Product Review:

GCC's Venus Laser System

By Mike Fruciano

The expanding market for laser systems has pushed manufacturers to design new and more impressive features in these very useful engraving and cutting machines. Along with many new features, system manufacturers have increased the range of laser power available in their systems. A by-product of the development of the laser tube technology has been the advent of shorter length, compact laser tubes. The length of a typical laser tube has been shortened by half when compared to lasers of only a few years ago. The shorter-length laser tube has afforded laser system manufacturers the ability to design systems with a smaller footprint.

One such compact tabletop laser engraver is the Laser Pro Venus system from GCC, Walnut, California. The Venus is part of GCC's extensive range of laser engravers. The Venus laser system shares many of the same features as GCC's larger systems, yet it's in a package that's not much larger than most standard computer printers. Recently, I had the opportunity to work with the Venus laser system and explore the many applications and markets for a tabletop laser system. I'll share some of my experiences with you here in my first hands-on review of a full-blown laser system.

The Venus laser system is compact and fits on a desktop.

System Components

Modern laser systems are comprised of three major components: the main laser system unit, onboard electronics and print driver software. The Laser Pro Venus laser system is no exception and it's helpful to look at all these components in evaluating any system.

Main Laser System

The Venus' main laser system looks very familiar, mainly because it's based on GCC's popular Mercury system, which has been in use since 2000. The time-proven mechanical components have been scaled down to fit the Venus and the result is excellent. The design features servo motors and robust mechanicals. The components of the Venus include the beam delivery system, engraving table and laser tube.

The engraving table on the Venus laser system accepts materials up to 8.3" x 11.8". Its table size is among the smallest in its class. The Venus' 17" x 24½" footprint is also among the smallest in the industry.

The Venus' laser tube is a little unique in that it has been shortened in length to fit inside the metal enclosure. GCC offers the Venus in two power ranges: 12-watts and 35-watts. Over the years, CO_2 laser tubes have become quite reliable and one would expect the same of the laser source on the Venus. A typical lifespan for a laser tube should be at least 2-3 years and is often much longer. Primarily comprised of CO_2 plasma in a sealed cavity or tube, the laser output is created by radio frequency (RF) plates along the sides. The RF energy

Product Specs at a Glance

Engraving Field Size	11.8" x 8.3"
Overall Dimensions	24.5"w x 17"d x 16.5"h
Laser Power	12-watts rated power (15.2 watts actual) 35-watts rated power
Print Driver	Full featured for Windows 98 and XP
Color Mapping	16 raster colors/16 vector colors
Rubber Stamp Mode	Included/variable shoulder settings
Halftone Mode	Fine, coarse and error diffusion settings
Computer Connection	PC only with parallel or serial cable
Exhaust	4 inch connection
Air Assist	Standard/air pump optional
Optics	1.5" included; 2.0", 2.5", 4.0" optional
Auto Focus	Standard/motorized Z axis control
Position Pointer	Standard/red visible beam
Memory Buffer	16 MB included, expandable to 64 MB
Safety Class	CDRH class 3a rating

As Printed in April 2003, Volume 28, No. 10 of The Engravers Journal.
www.engraversjournal.com

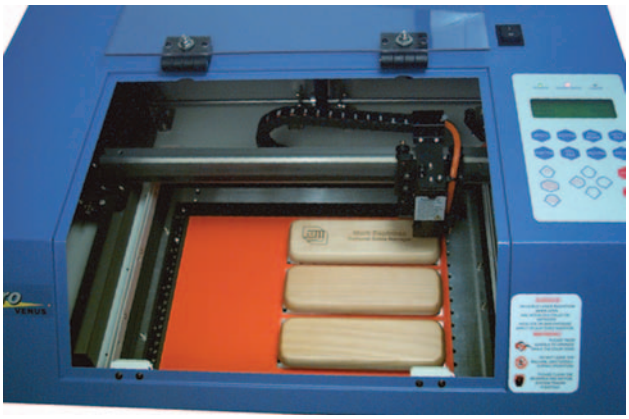

Figure 1: A fixture holds three pen boxes for engraving.

excites the plasma mixture to create the laser energy output.

The response time of the laser I tested was excellent. A fast response time (the minute time interval between when the print driver signals to cut and when the beam begins cutting) is important because this provides highly detailed engraving, even on sensitive plastic laminates.

When people ask me about laser power options for a new system purchase, I always advise them to weigh their needs and the amount of deep cutting or deep engraving versus the price of the system. In other words, higher wattages generally equate to higher system prices, but higher wattages also provide better and faster cutting. A 12-watt laser can engrave on most standard materials and cut up to 1/8" plastic and wood. However, you can expect a 35-watt laser to engrave on the same materials faster and to cut 1/4" plastic or wood easily.

