Running the New GCC Explorer Laser

By the staff of A&E Magazine

A couple of years ago, A&E tested the LaserPro Mercury 25-watt laser manufactured by GCC of Taiwan and gave it a pretty glowing report. Especially liked was the focus mechanism, the speed, the software driver and the control systems.

This time around, the test was for the new Explorer 60-watt laser, which has many of the same features, but each one has been stepped up a notch. The driver is smoother, easier and more flexible; the focus mechanism is basically the same and still the one we like best of all the lasers we have tested; the speed is up, and with a couple of minor exceptions, the machine gets pretty much a solid "A". Here is what we liked and what we didn't like:

CONSTRUCTION

The design and construction of the cabinet is even better than the earlier machines. Well built, strong and nicely finished. The top opens wide to allow easy access to the engraving area, and we really appreciated the interior lighting system. The version tested ran on the specified 220 VAC but it can also adjust (automatically) to 110 VAC.

The unit is big, just short of 51"x 29 x 39" with an engraving area of 32" x 20", and can be expanded to 38" x 20" by using the SmartACT feature. It came with air assist and rotary device (sold separately) so we were able to try a little bit of everything—which we did.

Especially nice was the charcoal filtration system (sold separately) that accompanied the test machine. It performed very well, removing all smoke and almost all odors associated with the products we engraved. Some odor did remain when engraving rubber stamps and cutting acrylic but it was much less than most other lasers that export smoke to the outside rather than filter it. These filters are expensive ($2,000-$3,000) but if you are in a mall situation or other location where outside venting is not feasible, this little (24" x 24" x 30" high) did an outstanding job. Filters do have to be serviced from time to time so be sure to build this into your budget.

The one negative was the fact that the laser came fully assembled. Although most would see this as a positive, if you have to take this up or down stairs, through doors or around tight corners, you may have a problem. (With an overall depth of 28.5″, it does fit through a standard 30″ door opening.) At over 400 pounds, this machine isn't portable. (However, the machine is fitted with heavy-duty casters and rolls easily across any workshop floor.) Advance planning needs to be given to how one will get it off the delivery truck and into your work area. We uncrated the machine outside and then rolled it into place, but even that was a chore. The positive side to this size/weight issue is that there is nothing to set up or assemble, and the additional space made possible by using this approach made for some very nice, clean design elements. The inside of the machine really is as nicely designed as the outside.

PRINT DRIVER

A refined print driver, organized in five tabs, offers the basics (power, speed & PPI x 16 colors) and then some. The *cluster* function enables the Explorer to skip horizontal white space between two adjoining graphics, saving time. A *bottom to top* (handy for wood, etc.) or *top to bottom* selector allows control of the engraving direction. *Vector sorting* enables the machine to perform inside-first, outside-last cutting priority. *Optimization sorting* saves time by reordering vector cuts. *Mirror* and *Invert* provide versatility if the application software lacks these commands. *Print Immediately* is an auto-start feature. All settings employed in the driver can be saved with descriptive long filenames, or saved as defaults. Other settings include: 21 dithering patterns and an error diffusion setting for halftones, contrast adjustment (photos), and a customizable stamp mode.

MOVEMENT MECHANISM

There are two types of movement designs in our laser industry: servo motors and stepping motors. Most will agree that servos are best for general use, and the Explorer does employ this type of motor. The problem with stepping motors is that they tend to lose track of where they are over the engraving area when they are bumped or they are run too fast. Servos eliminate this problem and afford a powerful movement mechanism as well. The servos tested in the Explorer worked flawlessly.

COMPUTER INPUTS

Input devices include the usual parallel and serial inputs but also include a USB input.

SPEED

Every laser manufacturer brags about the speed of their machines. This machine engraves at a full 80 inches per second. It is hard to appreciate how fast that is until something very large is being engraved. Remember, speed and power must work together. Having lots of speed and inadequate power doesn't help. Speed becomes an advantage only when the laser offers the power necessary to keep up. At 60 watts, this machine allows for full-speed operation on most products, including many woods. (It still might be preferred to slow down the machine and get a deeper engraving but that is strictly personal preference.)

The control panel is simple and easy to use. The machine's ability to remember jobs is really a helpful improvement.

RAMPING

The problem with speed is something called *ramping* (also known as acceleration and deceleration). Each time a laser's mechanism moves to the edge of a product being engraved, it must slow down, stop very briefly, and then come back up to speed in the opposite direction. When engraving small items, it can actually take longer to ramp up and down than to do the engraving. To help control this, LaserPro has built something into their software called SmartACT (patent pending). This affords the laser the ability to make a much shorter ramping process than it would normally, resulting in a shorter distance traveled in each raster pass. This shorter distance traveled translates into quicker job run times, and higher productivity. In addition, when using SmartACT the engraving area width goes from 32" to 38". A simple checkbox in the print driver allows the user to switch this feature on or off.

LASER TUBE

The laser, mounted below the cabinet to reduce the depth of the machine, fires the laser beam sideways to the first mirror where it is redirected at 90 degrees upward, toward mirror #2. A total of four mirrors are used. The machine tested was fitted with an air-cooled, 60-watt laser tube.

MANUAL

Significant improvements have been made in the manual that accompanied the laser. Although the English is still a bit rough, and it should be proofed by someone with English as a first language, the manual provided clear, simple instructions for the end user. We especially appreciated the care given to helping the user clean and service the machine. The manual included lots of color pictures to help illustrate what was being discussed.
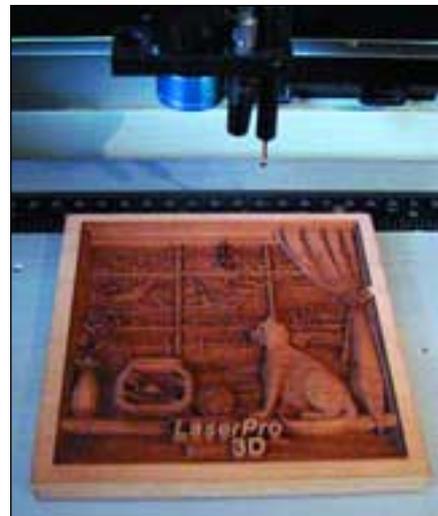
AIR ASSIST

Air assist is one of our favorite features on any laser. When engraving wood, rubber or cutting acrylic, air assist is a must. Unlike some lasers, the LaserPro lasers come pre-plumbed and ready for air assist whenever you want to add it. Likewise, LaserPro offers a very nice little compressor to go along with the laser. Of course, any little hobby compressor will get the job done, since only about 10 psi is the most one would ever need. Be aware that some laser manufacturers tend to overprice add-ons like compressors, so it is always wise to ask lots of questions and do a little shopping around.

Our test machine not only came with a compressor but also a moisture control system which, although we're not sure how much it is really needed, certainly can't do any harm. It mounted nicely on the front of the laser—a nice finishing touch to insure any air reaching your engraving product is perfectly dry.
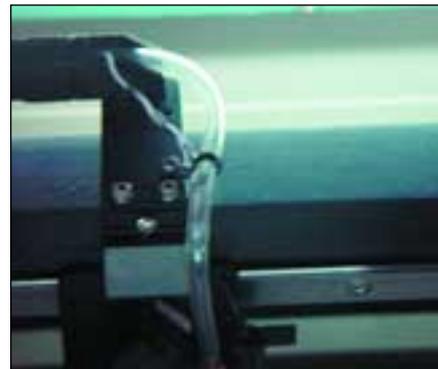
More important is the way the air is distributed onto the surface of the engraving substrate. Of course, the amount of airflow
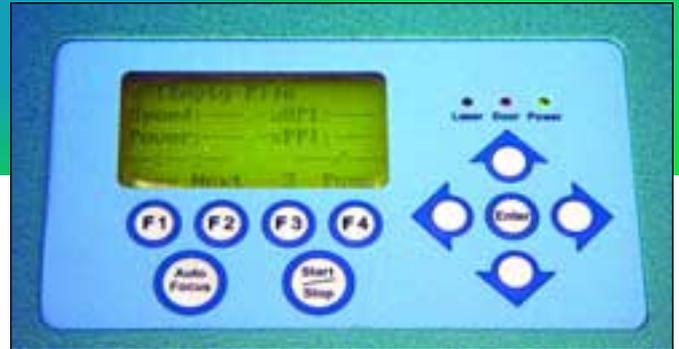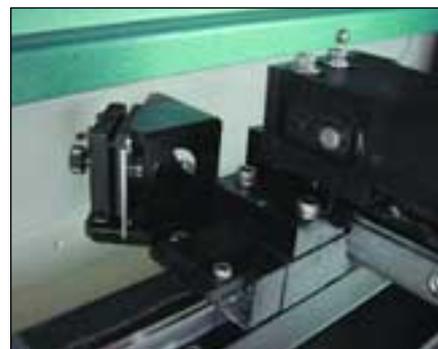

The laser's ability to engrave 3-D images has much improved over previous machines. This ability may well be commonplace in lasers of the future. 3-D engraving is slow but very impressive.

The clear hose is part of the air-assist system. All machines come pre-plumbed for air assist.

The X and Y axis is controlled by a servo motor. Servos are very fast and accurate. Although they almost never need servicing, the LaserPro's control systems are easily accessible.

can be regulated by a valve mounted on the right front corner of the laser (adjustable when using any air source) or at the compressor itself if using a generic compressor, but what about controlling the spot where the air is going to strike? Because the laser can be fitted with different focal length lenses (1.5, 2.0, 2.5 and 4.0 inch), always having air expelled at one given spot doesn't always get the job done. LaserPro has designed a nozzle that can be rotated to insure the air goes exactly where it is needed. Of course, some care should be taken not to move the nozzle accidentally when loading or unloading jobs.

CUTTING GRID

When cutting materials such as acrylic or wood, it is very helpful to have a grid-type cutting table. The table that accompanied our test machine was very nicely made, although it was very large and a bit clumsy to install. It performed well with its deep grid and fit tight against the back of the laser. At first glance, this appears to be a good design, but it does make it difficult for the exhaust to draw smoke directly from underneath the grid, which we feel would be ideal. The frame holding the fragile honeycomb grid was well built, strong and durable. A modification to allow air to exit from under the grid would be a plus.

ROTARY FIXTURE

The rotary device sent with the laser performed very nicely. It was easy to use, simple to install and did a good job holding objects, especially stemware, glassware and similar items. The software was easy to use and straightforward. Setup was pretty much automatic, making it simple and fast to install and un-install the device.

AUTO FOCUS

All LaserPro models offer the ability to focus their engravers on the spot, meaning you can manually move the engraving head to any location and press the Auto Focus button, and it will automatically focus without moving on the X or Y axis. This makes for fast, accurate focusing. Many lasers are programmed to move to a pre-set location before they can focus. Alternatively, operators can choose to use the manual focusing tool (a metal rod that drops into a hole on the engraving head device). To manually focus, the operator simply uses the manual focus tool. It is easy to use and easy to see when the machine is properly focused.

RED DOT POINTER

Like many of today's lasers, this machine does have a red dot pointer. This is a very low power red LED that cannot mark the product but can show the user where it is going to engrave text or cut vectors. Of course, it can be turned off and on and does come in handy from time to time. Remember, red is a color that is absorbed by some products rendering it invisible.

ORIGIN

Most lasers begin by measuring from the zero X and zero Y position (upper left hand corner) of the laser. Within the Print Driver on the Explorer, this is referred to as Home under the Position Mode. The Explorer can begin engraving anywhere you place it by selecting from one of four possible modes: Home, Without Home, Relative and Center. Relative allows the operator to simply position the Red Dot by moving the lens carriage by hand anywhere in the work area, thus indicating the top left hand corner of the layout.

It might be considered a *floating zero*. This, coupled with the red dot pointer, makes it easy to insure exactly where the engraving is going to begin. No longer does one have to place everything to be engraved in the upper left hand corner. Just place it anywhere on the table, position the engraving head to the place you want it to start and press start.

It is also possible to save a relative position in the memory of the laser; recall it to resume or repeat a previous job. This is especially handy with odd-shaped parts and fixtures. In addition, if you have an odd-shaped object, just point the red dot to the center of the object, and regardless of where your layout is on the paper, the center of your image will engrave on the center of your object.

LIGHTS

The engraving area of a laser is not unlike a dark cave. It is difficult to position room lighting in such a way as to illuminate the interior of a laser without creating a ton of shadows as well. The E-60 has four slender light tubes inside the laser cavity. These do a good job, making it much easier to see rulers or engraving, or to position product. These turn on and off automatically with the laser, but there is also a separate switch inside the engraving cavity for those who want to control them manually.

FIRE SAFETY

Fires with lasers are rare, but the potential is always there. When working with a laser as powerful as the E-60, it would be easy to set fire to rubber, plastic or even wood products. In a laser, a small fire can do a lot of damage in a very short period of time. Forgetting to turn on the exhaust system, for instance, can easily result in a fire. Leaving a running laser unattended is asking for trouble.

To deal with this potential danger, LaserPro is offering a device called SmartGUARD that senses fire and alerts you of the danger. It can be set to allow flame-ups of as little as one second or as long as eight seconds without going into alarm. Our test model did not have this device installed, so no testing was done, but this is a very good idea since engravers often give their attention to other tasks once a job is started.

OVERHEATING SAFETY

Another safety device that was on our test machine was its ability to monitor the temperature of the laser tube. This feature monitors what is going on and automatically shuts down the machine should the laser tube become overheated. We suspect it is very rare that a tube would ever overheat anyway, but should a cooling fan quit working or an air intake become blocked, it would not take very long to do a lot of expensive damage. This is a nice feature that, hopefully, no one will ever see actually work.

BUILT-IN MEMORY

All lasers have some memory built in to store jobs. The Explorer can have up to 64 megs of RAM memory to store jobs. What makes this feature unique in the LaserPro is the fact that it remembers jobs, so the operator can run jobs from the previous day without using the computer. A maximum of 100 jobs can stay in the Explorer's buffer until they are deleted by the operator, or until the machine is powered off. The operator can choose to delete any one job, or all jobs from the menu. It stores commonly used jobs so they can be pulled up and run at will. This is a nice feature for production shops.

3-D ENGRAVING

Laser manufacturers seem to have reached a design plateau. These lasers can only go so fast, and some manufacturers actually produce lasers that move so fast the quality of the engraving is greatly sacrificed. Only so many features can be offered. These bells and whistles are nice to have, but they don't do much to cause people to buy lasers, or even to motivate existing laser owners to upgrade. Manufacturers have long been looking for something new to offer that will cause people to want to buy a new laser.

LaserPro has invested a lot of energy and advertising into their ability to do three-dimensional engraving. This could well be the next great advance in laser systems. Other companies are also beginning to offer this feature in one form or another. The ability to do 3-D is, in its most simplistic form, the ability of a laser to see the many shades of gray generated in an image and translate that to a variety of power settings. It is the varying power settings that result in the 3-D appearance.

Unfortunately, the ability to produce artwork worthy of 3-D is still limited and complex. Likewise, the time required for engraving in 3-D is cost prohibitive for many applications. Still, for those applications where 3-D is warranted, this laser's ability is interesting. Things like wooden coins, dies using special laserable materials and similar products could open a high-profit niche. New materials being developed may further open the window for 3-D work. Thus far, the best application we have heard of for a lasered 3-D product was for a Las Vegas baker who had coins engraved in 3-D. He places the coins in the bottom of bread pans so the resulting bread has the casino's logo embedded in it. The type of material used is not known.

Likewise, coins, molds and other high-relief products can be made, and it would not be a great surprise to see these kinds of products become a common product at some time in the future.

Determining what laser is best for you requires consideration of at least four elements:

1. The capability of the laser itself. This includes the way it is designed and built, and how it operates.

2. The machine's long-term service record, including part failures and items that need continual or repeated service.

3. The software, including the print driver and how well it performs, how easy it is to use and how often it is updated by the manufacturer.

4. The quality of support, training and repair services. These will vary from manufacturer to manufacturer, from one area of the country to another and from one company representative to another.

A test review like this one is helpful in determining two of these elements (1 and 3) but cannot determine the quality of service given by representatives nor the longevity of a machine. These must be determined by talking with those who have gone before you. Doing one's homework is always a good idea when making a decision about a laser engraver. For us, however, this Explorer laser did an excellent job and would be a welcome addition to any shop. **A&E**
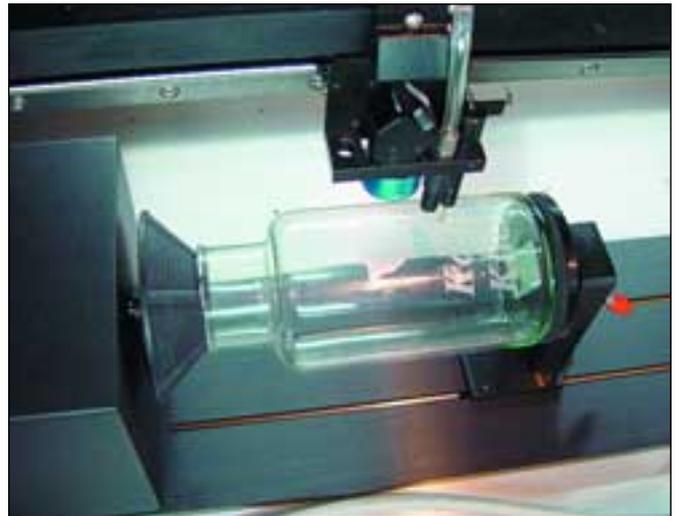
The rotary fixture is easy to install and performed very well. The supporting software was also very easy to use.
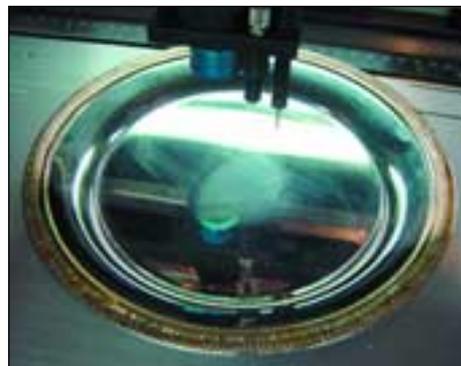
The ability of the Explorer to use any point on the engraving table as its beginning point is a super feature (left-top or center-center origins are possible). It takes a little getting used to but makes what would otherwise be a difficult job to set up a snap. Just drag the lens assembly to where you want it to start engraving and tell it to go. This allows the laser to engrave inside of deep objects like bowls with no difficulty and no complicated set-up.

For further information, please contact the company.

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