

# Galvanometer Scanning Technology and 9.3 $\mu$ m CO<sub>2</sub> Lasers for On-The-Fly Converting Applications

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## Abstract

Digital converting processes are used to transform a roll of material into a different form or shape and provide the flexibility to deliver unique designs or changes on-the-fly, unlike traditional mechanical processes. Tremendous progress has been made in the field of digital printing; its increased adoption requires that converting processes also be more flexible and cost-effective while delivering high cut quality. Due to the high cost of storage and maintenance of a plurality of conventional dies and long set up time, using CO<sub>2</sub> lasers in combination with fast and precise laser scanning has proven to have great potential in paper and cardboard processing, flexible packaging and label cutting. At the same time, the capability to control the laser beam power density delivered on the material processed is critical to achieve high quality finish goods.

In this paper, we are showing the capabilities of an all-digital galvanometer scanner in combination with a highly frequency stable CO<sub>2</sub> laser that provides stable laser power density by modulating the laser power in coordination with beam scanning speed. Our system also demonstrates high scanning speed of more than 10 m/s and a focal spot size of less than 150 $\mu$ m.

Keywords: 9.3 $\mu$ m CO<sub>2</sub>-Laser; Uniform Laser Density; Digital Galvanometer Scanning Technology; Digital Converting; Cutting; Drilling; Micro-Cutting;

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