Referred to as the laser's "Z" axis, the engraving table is motorized to raise or lower the work surface in conjunction with the auto focus feature. When using auto focus you will find that production is greatly increased by eliminating time spent manually focusing the job. To use this feature, you merely place the material to be engraved or cut on the table and start the auto focus. The motorized table moves smoothly upward until the auto focus sensor is activated. Manual focus is also available by pressing the "up" or "down" keys on the keyboard.

The beam delivery system can be best described as the optical and mechanical components that position the laser for engraving or cutting. The motorized system uses servo motors to position the mirrors and focus lens quickly and accurately in both the "x" and "y" axes. The nature of a small, desktop system like the Venus is that the mechanics are tightly packaged within the metal enclosure.

When servicing the focus lens and mirrors, I was able to access all necessary areas through the top cover. The optical components featured a unique method to make sure they go back in the same way they came out (Figure 2). This was good, as I did not really pay attention during the removal process to the focus lens and was happy to find it only went in one way, which ensured the lens was positioned correctly!

On the off chance that additional servicing is required, the Venus has a clam shell design enclosure that is hinged and lifts up. The result is an uncluttered look at all the mechanical and electrical components of the laser. Designed for safety as well, the Venus has all the safety interlocks that any laser should have to avoid operator exposure to the laser energy. Specifications for safe laser system design are published by the Center for Device Radiological Health (CDRH) and the Venus classifies as a Class 3a system. Laser systems with Class 1 or Class 3a ratings are among the safest available.

Onboard Electronics

The Venus' laser has its own onboard computer and a touchpad with LCD display for setting machine functions (Figure 3). The onboard computer serves as the controller of the laser tube and servo motors, driving the beam delivery system as well as storing jobs sent over by the host computer. The electronics can control the motors to engrave at speeds varying from .02 to 20 inches per second. You can control the engraving speed from within your design layout by changing the "color" of individual design elements and then programming the various colors to correspond to different speed and power settings. This color-mapping feature allows both cutting and engraving functions in the same job. The control of the laser power is calculated as a percentage of available power. The electronics allow you to use 1 to 100% of the laser power for engraving or cutting.

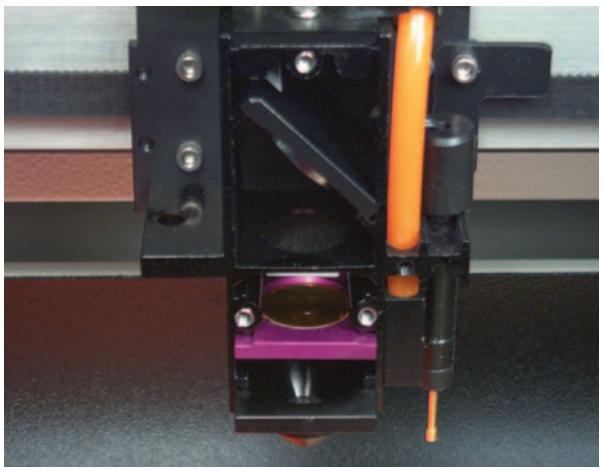

Figure 2: The lens assembly includes a color-coded lens (purple) and slots for the mirror and air-assist cone and hose (orange).

The onboard memory buffer allows dozens of jobs to be stored in the unit's built-in RAM memory at any given time. The display panel (Figure 3) shows the job file name and allows you to select any of the jobs stored in the buffer. The stored file allows for repeating an already engraved job and saves the step of re-downloading the job a second time from the host computer.

The control panel of the Venus has large, easy to read buttons which are well labeled and very functional. The keypad allows editing of jobs in the buffer just in case some final tuning is needed to adjust the power or speed setting to a job already in the buffer. Pause and Resume keys allow the job to be stopped while running and then to pick up right where it left off. This feature allows you to open the top door to inspect the engraving in the middle of the job, then continue on if everything looks fine. The display panel is backlit and the characters are fairly large, so the job information displayed is easy to read. For an extra level of safety, the unit has indicator lights which show when the top door is open and when the laser is firing (Figure 4).

Print Driver Software

The print driver software is an integral part of any laser system in that it converts the digital information from the layout software on the host computer to a format the onboard electronics can understand and execute. The GCC print driver is compatible with standard layout software such as EngraveLab Laser, CorelDRAW, Adobe Illustrator and a host of other standard programs. After the layouts are completed, the conventional "print" function is done in the normal manner with one exception. The printing exception is to click on the "properties" button of the print dialog box to reveal the GCC print driver settings. The print driver is where the power and speed settings for each color used in the layout are assigned.

GCC's current print driver is clean and easy to understand and features six different engraving resolutions up to 1000 dpi. Driver functions include 3-D effects, grayscale settings and a "rubber stamp" feature.

The relatively compact size of the Venus laser limits the amount of large area engraving and cutting jobs that one typically might do in daily production, yet the print driver provides all the necessary support to do highly sophisticated work. The advanced driver seems to be yet another feature taken from GCC's larger laser systems and was chock full of all the same tools the big lasers use. The GCC driver did not disappoint, and all the features worked just as advertised in the detailed owner's manual.

