) or 355nm (ultraviolet) on multi-wavelength systems. Single wavelength IR or green systems are also available.

Features:

- Switch-selectable wavelengths for multi-wavelength systems

- Uniform, repeatable cuts from 50um x 50um (with 50x objective) to 1 um x 1um (with 100x objective)
- 5 Hz burst mode for 10 seconds (followed by 18 second rest) facilitates faster material removal
- Simplified operation with easy-to-read color LED indicators, large, energy-level meter and RS232 interface
- Panel-mounted HI/LO energy level switch to extend energy range while allowing precise energy control
- Operation with Mitutoyo FS60 series or Ready Products A-Zoom microscopes
- Easy installation, no costly maintenance and no toxic gases to handle

85K JPG

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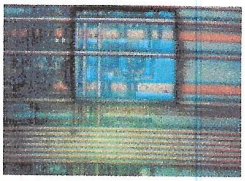

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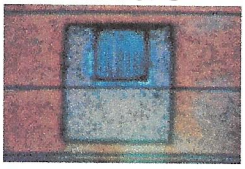

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**Operation:**

The *EzLaze Laser* is convenient to operate. All laser operations, including energy level, aperture size and wavelength, are controlled remotely on the system's power supply. This eliminates the chance of disturbing a delicate laser or microscope set-up through accidental contact. In addition, wavelength, cut size, energy level and number of shots can be controlled through a RS232 computer interface.

Consistent with the New Wave Research system design philosophy, single wavelength systems can be easily upgraded to multi-wavelength systems.

**Multiple-WaveLength Advantages:**

Multiple-wavelengths offer design engineers, failure analysts and those involved in LCD repair the ability to conveniently select the laser wavelength that most closely matches their application requirements.

For example, UV removes polyimide directly without causing damage to materials underneath; silicon and GaAs are semi-transparent to IR energy so metal lines can be removed using IR creating minimum damage to the underlying silicon substrate; green, the most universally used wavelength, is effective for cutting metals and removing oxide. Devices under test can contain several materials and require the use of multiple wavelengths to achieve the desired results.

| | **Infrared (1064 nm)** | **Green (532 nm)** | **Ultraviolet (355 nm)** |
|---|---|---|---|
| **LCD Materials:** | ITO<br>Chromium<br>Color Filter-red, green | ITO<br>Chromium<br>Color Filter-blue/green | Color Filter-blue/green |
| **Semiconductor Materials:** | Aluminum<br>Gold<br>Ti-Tungsten | Silicon Dioxide<br>Nitride<br>Polyimide (big cuts)<br>SOG<br>Poly-silicon<br>Gold<br>Aluminum<br>Ti-Tungsten | Nitride<br>Polyimide<br>Gold |

**Microscopes:**

The *EzLaze* Series is designed to operate with both the Mitutoyo FS60 and FS110 Series microscopes, as well as the A-Zoom from Ready Products. The A-Zoom requires a laser adapter kit from Ready Products.

Laser systems using the Mitutoyo microscope require the FS60YC microscope body if the laser emits IR (1064 nm) energy. The Mitutoyo UV tube lens kit is required for lasers emitting UV energy. The fixed 1X UV tube lens kit from New Wave Research replaces the tube lens in the FS60YC or the zoom mechanism in the model FS60FC. Once the UV tube lens kit is installed, the zoom mechanism is no longer available.

NIR (near infrared) or NUV (near ultraviolet) objective lens must be used with IR and UV wavelengths respectively. They are available in 50x and 100x versions. Both NIR and NUV lenses may be used with the green wavelength.

**SPECIFICATIONS**

| | 1064 nm | 532 nm | 355 nm |
|---|---|---|---|
| **Wavelength:** | | | |
| **Pulse Width:** | 7 ns | 6 ns | 5 ns |

**Energy: (before microscope)**

| **Model** | | | |
|---|---|---|---|
| **EzLaze IR** | .6 mJ | | |
| **EzLaze Green** | | .6 mJ | |
| **EzLaze IR/Green** | .6 mJ | .6 mJ | |
| **EzLaze Green/UV3** | | .6 mJ | .6 mJ |
| **EzLaze TriLite** | .5 mJ | .5 mJ | .4 mJ |
| **Min. cut size: (100x objective)** | 2 x 2 um | 1 x 1 um | 1 x 1 um |
| **Max. cut size: (single pulse)** | 50 x 50 um with 50x objective (Mitutoyo) | | |
| **Repetition Rate:** | single shot or 1 Hz continuous or 5 Hz burst for 10 seconds followed by an 18 second rest. | | |

**Dimensions:**

| | |
|---|---|
| **Head** | 6.25" (159 mm) W x 12" (305 mm) H x 5" (127 mm) L |
| **Power Supply** | 7.75" (197 mm) W x 8.9" (225 mm) H x 16.0" (406 mm) L |
| **Control Panel** | 7.56" (192 mm) W x 3.63" (92 mm) H x 5.9" (150 mm) L |

**Weight**

| | |
|---|---|
| **Head** | 8 lb. (3.6 kg) |
| **Power Supply** | 18 lb. (6.2 kg) |
| **Control Panel** | 3 lbs. (1.4 kg) |

*Note: Specifications subject to change without notice.*

**QuikLaze Laser**

**QuikLaze** is an excellent productivity tool for semiconductor failure analysis and LCD repair micro-machining applications. QuikLaze can dramatically improve the productivity of IC design engineers and failure analysts by providing them with a valuable tool for quickly removing passivation materials and cutting circuit lines. LCD technicians can vastly improve their repair throughout by faster removal of shorts and defects.

The QuikLaze laser micro-machining system features the latest Advanced Beam Delivery System* (ABDS) from New Wave Research. ABDS gives you highly precise control over each of the three wavelengths (Infrared, Green or Ultraviolet) that the system offers. QuikLaze is the only laser micromachining system that offers one, two or three switch-selectable wavelengths in a single laser. This allows the system to operate as though it were a single wavelength laser, while having the ability to easily switch to the wavelength that best suits the test material.

Features:

- Higher repetition rate (20Hz) promotes faster machining times and increased throughput
- Multiple wavelengths give more precise control of specific applications
  - UV: remove polyimide or nitride

- Green: cut large metal buses or small circuit lines
- IR: cut metal on GaAs products or LCD materials

- Superior pulse stability for uniform cuts and accurate results
- Available in single and multi-wavelength systems. Five different task-specific models are available.

Signatone offers a stand-alone **Laser / Microscope Stand**

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