GCC offers print drivers compatible with Windows PC operating systems including 2000 and XP. I was able to test both the Windows 98 and XP drivers and found them to work well without complications. The manual had some excellent printouts of the driver screens and detailed the functions and how to use them in clear and concise terms.

Real World Applications

After a thorough hands-on testing of the technical side of the Venus laser system, I began thinking about how this piece of equipment would work for real world applications. One concern I had was the comparatively small (8.5" x 11") engraving table size and how this would affect the products and jobs that could be created. Next, there was the issue of laser power and just what kind of jobs could be created using the 12-watt laser in my Venus. Of course, as mentioned earlier, the Venus is also available with a 35-watt laser table, where power is less of an issue.

So just what is a good application for the compact Venus laser? Well, quite a few profitable ideas come to mind. First, there is the idea of a retail kiosk style of shop where customers can pick from a range of laser engravable giftware that can be personalized. This is certainly possible, and many laser systems are currently doing just this in malls throughout North America. Several logistical issues should be considered for this application, including how to properly exhaust fumes from the laser system. Pay careful attention to this detail as the fumes from plastics, acrylics and even some woods contain toxins that may be hazardous without proper ventilation.

The Venus also fits the bill for a start-up company with a small budget, offering an affordable entry-level price point. For many small companies, the physical size or cost of a larger laser system could be prohibitive. The Venus would certainly fit the bill as a reliable entry level system.

Figure 3: The control panel is very user friendly.

Another application would be for existing engraving shops to have a system dedicated to rush orders that wouldn't interfere with the production jobs on the larger systems. We all know that one-hour photo processing has become very commonplace, based on the idea that customers will pay extra to have it done in a shorter period of time.

Mobile lasers have been popular in Europe for many years and the Venus certainly opens many new markets by offering the option of taking the laser to an event like a car, dog or horse show, racing events or any other gathering where memorabilia could be engraved on the spot. The Venus laser is both portable and durable enough to transport to events.

The range of materials with which the Venus can work seems almost endless and includes many laser-friendly materials such as wood, acrylic, leather, anodized aluminum, laminated plastic, paper and cardboard. Testing the 12-watt Venus on these materials proved it to be very capable. It provided crisp, clear results. Power, or the

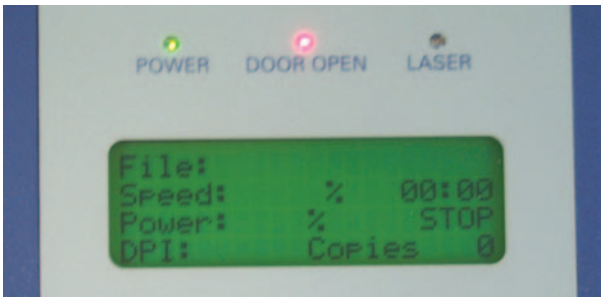

Figure 4: The red light on the control panel alerts the user if the door is open.

lack of power, only moderately limited the material types able to be used on the Venus. Consider, for example, that I was testing the range of materials and not overly concerned with the length of run times to achieve results. Any system with a higher-wattage laser will greatly out-produce a low-wattage system for applications requiring considerable power.

Along the same lines is the list of product types that can fit into the compact Venus laser. This includes, but is not limited to, pens, pen boxes, awards, bottle openers, key chains, business card holders, desk accessories, plaques…and the list goes on! Interestingly enough, small items like key chains engraved about 20% slower than on more powerful, faster systems. This is due to the fact that higher speed systems need time to speed up and slow down on each pass of engraving. The motion system is moving faster but it travels in a longer path, which is only significantly faster on larger sized pieces. So while a really fast (large) laser is faster in all cases, for smaller items the Venus is almost as fast, making it quite productive and a good value for small work.

If you intend to use your laser to perform cutting tasks, there is no replacement for power! The 12-watt Venus laser had no problem slowly cutting thin plastics and wood. In fact, 15 watts was actually measured on the table and provided enough power for engraving most giftware products like pens and pen boxes. However, a more practical solution would be to upgrade to the 35-watt laser tube for anyone who regularly does through cutting. More laser power will translate into shorter run times for deep engraving jobs and offer the extra power needed for cutting thicker materials faster.

Small Package, Full Features

Testing the Laser Pro Venus proved to be an interesting experience due to the unique size and power of the system. Sure, a few customers asked if it was a toy or what kind of laser it would be when it grew up. A toy it is definitely not and I found that good things can come in small packages! GCC has a capable range of laser systems which are backed up by both factory and regional distributors. All together, the Laser Pro Venus performed as expected and in many ways exceeded my idea of what a desktop laser system could be. The compact nature of a laser system like the Venus also proved to open many new markets for lasers and the growing laser processing industry. EJ

About the author:

Mike Fruciano is co-founder of Laserbits, Inc., a company specializing in products for laser engraving professionals. Contact Mike through his Web site www.laserbits.com or by e-mail at mfruciano@engraversjournal.com.

Notes: