# RDWORKS

# TRAINING MANUAL

**TRAINING**

Instructed By

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RDWorks for Laser Engravers ®

# RDWorks Table Of Contents

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*See Additional RDLaser Manuals for more in-Depth Instructions*

## Major CheckPoints

Intro to RDWorks

1. Welcome to RDWorks

2. Our Main Staff

3. Laser Line

4. Support
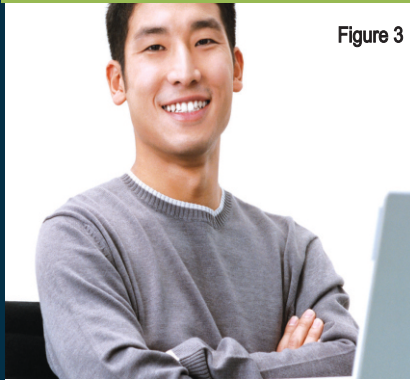
Figure 3

# Laser Installation

An American Company Supporting Top of the Line Lasers from $CO^2$ to Galvo-Fiber to Deep Metal Cutting!

Figure 4

## Installation Video I

WATCH FOR THIS:

Figure 1

COREL

### 1. Welcome to RDWorks:

**A)** Welcome to the RDWorks for Lasers: the purpose of this Tutorial Manual and its Instructional PDF Fliers is not only get the unit up and running, but for you to make money with it.
**B)** There will be a series of One page subjects with Videos and add-on sheets of data or sample jobs to train you.
**C)** This, in concert with the Corel or EngraveLab Graphics courses and the On-site or PC to PC training, should have you very proficient in no time. Installation is the most important job we do at Engraver's Choice, now let's move forward.

## TRAINING DATA COVERED HERE:

1. Introduced you to the Course.

2. Presented the Rdworks Team.

3. Showed our Support Vehicle.

4. Welcomed you to RDworks.

"Tip"

*The Laser can run from any Software through the RDWORKS Interface or Power Cell. We support it from Corel X3 or better and from EngraveLab. These Packages are the Backbone of the Industry and are in most shops throughout the world.*

C02 LASERS

GMTech

Figure 2

### 2. Our Main Staff
**A)** The Main part of our Staff is our Post Assembly and Q.A. Teams.
**B)** The Core Operation is in SoCal. staffed with Technicians and Applications Experts. See our 'Bio' on the Website and catch our on-line training sessions.
**C)** I am Joe Braga I have owned engraving and sign operations and run technical support for many of the manufacturers out there. Catch my 'Bio' at www.engraverschoice.com. We are a balanced team and have Demo sites throughout North America and are here to help. Call us anytime to instruct you with whatever questions you may have from Software to Hardware to Pricing and Shop marketing of your individual product lines.

### 3. Laser Line
**A)** A Laser Line ranges from our entry LS 1426 to the Class 4 LS 5298 to the Fiber Metal Cutting and Marking units.
**B)** The Hybrid units is one of our larger enclosed laser machines. Boasting an expandable working platform of 36 x 50 inches, with up to 180W of power.
**C)** T20/50W fiber laser enables you to permanently mark or etch firearms, tools, parts, jewelry, bar codes, serial numbers, industrial polymers, etc. When you call just inform us of what you have or text us your questions. Most questions will be software related to either Corel, EngraveLab or RDWorks interface.

### 4. Support

Call us at Engraver's Choice

from 8 PM to 8 PM Monday thru Friday and 10-2 on Saturdays.

We provide Phone and PC-2-PC support as well as the Video Packages and Onsite service.

# Key Steps to our Goal

**Main Task: Intro to BOSS**

1: This section will be used to show the Main Keystrokes for the main Tasks.

2: We only cover the Keystrokes for the Major Features shown on the Page.

3: We cover areas just for that Subject.

4: We will talk about Commands that we will need to complete the task at hand

5: We hope this will be helpful in simplifying the process.

E

Figure 3

# Unpack & Inspect

Learning the Safety Precautions is Critical to you and the operation of the Laser.

Figure 4

**Level the Laser with the Bottom Pad Mounts**

4-5' Fume Exhaust Ports Double& Single Hook-ups

## Installation Video II

## Major CheckPoints

**Unpack & Inspect**

1. Pre-Installation Sheet

2. Uncrate & Tie-Straps

3. Position Laser & Inspect

4. Safety & Check the Tube

---

**1. Pre-Installation Sheet:**

**A)** There is a Pre-Installation Sheet that has a Check-list of the items that we will go over.
**B)** You will get the Laser unpacked and in place, Inspect it, load drivers and run tests.
**C)** Check the unit and prepare it for training and final installation. We will being training on the Laser Operations, Pendant, LaserWorks and more than likely Corel or EngraveLab. We will complete the Applications Training and Dial the machine in for the major materials that you will produce.

### TRAINING DATA COVERED HERE:

Be careful. Laser machines are powerful tools designed to cut or engrave with highly focused heat energy. Never leave your laser unattended and never let anyone unfamiliar with your machine operate it. Always keep access covers on and top lid closed. Avoid any direct exposure and never stare at the laser light while operating. Read and understand all of the warning labels attached to your machine. ALL safety measures must be strictly enforced and abided by. BOSS LASER shall not be held responsible for damages or injury resulting from improper use or dismantling of the laser machine.

**"Tip"**

*In Case of Fire:*
*1.Press the EMERGENCY STOP button located above the LED Panel*
*2.Lift the lid*
*3.Quickly blow out the flame (or use a CO2 fire extinguisher for serious flames, but do this ONLY as a very last resort)*
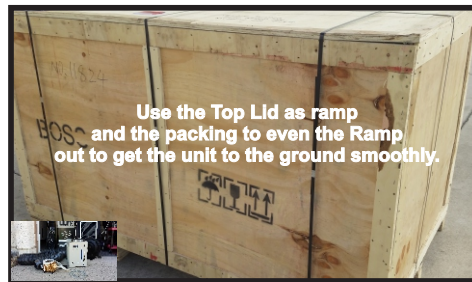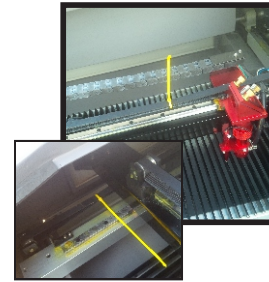
**Use the Top Lid as ramp and the packing to even the Ramp out to get the unit to the ground smoothly.**

Figure 1

Figure 2

**2. Uncrate & Tie-Straps**
**A)** *Plug into 110 or 220 VAC electrical Outputs LAST*. We have a 6" Portal for the Laser Exhaust. When un-crating the Laser remember to be aware there are many items inside.
**B)** Uncrate the laser and roll it into place. Then go through the Shipping checklist to verify all components are there. You must remove the tie straps or tie downs from the Motion System.
**C)** Recheck the pre-installation checklist and verify that all items were received, intact and not ship damaged, especially, the Laser tube. If the Checklist is complete move forward to the next section.

Figure 2

**3. Position Laser & Inspect**
**A)** Once rolled into place, evaluate that all the internal tie-straps are removed, so the motion system can go to the home position for the first time. Now, look to see that you are prepared to start to do the hook up of the hoses and cables.
**B)** Recheck that all packing is removed. Pull the Bridge of the motion system to and away from you.
**C)** Now push the Lens Carriage to the left and Right, Mount the Lens if needed to the Carriage assembly. *Remove all extra grease from the rails.*

Figure 3

**4. Safety & Check the Tube**
A) Read Safety requirements in the BOSS Manual. Now look at the Tube and see that there are two electrical connectors of different types on each end.
B) The Tubes beam points at the First mirror about 1/4 away from the mirror. The Connectors are aligned so that we can not get it in backwards.
C) Check the tube hoses for the water chiller you can secure them with tie straps. The Tube should have Duct tape wrapped around it in two places, This is where you clamp to it and level it.

Figure 4

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## Key Steps to our Goal

**Main Task: Unpack**
Make sure you are ready with necessary tools and plenty of room for laying out the parts and accessories of your new laser. Our crates are usually banded to a wooden pallet for safe shipping. If you see any damage such as pierced or broken plywood take a picture before removing bands. If it looks smashed or opened take more pictures. The machine is insured for its value and may be damaged if the crate is badly damaged.

Cut any bands. Then carefully remove the top lid. Be careful not to use any part of the plywood interior for a focal point on pry bar. Stay on the outside framing to ensure not piercing plywood and damaging machine. Once the top lid is off, look inside and find any loose boxes containing accessories. Remove any box that may fall when sides are removed. Remove front panel and then two side panels, then the back panel. Save the crate panels in the event you ever need to move the machine again.

---

**WATCH FOR THIS:**
Saftey Checklist
Figure 1

•NEVER operate laser machinery unless you have been properly trained.
•ALWAYS use protective eye-wear,
•ALWAYS turn the Exhaust Fan on while running the laser.
•NEVER sit anything on top of the laser.
•NEVER leave the laser unattended. Remain with the machine when it is running at all times
•ALWAYS keep the machine's environment free of heavy pollution such as strong magnetic-electrical interference.
•NEVER use unapproved or unsafe materials, such as Polyvinyl Chloride (PVC)
•NEVER operate the laser near flammable and explosive substances. The UV light beam that is emitted is not visible and poses a great fire hazard.
•NEVER open the upper cover of the laser machine while it is running & NEVER engrave a shiny metal or mirror. The laser beam can reflect and deviate
•NEVER push or pull the laser head and its gantry while the laser is running.
•NEVER dismantle the laser machine. There are laser and high voltage/pressure parts that could cause harm or injury.

## Major CheckPoints

**Attach Hoses & Cables**

1. Mount Tube to Laser

2. Hook-up Hoses

3. Fill Chiller & A/C Connect

4. Recheck All & Power-up

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**Figure 3**

Chiller Side: Water *OUT* ----to ---Laser Side Water IN
Chiller Side: Water *IN* ----to ---Laser Side Water *OUT*

WATER IN   AIR IN   WATER OUT   CHILLER SIGNAL

Chiller Out ↑     Chiller In ↓

*Use a Small Heat Gun or Hair Dryer to Soften Hose to get them to Fit onto the Barbed Outlets*

# Attach Hoses & Cables

Hooking the Hoses and A/C Cord up

to the Laser and Machine homing the unit..

**Figure 4**

TESTER

## Installation Video III

The purpose of the air pump is to blow air through the laser head therefore blowing debris and smoke away from the beam, while allowing for cleaner cuts and protecting the lens. The air pump on/off switch should also be close by, and preferably on the same circuit as the water pump and exhaust fan to ensure its operation when running the laser machine.

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### 1. Mount Tube to Laser

**A)** Normally, the Tube is already mounted in the Laser, but if you need to mount it is this simple.
**B)** Mount the Tube so the beam points at the first mirror about 1/4" away from the first mirror. Now connect the Electrical connectors and the hoses for the water chiller either with tie straps or clamps.
**C)** The Tube should have tape wrapped around it in two places, so you can screw the clamps in around the wrapped taped areas (2) of the tube. Adjust the gap of the Tube to the mirror from 1/4" to 1/8" and tighten the clamps screws in. Make sure the Tube is Level and put the Cover down and you are done.

### TRAINING DATA COVERED HERE:

Be careful. Laser machines are powerful tools designed to cut or engrave with highly focused heat energy. Never leave your laser unattended and never let anyone unfamiliar with your machine operate it. Always keep access covers on and top lid closed. Avoid any direct exposure and never stare at the laser light while operating. Read and understand all of the warning labels attached to your machine. ALL safety measures must be strictly enforced and abided by. Boss Laser shall not be held responsible for damages or injury resulting from improper use or dismantling of the laser machine.

**"Tip"**

**Chiller Hoses:**
1. Chiller *OUT* to Laser *IN*
2. Chiller *IN* to Laser *OUT*
3. Chiller Signal outlet must attached on both ends or laser will not *Fire*.

**Figure 1**

Air Pump

CW-3000
INDUSTRIAL CHILLER

**Figure 2**

### 2. Hook-up Hoses

**A)** The water pump requires two lines; one to the **water in** and one to the **water out** barbed fixture. Most Boss Lasers tubes are water cooled and the laser machine will not fire if water is not flowing. *Make sure to **not** get the lines reversed.*
**B)** One Hose goes from **OUT** of the Chiller side to the **IN** of the Laser side, the second hose **IN** on Chiller side and to the **OUT** on Laser side. Plug the Chiller Signal outlet in on both sides, without this the laser will not fire.
**C)** The Air pump hose needs to be attached to the Air inlet fixture. Now attach the two Exhaust Blower hoses from the Laser to the blower with clamps, then from Exhaust blower to the to the wall outlet. Attach the external ground designed to help eliminate static electricity. Just run the included ground wire from the connection to

**Figure 2**

### 3. Fill Chiller & A/C Connect

**A)** Open the Tank Cap on the top of the Chiller and with a Funnel, Fill the Chiller tank with 2-5 gallons of DISTILLED water depending which chiller you have, and replace cap.
**B)** Plug in Chiller A/C power cord into the Laser Surge Protector, and the Air Pump and Exhaust Blower Power Cords into another Surge Protector.
**C)** Next after a final recheck, Plug the 'Isobar' Protectors for the Laser - Chiller along with the PC or Laptop Power Cord(s) into a Dedicated A/C outlet

**Figure 3**

### 4. Recheck All & Power-up

**A)** Review all items, check that the Motion System is free moving on both X & Y Axis. **Check that the tube has its Silicon White covers over its ends to keep arcing from happening**.
**B)** Turn on the Chiller, then turn on the Surge protector. Turn on the Laser and PC.
**C)** All should be on, the Laser Pendant should light up. Walk around the laser and listen for arcing. Now press the '**RESET**' button. The Pendant and the Laser will move to Machine Home.

**Figure 4**

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# Key Steps to our Goal

**Main Task: Exhaust Hoses**
The **exhaust** requires the most effort and its importance can't be overstated. The laser vaporizes material as it moves along its axis, generating large amounts of smoke. The exhaust is necessary to remove this byproduct. Duct exhaust to the outside, away from any area where co-workers may congregate. Correctly ducted, a laser can easily be placed in an office or spare room.

Larger machines with two exhaust ports; the top port with flange is designed to remove air from above the material during engraving/etching for example. This is the most common of exhaust outlets to use. The lower port is designed to draw air from below the material, during cutting for example. First, this port also removes air and all associated debris from the working area as soon as possible. Second, this lower unit will act as a vacuum to hold down light material such as cloth or paper. Notice there is no flange on the lower port.

4 YEAR Warranty

## Major CheckPoints

**Testing Laser & Drivers**

1. Test Motion System & Focus

2. Set Origin & Test Fire

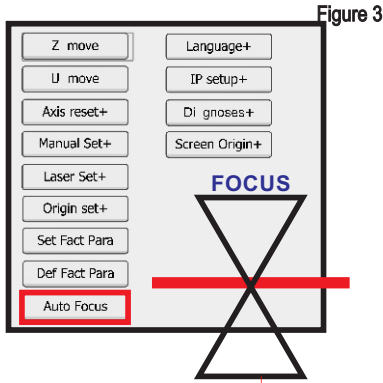3. Install LaserWorks/ USB Driver

4. Install Power Cell Driver

---

**Figure 3**

Z move | Language+
U move | IP setup+
Axis reset+ | Di gnoses+
Manual Set+ | Screen Origin+
Laser Set+
Origin set+
Set Fact Para
Def Fact Para
Auto Focus

**FOCUS**

## Testing Laser & Drivers

Hooking the Hoses and A/C Cord up

to the Laser and Machine homing the unit.

**Figure 4**

### WATCH FOR THIS:
Install Laserworks

**Figure 1**

Welcome to use

Install USB driver | Unistall USB

Type: | LaserWork
Language: | English

☐ Locate install path
☐ Pen drawing lines
☐ Plug LaserWork

Install | Exit

Welcome to use

Install USB driver | Unistall USB

Type: | CorelDraw_Laser
Language: | English

☐ Locate install path
☐ Pen drawing lines
☐ Plug LaserWork

Install | Exit

## Installation Video IV

### 1. Test Motion System & Focus

**A)** With the Laser on & the Pendant lit up, use the Arrow keys to jog the laser carriage around, then hit 'Reset' to Datum the laser.
**B)** Now Jog the laser carriage over some Laser-able Material with the *Plunger over the Material,* as well. Then hit the **Z/U** button on the Pendant, press the **left or right** arrows; you will see the table move up and down,. If you are 2.5 inches from the material, you are in Focus. See that the plunger is a little below the Air-Nozzle, this is important..
**C)** When you hit the **Z/U** key the Pendant screen will change. The **Auto-Focus** icon is on the bottom of the Screen, arrow down to it and hit '**Enter**'. The Table will rise to the Focus Plunger and return to 2.5 inches from the Lens; **No Focus – No Burn**.

**Training Data Covered Here:**

1. TESTED THE LASER'S MOTION SYSTEM
2. TESTED & FIRED THE LASER TUBE.
3. SET AN ORIGIN FOR POSITIONING.
4. LOADED THE LASERWORKS GRAPHICAL INTERFACE.
5. LOADED THE USD DRIVER
6. LOADED THE CORELDRAW POWER CELL.

*You will have to check this with the Acrylic Manual Focus Tool*

Acrylic Manual Focus Tool

**"Tip"**
**Plug-in software support a version from CorelDrawX3 to X7. The installation of CorelDRAW X7 to introduce the installation process of plug-in software.**
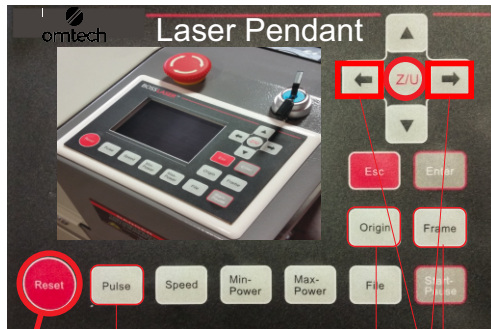
### 2. Set Origin & Test Fire
**A)** Jog the Laser Positioning Light to the Top/Right Corner of your plate and hit the '**Origin**' Button on the Pendant.
**B)** The Laser will begin the fire from this point. Either working top to bottom in Scan or Raster or Bottom to Top, as you will control.
**C)** Next move the Red Position Diode Light to the Center of the material. Now hit the '**Pulse**' button and the Laser beam itself should fire. Once the beam fires it shows that the Laser tube is operational. Hook the USB cable to the Laser and to the PC or Laptop. Check the laser to see if the Chiller is working.
**Figure 2**

### 3. Install LaserWorks/USB Driver
**A)** Either insert the CD that came with your BOSS laser or get the Software from the BOSS Laser support site.
**B)** Install the LaserWorks software for English and the open LaserWorks and Close.
**C)** Next, Install the USB Driver at the top of the Dialog. This is the main Interface LaserWorks and USB Driver that allows you to send data to the laser via USB.
**Figure 3**

### 4. Install Power Cell Driver
**A)** Load the Full Power Cell for CorelDRAW or EngraveLab.
**B)** Do not have CorelDRAW or EngraveLab open and once it is complete you can close the installer completely.
**C)** All the Drivers and interfaces are loaded and we are ready to align the Full Power Cell within Corel or EngraveLab.
**Figure 4**

1. Install/Uninstall USB driver:
2. According to the different customer application needs & the habit of using
a)LaserWork.
b.The software that plugs-in to CorelDraw x3-x7
c.The software that plugs-in to AutoCad. Support the version from 2004 to 2010.
d.The software that plug-ins to Illustrator.
3. Choose a different installation language
4. Select the software that matches the motherboard
5.Locate install path When installing LaserWork, default install path is , to change the install path, check this option.
6. Pen drawing lines This option is only applicable to a particular machine, which has the function of the chalk line, ordinary machines do not need to check this.
7. Plug laserworks The installer default install is a special plug-in RDPlug. If the users are more accustomed to using LaserWorks program you can check this.

---

**Laser Pendant**

omtech

**Figure 1**

Datum Laser | Laser Beam Will Fire

**Inside cabinet door on right side of laser**

Seat Positioning | Track Layout

In Z/U Left/Rgiht Arrows for Up/Down
**Figure 2**

## Key Steps to our Goal

**Main Task: Laser Pendant**
**RESET**: Datum or Reset whole Laser System.

**Origin:** Set Relative Starting Point to the Laser Layout

**Pulse:** Pulse or Fire the Laser Beam to the Material

**Frame**: Track around the outside of the Layout.

**File:** Pick up File Download to the Laser or Udisk

**Star/Pause:** Start or Pause a Job Downloaded to the Laser

**Left / Right Arrow Keys:** JOG the Lens around the Table via the Motion System.

**Up/ Down Arrow Keys:** To move the Table Platform up and Down to focus to the Material.

## Major CheckPoints

**Testing Corel Power Cell**

1. Test Power Cell

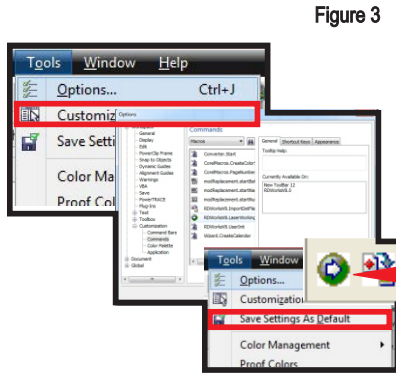2. Create a Test Job

3. Download a Test Job

4. Run the Test Job

Figure 3

# Testing Corel Power Cell

Installing and testing the Power Cell

For CorelDraw, AutoCad, Adobe & EngraveLab

**Figure 4**

# Installation Video V

**WATCH FOR THIS:**

Corel Macro

**Figure 1**

For some versions of CorelDraw (such as green version) may not automatically navigate to the location where CorelDraw is installed. Only need to check "Locate install path" on the installation software, and then manually browse to Folder navigation. Exit the installation program, and run CorelDraw.

**1.Test Power Cell**

**A)** To Test the Full Power Cell we first must get our Power Cell Icon to the Standard Bar of CorelDRAW or EngraveLab.
**B)** In Corel, click 'Tools' Pull-Down Menu and click on 'Customization'. Then select Commands and within that Dialog select Macros.
**C)** Now Highlight the LaserWorks Icons and Drag them to the main body of Corel. Click 'OK' and Drag the icons to the Standard Bar at the top. This is the Case for both sets if needed. Click on the Icon to show that the Power Cell opens. Shut the Power Cell down and click the 'Tools' Pull-Down and click the 'Save Defaults' to get the icons to remain.

Training Data Covered Here:
1. Tested the Power Cell ICON
2. Created a TEST Job
3. Downloaded test job to the Laser.
4. Ran test job on the laser.

**"Tip"**
You can have two LaserWorks Icons for the Power Cell and One to Drop the layout directly into LaserWorks Main Graphics Interface Program.
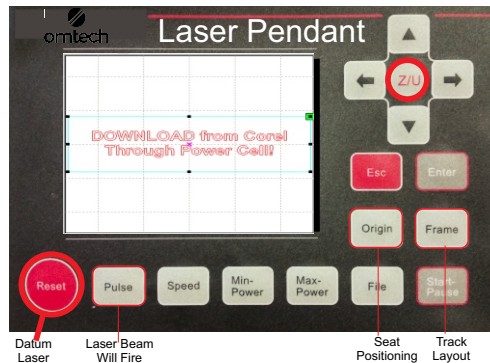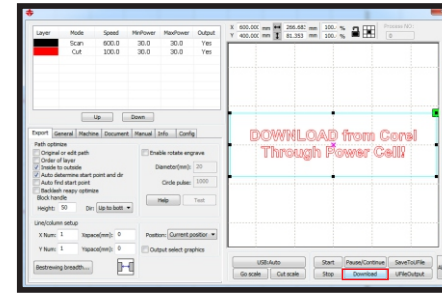
**2. Create a Test Job**
**A)** In CorelDRAW click on the Property Bar and make your Plate Size 2x4 landscape.
**B)** On the **TOOLBAR** click the **Text** icon and click in the middle of the plate and Type 'BOSS Laser' and then click on the **Pick** Tool at the top of the **TOOLBAR**.
**C)** Grab a corner node and then Click and HOLD to Resize the Text. Now hit the '**P**' key on the Keyboard to center the text to the Plate. Whatever Font you have is fine. Next Click on the Rectangle Tool & put the mouse cursor in the top/left of the text, Click on hold the flt mouse button and pull down & across to surround the text and let go. Save the Job under the 'File' Pull-Down Menu.

**Figure 2**

**3. Download a Test Job**
**A)** Click on the LaserWorks Icon in Corel and activate the LaserWorks Power Cell.
**B)** In LaserWorks, drag a selection Marquee box around the text and click the **Black** swash on the Color pallet to the Right. Then select just the box around the text and click the **RED** on the Color Pallet to the Right.
**C)** On the Control Panel **RED** to Cut and **Black** to Scan, Put in your Power & Speed Setting and click the 'Download' tab on the bottom right.

**Figure 3**

**4.Run the Test Job**
**A)** Now check to see that the job is at the Laser and jog the Red positioning Light to the Top/Right corner of you material and hit the 'Origin' key.
**B)** Next press the 'Frame' Key and the Red light should track the material.
**C)** Last hit the 'Start' key on the Pendant and the Laser will begin to Scan or Raster first based on it being at the top of your list in the Power Cell and will Cut or Vector last. If there is a flame-up just stop the laser or open the top door only.

**Figure 4**

## Laser Pendant

Datum Laser

Laser Beam Will Fire

Seat Positioning    Track Layout

**Figure 1**

**Figure 2**

# Key Steps to our Goal

**Main Task: Laser Pendant**

**RESET**: Datum or Reset whole Laser System

**Origin**: Set Relative Starting Point to the Laser Layout

**Pulse**: Pulse or Fire the Laser Beam to the Material

**Frame**: Track around the outside of the Layout

**File**: Pick up File Download to the Laser or Udisk

**Star/Pause**: Start or Pause a Job Downloaded to the Laser

**Left / Right Arrow Keys**: JOG the Lens around the Table via the Motion System.

**Up/ Down Arrow Keys**: To move the Table Platform up and Down to focus to the Material.

Video: A5

Figure 4

Laser Focus

Figure 1

With Lasers the 2.5 lens is normal and very clean. It does Scan or raster marking and Vector cutting to 1/4". A 1.5 lens is for very small marking and is not for Vector cutting. The 4.0 lens is for vector cutting up to one inch. Sometimes you need all three.
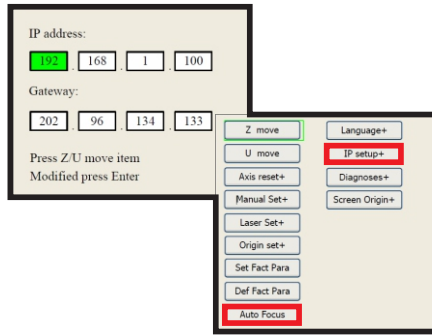
## Major CheckPoints

### Laser Pendant & More

1. Laser Pendant & Auto-Focus

2. Check Ethernet Setting

3. Customize Corel Workspace

4. Test from Ethernet

---

Figure 3

IP address:
192 | 168 | 1 | 100

Gateway:
202 | 96 | 134 | 133

Press Z/U move item
Modified press Enter

| | |
|---|---|
| Z move | Language+ |
| U move | IP setup+ |
| Axis reset+ | Diagnoses+ |
| Manual Set+ | Screen Origin+ |
| Laser Set+ | |
| Origin set+ | |
| Set Fact Para | |
| Def Fact Para | |
| Auto Focus | |

## Laser Pendant & More

Testing the Laser Pendant and set Defaults

## Installation Video VI

### 1. Laser Pendant & Auto-Focus

**A)** Go through the Main Boss Manual and look at the Pendant controls for the Laser.
**B)** Focus is very important, the material must be 2.5" from material if the Focus Lens is 2.5". Jog the Red Position Light and Plunger over the material and hit the **Z/U** button and arrow down to **Auto-Focus.**
**C)** Now the material will come up to the Focus Plunger and recoil back to the Focus length. Now start to work yourself through the Buttons on the Laser Pendant to become knowledgeable of their operations. Look heavily at '**FILE**' and recalling jobs sent.

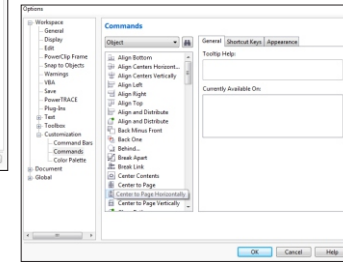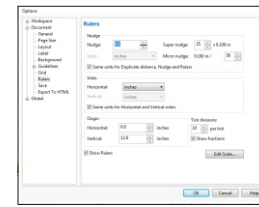Training Data Covered Here:
1. Learned about the Pendant controls
2. Learned about Focus.
3. Set up the Ethernet connection.
4. Loaded a test job
5. Checked the ethernet connection with the Test Jobs

"Tip"
**With a USB you are limited to 25ft and you will need a repeater if the PC is not next to the Laser. If not use a Ethernet cable at 2500 ft lengths.**

### 2. Check Ethernet Setting
**A)** When the green block is on this item, push the '**Enter**' key.
**B)** Push '**Z/U**' key to move the changing item, then push 'X+/-' keys and 'Y+/-' keys to change the value, when all the **IP** values and the Gateway values are changed, push '**Enter**' key to validate the change, or '**Esc**' key to invalidate the change.
**C)** These Values come from the Ethernet Card in the PC. Go to the 'Control Panel' of 'Windows' and Network setting, Local area Connection and Details to get the Ethernet Address to Plug in, within LaserWorks assign the **IP** to the Download.

Figure 2

### 3. Customize Corel Workspace
**A)** In CorelDRAW, click the '**Tools**' Pull-Down Menu and click
**B)** Now Click '**Commands**' and then choose from the little down Triangle the '<u>Arrange</u>' command to see all the choices from that Pull-Down, and Pull-out with mouse the '*Align and Distribute*' & '<u>Horizontal</u>' & <u>Vertical</u> Page Positioning to the page.
**C)** Now do the same for '<u>Case Changes</u>' under the '<u>Text</u>' command into the dialog, and click '<u>OK</u>'. Lastly, place the 'Case Change' on the **Standard Bar** and the other icons on the bottom of the TOOL-Kit, and Click the '<u>Tools</u>' Pull-Down and '<u>Save setting as Defaults</u>' & Corel is set for a Workspace.

Figure 3

### 4. Test from Ethernet
**A)** Put the Red positioning Light to the Top/Right cover of your material and hit the '**Origin**' key.
**B)** Recall the Test job in Corel, Click the '**File**' Pull-Down Menu and '**Open**' and select the Job and click '**OK**'.
**C)** Click the LaserWorks Full Power Cell Icon, and put in the *Power and Speed* and click '<u>Download</u>'. Now hit '**Start**' on the Laser Pendant and if the download was ok you are running from a Ethernet or USB connection.

Figure 4

---

Laser Pendant

DOWNLOAD from Corel Through Power Cell!

Z/U | Esc | Enter | Origin | Frame | Reset | Pulse | Speed | Min-Power | Max-Power | File | Start-Pause

Laser Beam Fire | Beam Power | File Storage | Accept

Figure 1

Figure 2

## Key Steps to our Goal

### Laser Pendant

**Speed:** Set the speed of the current running layer, or set the direction keys move speed

**Max. Power:** Set the max laser power of the current running layer, or set the power of "Pulse" Key;

**Min. Power:** Set the min laser power of the current running layer,

**Esc:** To stop work, or to exit to some menu.

**Z/U Button:** The Z/U key can be pressed when the system is idle or the work is finished. On pressing this key, it will show some entries in the interface, each entry includes some functions, Z axes move, U axes move, each axes to go home etc.;

**Star/Pause:** Start or Pause a Job Downloaded to the Laser

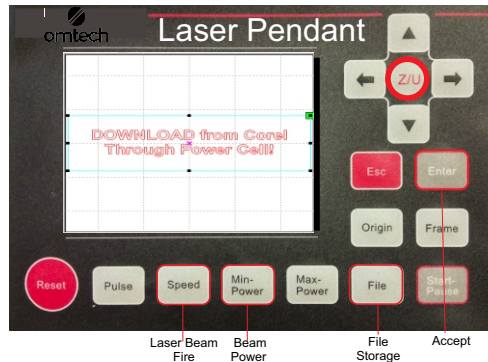**Up/ Down Arrow Keys:** To move the Table Platform up and Down to focus to the Material.
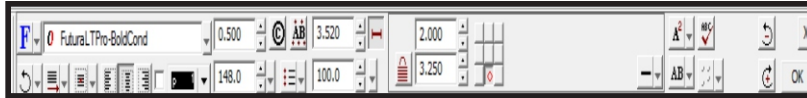
## Major CheckPoints

**EngraveLab to RDWorks**

1. Five Steps

2. Power Cell

3. Color Setting

4. Download

Figure 3

## Creating Jobs for EngraveLab

Using Power Cell within EngraveLab

Figure 4

Fonts

TEXT TOOL

**EngraveLab BOSS Laser Edition II**

Plate Size

RESIZE &REPOSITION

CUT

SCAN

Power & Speed

## EngraveLab to RDWorks

If you see a Flame up on the material Check to see if you have the air pump on or if you are applying to much power or going to slow into the material for cutting. If so just lift the lid and stop the process. The flame up will go out.

### 1. Five Steps

**A)** As with any software the **Five Steps** to creating a job apply. **Size of Plate. Text on the Screen. Change Fonts. Resize & Position.**

**B)** In EngraveLab click on the 'Plate Size' icon, then the Capital' **A'** on the Tool-Kit and click first '**A**' for frame text and type your text on the page.

**C)** Now highlight the line of text and on the <u>Smart-Bar</u> change the font and resize. The Frame will auto-adjust the positioning and the job is now complete. Just save the job under the '**File'** Pull-Down Menu and we are done.

**Training Data Covered Here:**

1. Created a job in EngraveLab
2. Learned about Color assignments.
3. Set up Power and speed per Cut/Scan.
4. Loaded an EngraveLab test job
5. Learned more about the Pendant and Power Cells Screens and Commands.

"Tip"
**First golden rule of Graphics is, nothing happens unless you something is selected or highlighted on a line, is a 90% correct Statement.**

### 2. Power Cell
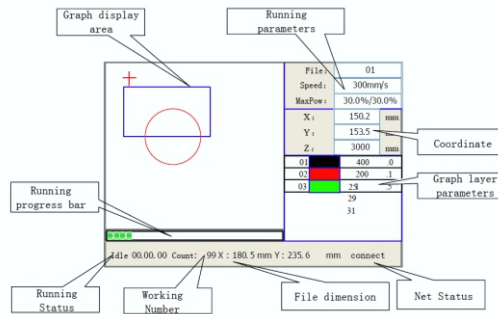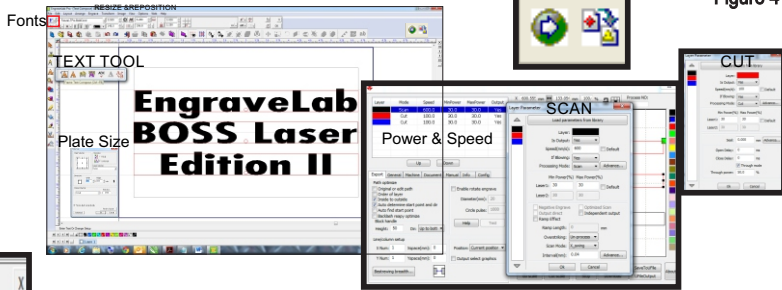
**A)** Click on the Power Cell icon and the Power Cell will open up so you can assign changes to the download parameters

**B)** First, look at the color that registers on the Dialog, or assign your own colors from the Color Pallet in the Power Cell.

**C)** Now double click on the main color, verify you are, in this case, in Scan mode and put in 30% Power for Max/Min. Verify that your interval is.007. Next do the same for the Cut Color.

Figure 2

### 3. Color Setting

**A)** In EngraveLab or CorelDRAW, your color Pallet should be in RGB not CMYK to insure the Power Cell will see those colors.

**B)** As we said before you can use the different colors to assign different modes and effects to the material.

**C)** This can even be done within a line of text and section of a logo. Now click the '**Download**' tab and you will see the layout appear on the Pendant screen.

Figure 3

### 4. Download

**A)** Once the download is complete you can press the '**File**' button on the Pendant and find your last job by title.

**B)** You can even do a Production-time estimates or watch it do the "**Frame**" test.

**C)** Run the Auto-Focus on the material if needed and once you hit the '**Start**' button to run the job. You can Pause it or Cancel it at anytime.

Figure 4

## Pendant Display

Graph display area

Running parameters

| File: | 01 |
| Speed: | 300mmy/s |
| MaxPow: | 30.0%/30.0% |
| X: | 150.2 | mm |
| Y: | 153.5 | mm |
| Z: | 3000 | mm |
| 01 | | 400 | 0 |
| 02 | | 200 | 1 |
| 03 | | 25 | |
| | 29 |
| | 31 |

Coordinate

Graph layer parameters

Running progress bar

Idle 00.00. 00 Count: 99 X : 180.5 mm Y : 235.6    mm   connect

Running Status

Working Number

File dimension

Net Status

Figure 1

Figure 2

## Key Steps to our Goal

**Main Interface**

**Speed:** Whether for scan or for cut the speed is how fast or slow the beam travels through or across the material.

**Max./Min Power:** Usually the same value and is a measure of the Percentage of Power applied to the material by the focused beam.

**Interval:** Is for the Scan feature and the space between the lines

**Process Mode:** To where you cut or draw also called vector or scan or raster across the material turning the beam on where it sees images pixels.

**Colors:** This is how you separate commands by assigning different RGB colors to different selections on your layout. You can assign different Process modes (Scan/Cut) or Power and Speeds to those selections.

**Pallet:** You even add items in the Power Cell and change its color to further control the download.

**These are the Main Controls to Learn First.**

## Major CheckPoints

**RDWorks First Job**

1. Create a One line Job

2. Color Settings

3. Power & Speed

4. Download
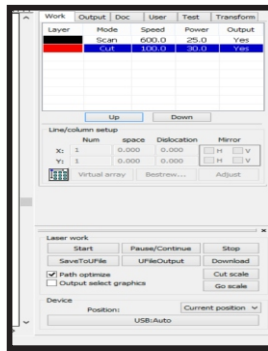

Figure 3

# Creating Your First RDWorks Job

## Making Our First Job in RDWorks


Color Pallet

# RDWorks First Job

**WATCH FOR THIS:**
Page Settings
Figure 1

[Page width]: Software page width, usually associated with machine X breadth. [Page height]: Software page height, usually associated with machine Y breadth. Once connected to the motherboard, the software will automatically format the page size for the current operation. However, if the motherboard is not connected or if a custom page size is needed (as for adjusting page size to material), the user can use the page setting to reconfigure the page size as follows: [Grid] Enables and sets grid space. [Keyboard] The user can use arrow keys to move or rotate selected graphics. [Color Config] Sets the color of the work area.

**1. Create a one line Job**

**A)** Enter the RDWorks software from the Icon on the Desktop; Click the 'F' icon on the Tool-Bar and click in the middle of your Work Pallet.
**B)** Next type out *MY Laser* '; and at the bottom of the Dialog type-in 250 mm for size and then select your font.
**C)** Now click the Rectangle tool and draw a box around the text. Hit **Ctrl-A** to Select All and lastly on the bottom of the Tool-Bar is a **Centering** Icon. This will center the two items - the box and the text in the middle of the page.
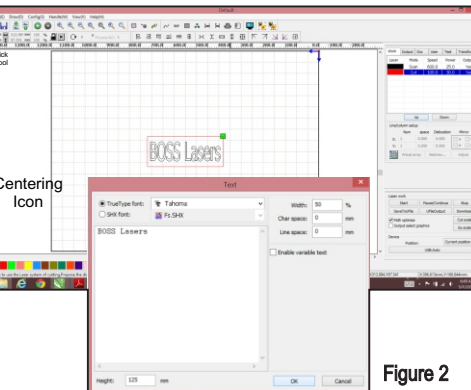
**Training Data Covered Here:**
1. Created a job in LaserWorks
2. Assigned Processing via Color setting.
3. Put in the Power and speed per Cut/Scan.
4. Downloaded the job
5. Focused and Framed the job then ran it.

**"Tip"**
LaserWorks is a Graphical Interface used to deliver the layout to the Laser. It is Not a Graphics Package, but can be used that way if you wish.
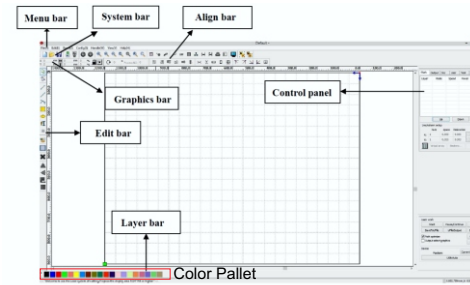
**2.Color Settings**
**A)** Click on the **Pick** Tool at the top of the Tool-Bar and select the Text.
**B)** Now click on your Color Pallet in RDWorks, Select the **Black.**
**C)** Next click on the Box, and color it Red. This allows us to assign different processes, like Power & Speed or Scan or Cut to those selections as identified by the colors assigned to it.

**3. Power & Speed**
**A)** In your Control Panel you should see Red and **Black**, put the **Black** at the Top & the Red underneath it.
**B) Black** should be assigned to Scan and Red to Cut.
**C)** Double click on the Color and assign the Process and Power at 25% for scan **Black** and 600 on speed, and on Red 30% Power and 100 on Speed. On Scan make sure the Interval is .07 and you are ready to go.
Figure 3

**4. Download**
**A)** Click the **Download** tab at the Bottom of the Control Panel in LaserWorks.
**B)** Make sure you put the position red diode light over the material and hit the **Z/U** button on the Laser Pendant. Arrow down to **Auto Focus** and hit the '**Enter**' button to Focus.
**C)** Run the 'Frame' Button to insure you are aligned to the material; then hit the '**Start**' button to run the job. You can Pause or Cancel it at anytime.
Figure 4

Figure 2


Pick Tool
Centering Icon
BOSS Lasers
Figure 1
Figure 2

# Key Steps to our Goal

**Program Layout**
**Menu Bar:** This is simply the Pull-Down Menus like 'File' etc..

**System Bar:** This is the high use commands and shows a list of icons for ease of use..

**Graphics Bar:** Allows you to draw quick shapes on the page like the Rectangles, used heavily for positioning.

**Edit Bar:** This Bar allows you to apply changes and modifications to objects and text already on the screen.

**Alignment Bar:** Used to position objects on the screen to one another.

**Layer Bar:** Is where you adjust colors and settings for processing.

**Control Panel:** Used for setting values to objects for processing.

**Figure 3**

**Figure 4**

## Power Cell Revisited

### The Power is in the Cell

Macro Upset

**Figure 1**

## RDWorks Power Cell I

**Engraver's choice**

### 1. Dialog Overview

**A)** The LaserWorks Power Cell within Corel, AutoCad, or EngraveLab has one purpose; to deliver the Machining or the Laser Parameters to laser for the graphic in question.
**B)** The Colors in the *RGB* Pallet of Corel or EngraveLab should match those in the Full Power Cell.
**C)** You also can save Material Parameters for Power and Speed and Scan and Cut. This is the most important feature of the Full Power Cell.

### Training Data Covered Here:
1. Reviewed RDWorks Power Cell.
2. Reviewed Scan Process.
3. Reviewed Cut Process.
4. Controlled Scan Direction
5. Showed the Udisk jump drive feature.

### "Tip"
The RDWorks Power Cell within Corel or EngraveLab has one purpose. To deliver the Machining or Laser Parameters to the laser for the graphic in question...
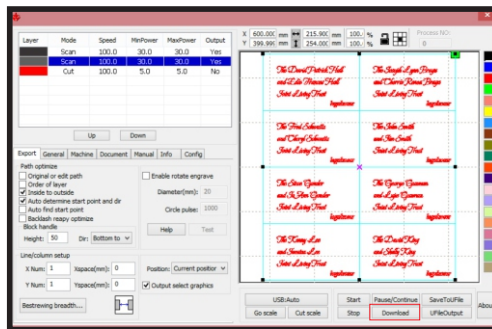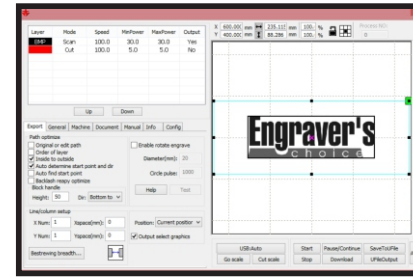
### 2. Scan Power & Speed
**A)** Click on the **Pick** Tool at the top of the Tool-Bar and select the **Text** Tool.
**B)** Now click on your Color Pallet in LaserWorks and select the **Black**, if not already assigned.
**C)** Double click on the Color and assign the Process and Power at 25% for Scan **Black** and 700 on speed. On **Scan**, make sure the Interval is .07 and you are ready to go. You can click the Library tab and assign the Parameters to be recalled later, this is very important.

**Figure 2**

### 3. Cut Power & Speed
**A)** Double click on the **Red** color and Click on the Process Mode and choose '**Cut**'.
**B)** **Red** should be assigned to **Cut** and **Black** to Scan, if not already assigned.
**C)** Double click on the Color and assign the Process and Power at Red 30% Power and 50 on Speed. You can click the Library tab and assign the Parameters to be recalled later, this is very important. For both make the Max and Min. Powers the same.

**Figure 3**

### 4. Front-line Features I
**A)** You can Control the Direction of Scan or Raster, I like the 'Bottom up'.
**B)** You do the same for Cut, you can also select items within the Preview screen to the right.
**C)** Save to the Udisk to transfer files via Jump drives. Click '**File**' on the Laser Pendant, arrow over to 'Udisk' and "Read it.' Then 'Copy File to Memory.' You can then pick up the job File and you will see it in the Preview.

**Figure 4**

**Figure 1**

**Figure 2**

## Key Steps to our Goal

**Main Task: Laser Pendant**

**RESET:** Datum or Reset whole Laser System

**Origin:** Set Relative Starting Point to the Laser Layout

**Pulse:** Pulse or Fire the Laser Beam to the Material

**Frame:** Track around the outside of the Layout

**File:** Pick up File Download to the Laser or Udisk

**Star/Pause:** Start or Pause a Job Downloaded to the Laser

**Left / Right Arrow Keys:** JOG the Lens around the Table via the Motion System.

**Up/ Down Arrow Keys:** To move the Table Platform up and Down to focus to the Material.

Figure 4

## Major CheckPoints

**RDWorks Power Cell II**

1. Front-line Features II

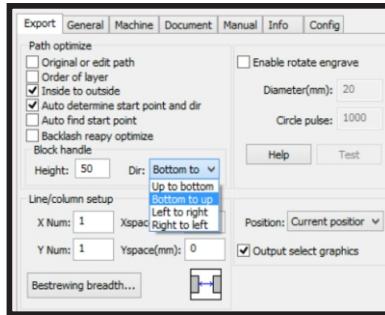2. Position & Origin

3. Rotary Device

4. Laser Pendant II

Figure 3

# Power Cell Revisited II

## More Power in the Cell



## RDWorks Power Cell II

**WATCH FOR THIS:**
Scan Speeds

Figure 1

Recommended Maximum Scan Speed:
LS/HP-1416s = 375 mm/s LS/HP-1630s = 400 mm/s
LS/HP-2436s = 500 mm/s LS/HP-3650s = 600 mm/s
LS/HP-5298s & SS-3650s = Speeds will vary. Please contact manufacturer for details.

**1. Front-line Features II**

**A)** There are many extra features and commands on the bottom right tabs of the Power Cell.
**B)** You can control the direction of the Scan or Raster, I like the Bottom up as the exhaust flows from the top and gives me a cleaner look.
**C)** 'Inside to outside' is a major tool that allows me to cut or vector the inside first before the outside keeping the cut-out from dropping out of focus. This is also why we scan or raster before we cut to maintain the focus. The balance of the commands can be looked into in the Mainlaser Reference manual online. These are not high use items for us at this point in your training.

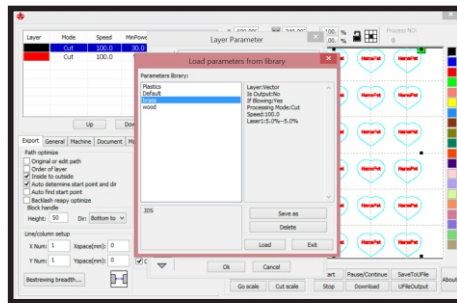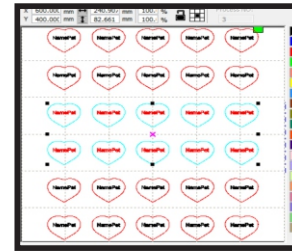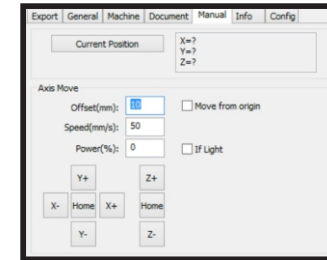**Training Data Covered Here:**
1. REVIEWED FEATURES OF THE POWER CELL.
2. REVIEWED THE ORIGIN & POSITIONING PROCESS
3. INTRODUCED THE ROTARY DEVICE.
4. REVISITED THE LASER PENDANT CONTROLS.

**"Tip"**
The LaserWorks Power Cell can be used for 85% of the Jobs you need to run. Some Projects will require the Full LaserWorks Graphical Interface to Process.

**2. Position & Origin**
**A)** Positioning of items on the table is very important to your ability to produce product.
**B)** There is a Position Table that can be purchased or made using the laser itself. the pre-cut piece need to be level and square, and in the same place on the Laser table every time..
**C)** Origin is simply the starting point for the Job based on the point the RDWorks indicates. We use Top/Right of the image. Many times I put a BLUE rectangle box around the plate and tell the Power Cell not to output that color. It is there for positioning control only.

Figure 2

**3. Rotary Device**
**A)** You can run a Rotary Device for 360 degrees items, performed with Roller or Chuck devices.
**B)** Use the LASER Manual for this., but **\*MAKE SURE THE MACHINE IS TURNED OFF BEFORE PROCEEDING\***
**C)** The Origin point and control will be different; do not attempt this until you have dialed the Laser in for the flat material,then do the more advance round.

Figure 3

**4.Laser Pendant II**
**A)** If you press the **Z/U** you will see an internal menu that gives me many commands like 'Auto-Focus'.
**B)** There are controls for 'Diagnostics' and the Pendant appearances..
**C) I Use this area to setup the Internet connection for more control over the Laser and the PC interface.**

Figure 4



Figure 1

Figure 2

# Key Steps to our Goal

**Functions Buttons:**
 **Start:** Send the current graphic to the machine for processing.

 **Pause\Continue:** Ongoing processing is halted when the Pause\Continue button is clicked. Clicking it again, causes a paused operation to resume.

 **Stop:** Clicking this process simply stops the processing work.

 **Save To UFile:** Clicking this button saves the current file as an RD file which can be used for offline processing.

*The file can be copied to another memory board for full offline operation. Use this option to export your file(s) to a USB flash drive, then to import into your machine.*

**UFile** Output: Clicking this button outputs the current file in RD format. After saving a file offline, click Ufile Output to select the RD file for processing.

**Download:** Clicking this button downloads the file to the memory of the controller,

Video: B8

## Major CheckPoints

**RDWorks Download Docker I**

1. Laserworks Download Docker

2. Rotary Device II

3. Check Auto-Focus

4. Intermediate Features


FOCUS GUIDE


FOCUS GUIDE

## Download Docker Controls

Controlling input from the Software to the Laser


Figure 3


Figure 4

## RDWorks Download Docker I

### 1. RDworks Download Docker

**A)** Just like the Power Cell the Control Panel area of RDWorks, Download Docker has a Work Section to input your Power & Speeds & Processes.
**B)** You have the 'Output' Tab that allows you to turn on the 'Rotary Device' and enable Feeding.
**C)** The other main area of the Control Panel is the 'User' tab; if you slide to the bottom of the text commands you will see '**Focus Depth**'. This is important when we do an '*Auto-Focus*'; the material will return via the Z-axis platform to the focus length of the lens or we will not get a proper mark or cut. This will be a different amount for each lens size used.

### Training Data Covered Here:

1. Reviewed The main Tabs of the Control Panel
2. Reviewed the Rotary Device procedure for Check and Roller.
3. Checked the Auto-Focus return lengths for the lens
4. Talked about the intermediate features of the control panel.

"Tip"

The Control Panel is mainly used to input Power and Speed parameters, but there are many powerful features hidden in it.
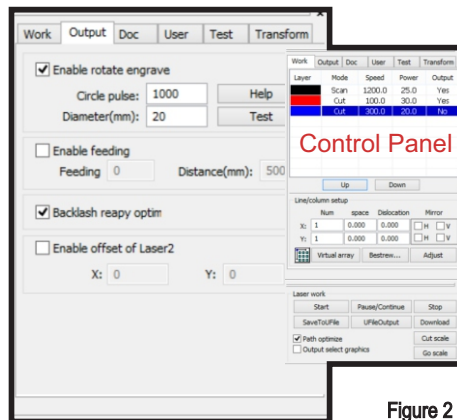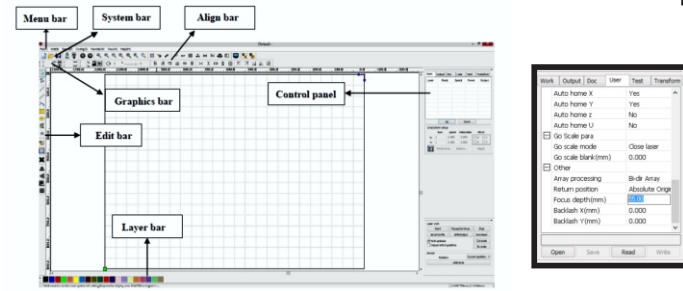

Control Panel
Figure 1
Figure 2

### 2. Rotary Device II

**A)** Turn off the Laser, unplug the Y-Axis drive cable from back of the cabinet & plug in the Rotary Device.
**B)** Now turn the machine on and let the laser head return to the home position. Since you unplugged the Y-Axis connector and replaced it with the rotary attachment, you'll notice that the laser head will only go to the right until it hits the X-Axis limit switch. This is normal. After the laser head has moved all the way to the right, move & push the gantry all the way to the back of the machine so that the Y-Axis limit switch has been triggered.
**C)** In the Control Panel go to the '**User**' Tab and click the 'Rotary Device' section. Now put 35 in the Diameter under 'Circle Pulse' Check changes for value, usually 6820.

Figure 2

### 3. Check Auto-Focus

**A)** Jog the Red Positioning Diode over the material and hit the **Z/U** button on the Pendant to raise and lower the platform.
**B)** Using the Acrylic Manual Focus tool, place the short end over the Plunger Bracket and adjust the table to have the lower larger end touch the material.
**C)** Now on the Pendant arrow down to the **Auto-Focus** and hit **Enter**. The table will rise to the Plunger and retract back and measure it with the Manual Focus tool. If wrong on the control panel go to '**User**' tab and slide down to 'Focus Depth' and adjust amount starting at 50.00 and write the new value to the laser. Test Auto-Focus and repeat until correct.

Figure 3

### 4. Intermediate Features

**A)** There are many features of the Control Panel tabs, the majority you do not touch.
**B) Cal time:**. The number of hours already spent in applying a particular file can be calculated and displayed by selecting the file and then clicking the Cal time button.
**C) Estimator works really well from the Motherboard when a laser is hooked up to it.**

Figure 4

## Key Steps to our Goal

**Control Panel Items:**

**Focus depth**: Use this auto focus operation to find the corresponding panel.

**Delay before feed**: When using this option and the feeding device, a brief pause can be forced before each feeding process begins. This pause allows for any last-second adjustments before processing.

**Return position**: The user can select the location of the origin point for the machine. This parameter determines the precise point at which the laser head stops after completing each operation.

**Cutting mode**: The following three cutting modes – split precision, fast, and ultra-fast –can be set as appropriate. When accuracy is paramount, the user should select the precision cutting; when speed and production is most important, the user should select ultra-fast cutting.
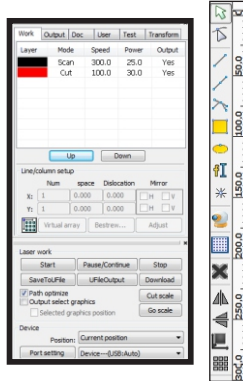**Scan mode**: Two scanning modes are available, general and special. The general mode does not allow treatment during the scan, while the special mode allows treatment of light spots. If the special mode is activated, the power of the laser will be increased in such a way as to reduce the proportions of light spots. The purpose of selecting the special mode is to make the laser high power short duration beams**.**

## Major CheckPoints

### RDWorks Basics

1. Screen Layout

2. File & Standard Bars

3. Positioning Bar

4.ToolKit

Figure 3

# Tools and Their Position

## Learn Your Graphical Interface Locations

Figure 4

## WATCH FOR THIS:
### Page Size
Figure 1

To control page setting , click [Menu] [Config] > [Page setting].
**[Page width]:** Software page width, usually associated with machine X breadth.
**[Page height]:** Software page height, usually associated with machine Y breadth. Once connected to the motherboard, the software will automatically format the page size for the current operation. However, if the motherboard is not connected or if a custom page size is needed
(as for adjusting page size to material), the user can use the page setting to reconfigure the page
size as follows:
[Grid] Enables and sets grid space.
[Keyboard] The user can use arrow keys to move or rotate selected graphics.
[Color Config] Sets the color of the work area.

# RDWorks Basics

**1. Screen Layout**

**A)** When learning the Screen Layout; not only memorize the position and function of the Bars and Icons, But learn how they work together.
**B)** Laser engraving is based on computer controlled machine tools that allows the user to achieve effective control of a wide variety of processing tasks. LaserWorks is a cutting edge example of a computer controlled Graphical Interface.
**C)** The components of the RDWorks system includes a controller card, a control panel, and supporting software.

### Training Data Covered Here:

1. Reviewed the major sections of the Screen Layout
2. Reviewed The icons of the File & Standard Bars
3. Reviewed The icons of the Positioning Bar
4. Talked about the functions of the ToolKit.

### "Tip"

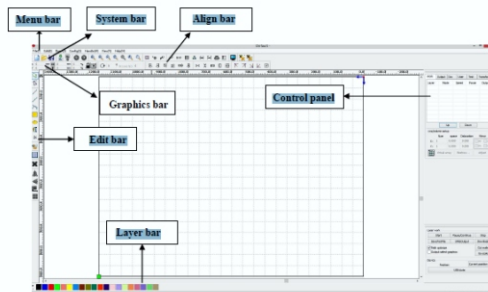Learn the Location and title of the major areas of LaserWorks. It really helps if you need to talk to customer support.
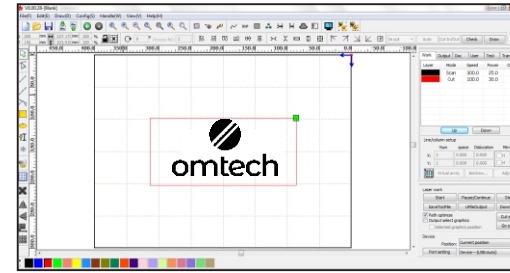
**2.File & Standard Bars**
**A)** With the File and Standard Menus and System Bars you can get to all the major commands.
**B)** Let's start with 'Import' commands and the 'Simulate' engraving commands.
**C)** To import a file, follow the procedure below. Click menu [File] > [Import], or click the icon, Then select a file and click open or preview to see a particular file. For most vector files, the LaserWORKS software will automatically import the file into the corresponding layers of LaserWorks according to the layer description.

**3. Positioning Bar**
**A)** Positioning Bar which is the Alignment Bar is just for that.
**B)** To Align objects on the screen to each other in a quick and easy way.
**C)** I would put two or three lines of text and Rectangle on the screen and move them around at will. To discover the ones you like the best, here are a few of my favorite commands. Commands: Left/Right Top/Bottom & Align center to middle and those that control spacing.

**4. ToolKit**
**A)** Toolkit or Edit Bar is all about drawing graphics
**B) Lines**: To draw lines, click the **Edit Bar** , and drag the mouse on the screen to draw the desired line. Press the "Ctrl"key for horizontal or vertical lines
**Polgon/Polylines**: click the Edit Bar and drag the mouse across screen to draw the desired polyline.
**C) Rectangles**: click the Edit Bar icon & drag the mouse on the screen to draw the sides . Press the "**Ctrl**" for a box.
**Ellipses**: Drag the mouse on the screen for ellipse. "**Ctrl**" key for a circle.

Figure 2          Figure 3          Figure 4

Figure 1

Figure 2

# Key Steps to our Goal

### LaserWorks Screen Positioning

**Menu BAR:** Allows you Access to Majority of the Commands via the Pull-Down Menus

**System Bar:** Also Called the Standard Bar in most Programs gives access to high use commands.

**Graphics BAR:** Also Known as the Property as it change with jobs and gives you control over size and dimensions of objects.

**Alignment Bar:** Does just that aligns object to one another.

**Edit Bar:** Also called the ToolKit allows you a series of commands i that allows quick changes to the object.

**Layer BAR**: The Color Pallet that allow the assignment of Color to individual object to assign a process to them.

**Control Panel:** Gives a place to assign power and speed to the different processes.

## Major CheckPoints

**RDWorks ToolKit I**

1. Pick Tool

2. Adding Text Dialog Box

3. Scanner & Capture

4. Positioning
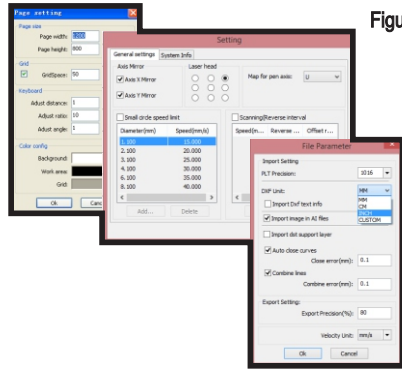
### Toolkit Functions of the EDIT Bar

We begin to Learn the Program one tool at a time!

**RDWorks ToolKit I**

Figure 3

Figure 4

**Defaults**

Figure 1

To control page setting , click [Menu] [Config] > [Page setting]. When this is done, the following dialog box appears 2):[Page width]: Software page width, usually associated with machine X breadth.
[Page height]: Software page height, usually associated with machine Y breadth. Once connected to the motherboard, the software will automatically format the page size for the current operation. However, if the motherboard is not connected or if a custom page size is needed (as for adjusting page size to material), the user can use the page setting to reconfigure the page size as follows:
[Grid] Enables and sets grid space.
[Keyboard] The user can use arrow keys to move or rotate selected graphics.
[Color config] Sets the color of the work area.

### 1. Pick Tool

**A) The Pick tool lets you select, size, skew, and rotate objects.**
**B)** Nothing happens unless something is selected is a Golden Rule of Graphics Art, and applies 95% of the time.
**C)** Before you can change an object, you must select it. You can select visible objects, objects that are hidden from view by other objects, and a single object in a group or a nested group. In addition, you can select objects in the order in which they were created, select all objects at once, and deselect objects.

**Training Data Covered Here:**
1. Reviewed the Pick Tool or Selection tool.
2. Talked about adding text once in RDWorks.
3. Talked about Scanning
4. Talked about Quick positioning within the Screen Pallet.

"Tip" .

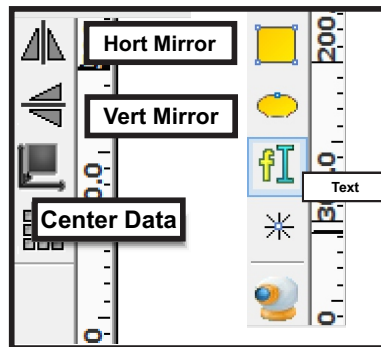Nothing happens unless you have something selected is a Golden Rule

Figure 1
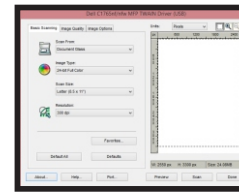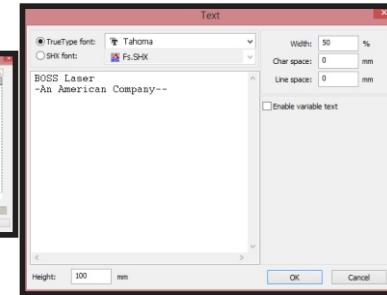
Hort Mirror

Vert Mirror

Center Data

Text

Figure 2

### 2. Adding Text Dialog Box

**A)** With a Graphical interface add different text to the screen.
**B)** Just select the 'Text tool' and click in the middle of the screen. a Text dialog box will appear and then you type. You can size and Kern, even change fonts to TrueType and SINGLE - line engraving fonts.
**C)** Enabling variable text reveals two variable functions: Date and Serial Number. Each function has its own properties and formats. For example, the date variable text supports 12 & 24 Hr formats & different mm/dd/yy. It can also be updated automatically from what your PC is set to. Just be sure that the format is the same for both cases.

Figure 2

### 3. Scanner/Capture
**A)** On the Tool-kit or Edit Bar is the '**Capture**' Icon; this is there to scan images into the screen Pallet of *LaserWorks*.
**B)** If the computer has been connected to the image device, the dialog box will appear. This dialog box enables the user to import pictures from a specified device.
**C)** Under the 'Config' Pull-Down Menu is 'File Para' Setting. This will bring up the 'File Parameters' Dialog screen. In there you will see the 'DXF unit' to right, select the down arrow and click on **inches**; This will ensure proper scaling in Inches to Metric conversions.

Figure 3

### 4.Positioning
**A)** There are many ways to position in LaserWorks; the most important is 'Center Data' this puts your grouped item into the center of the 'Screen Pallet'.
**B)** The Horizontal and Vertical mirror icons on the toolkit will reserve the position of items selected and allow you to do reversed upside down engraving.
**C) Remember there are many position keys but the position of the layout on the Screen pallet does not matter - only the origin point, Origin top-right.**

Figure 4

## Key Steps to our Goal

**Toolkit ICONS**

**Text:** To add text, take the following steps: Click [Menu][Draw] > [Text], or click the Edit Bar icon, and then insert text into the resulting pop-up text dialog box .

**Capture:** To import a stored object, invoke Select Source box (below) by clicking [Menu] [Draw] >[Capture]. If the computer has been connected to the image device, the dialog box will appear. This dialog box enables the user to import pictures from a specified device.

**Mirror:** This button reverses horizontal and vertical objects for selected images or text.

**Center Data**: Put all data to the center or middle of the Work Pallet, but be sure you are grouped first.

**Work Pallet:** This is the grid screen, where the Laser will draw its graphical information from; the position of your layout does not matter in the Defaulted setting. Just center it for easy viewing.

**Figure 3**

## More Toolkit Functions

Matrix or copy object is too big for Production

## RDWorks ToolKit II

**Figure 4**

### WATCH FOR THIS:
Nodes

**Figure 1**

Curve objects created in Laserworks follows a path that gives them their defining shape. A path can be open or closed and can sometimes include subpaths.
For more information about paths and subpaths, see "Breaking the path of curve objects." Most objects that are added to a drawing are not curve objects, with the exception of spirals, freehand lines, and Bézier lines. Therefore, if you want to customize the shape of an object or text object, it is recommended that you convert it to a curve object.

**1.Matrix Copy**

**A)** To duplicate an object for an array, first Select the object by clicking on it. Then on the Edit Bar, click the 'MATRIX COPY'
**B)** The Array dialog screen will appear. A user can replicate an array in different directions. The direction of copying is based on the original graphic. If the user chooses "lower right" as an array direction, the original graphic will appear in the upper left corner.
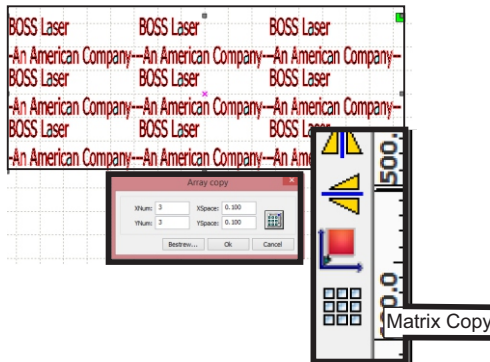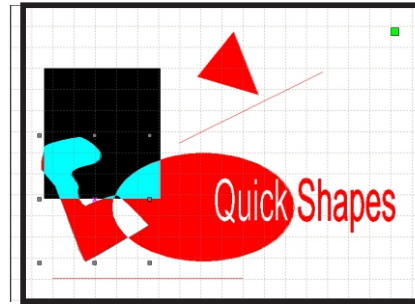**C)** Once the Array is processed, Group the Layout and Center to the Work Pallet.

Training Data Covered Here:
1. Learned to copy in a Array or Matrix
2. Used the Quick Shapes
3. Talked about LGP Design
4. Talked about Node Editing

"Tip" .

Drawing Basic Shapes quickly helps complete jobs.

**2. Shapes & Graphics Tools**
**A)** The **Ellipse** and **Rectangle** tools can be used to make borders or cutouts.
**B)** The 'Line Tools' are used to join or create underlines to words or objects.
**C) These quick shape tools are useful to add Vector Cutout or fill in to correct errors in your graphical layout.**

**3. LGP Functions**
**A)** To activate the LGP Design tool, click the menu command [edit] /[LGP design], or click the drawing toolbar.
**B)** The software creates standard rectangular and oval outlines. Import a graphic design; then by clicking on text that you put on the screen, you can choose to have the outline of the document. It should be noted that the outline file must be a closed graphic, or the system will automatically delete it.
**C)** This Tool is very Advanced and should not be used without advanced instruction.

**4.Node Edit Tool**
**A)** A curve object has nodes & control handles which you use to change the shape. It can be any shape.
**B)** An object's nodes are the small squares that appear along the object's outline. The line between two nodes is called a segment. Segments can be curved or straight. Each node has a control handle for each curved segment connected to it. Control handles adjust the curve of a segment. Components: control handles, segments, & nodes
**C)** Once clicked on node edit a menu allowing you to edit..

**Figure 2**          **Figure 3**          **Figure 4**

## Key Steps to our Goal

**Shapes ICONS:**
 **Lines:** Click [Menu][Draw] > [Line],or click the Edit Bar , & drag the mouse on the screen to draw the desired line. Press the "Ctrl" key while dragging the mouse for horizontal/ vertical.
 **Polgon/Polylines:** Click [Menu][Draw] >[Polgon], or click the Edit Bar the and drag the mouse across screen to draw the desired polyline.
 **Rectangles:** Click [Menu][Draw] > [Rectangle], or click the Edit Bar icon & drag the mouse on the screen to draw the sides of the desired rectangle. Press the "Ctrl" key while dragging the mouse to draw a square.

**Ellipses:** Click [Menu][Draw] > [Ellipse] or click the Edit Bar icon, and drag the mouse on the screen to draw the desired ellipse. Press the "Ctrl" key to draw a circle.
**Point:** Click [Menu][Draw] > [Ellipse], or click the Edit Bar icon. A point can also be drawn simply by clicking the mouse on the screen. **Work Pallet:** This is the grid screen, where the Laser will draw its graphical information form; the position of your layout does not matter in the Defaulted setting. Just center it for easy viewing.

**Figure 1**          **Matrix Copy**          **Figure 2**

## Major CheckPoints

**RDWorks Positioning Bar I**

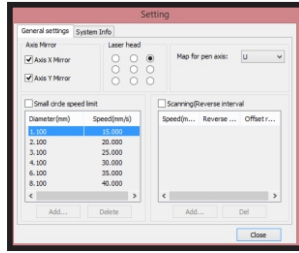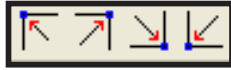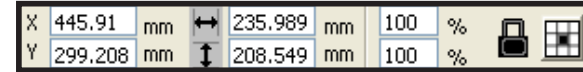1. Sizing

2. Origins

3. Positioning

4. Rotation and Process

---

## RDWorks Positioning Bar I Toolkit Functions

### Quick Sizing and Positioning are key Features of Laserworks

**RDWorks Positioning Bar I**

### Origins

**Figure 1**

One can facilitate the view of an object by the way it is placed relative to the origin. LaserWORKS v8 provides the following tools to control the placement of an object:

• Clicking the icon results in the placement of the object in the center of the page, such that the center of the page and the center of the object overlap.

• The use of the icons cause the selected object to be placed in one of the upper or lower corners.

---

### Training Data Covered Here:

1. Learned to size items on the work pallet
2. Used origins
3. Talked about positioning
4. Talked about rotation & Process

**"Tip"** .

Quick Position is the key to controlling any graphics Software.

---

**1.Sizing**

**A)** The size of the layout or individual object is shown on the Standard Bar and will indicate what is selected and what can be adjusted by that selected process.

**B)** The sizing of the Layout and individual line and object is determined in the design software.

**C)** Transformation refers to a change in the location, orientation or **size** of an object. The object transformation menu provides a convenient interface for users wishing to change the location, orientation or size of a selected object. The user can mirror and rotate an object within the draw toolbar.

**Figure 1**

---

**2. Origins**

**A)** The origin is the point on a Laser where the lasering will start. Its usually set to the top/right of the plate.

**B)** You jog the RED Positioning Light to the top/right corner of the plate or jig you are using . Now press the **Origin** button on the Laser Pendant and as long as the software origin point is the same you will run from that point.

**C)** Under the '**Config**' Pull-Down Menu is **System Settings**' you can change the software origin point there. The user can select the location of the origin point for the machine. This parameter determines the precise point at which the laser head stops after completing each **operation.**

**Figure 2**

---

**3. Positioning**

**A)** Position can mean many things, the position of objects on the screen to one another or the position of the laser beam to the part you are engraving.

**B)** The position function is used to return the laser head to a predetermined location after processing has been completed. Possible return positions include the current position, the last position that was anchored, or to the position that has been set as the "*machine zero*" position.

**C)** Learn the Position that affects the layout downloaded first, then learn the position of the selected objects to one another.

**Figure 3**

---

**4.Rotation and Process**

**A)** You can Rotate objects on the screen or Work pallet as you see fit in the 'Transformation' Docker of the Control Panel.

**B)** You can turn on the Rotary Device and do 360 degree engraving as we have talked about earlier.

**C)** To process is simply to click the Download tab in the **Control Panel** and send the job to the laser *Que* for processing. Where you can select the job from the Pendant '**File**' Button anytime.

**Figure 4**

---

## Key Steps to our Goal

**Positioning ICONS:**

**The precise alignment of objects can be determined by making use of the tools provided by the Alignment Bar:**

*The specific functions invoked by the icons on the Alignment Bar include the following:*

**A:** From left to right, these icons cause right alignment, left alignment, bottom alignment, and Top Alignment.

From left to right, these icons cause vertical center alignment, horizontal center alignment, & center alignment.

From left to right, these icons cause an object to be placed at a horizontally equidistant point or at a vertically equidistant point.

From left to right, these icons cause objects to have the same width, the same height, or the same size.

**Figure 2**

---

## Major CheckPoints

**RDWorks**

**Standard Bar I**

1. Admin Functions

2. Zoom & Show Path Tools

3. Edit Cut In and Out

4. Edit Cut Parameters

Figure 3

## RDWorks System Bar Functions

**Zooming and Cut In/Out are Huge features**

Figure 4

## RDWorks Standard Bar I

Cut in/ Cut Out

Figure 1

To make cut in/cut out lines, the user must first enable the cut-in/cut out function. There are two types of the cut in/cut out lines: straight lines and arcs. Straight line cut-ins are created in threeways:
• By cutting in at an angle. In this procedure the cut in line and starting segment form a specified angle (in which counterclockwise angles are positive);
• By cutting in at the center, and by making the starting point of the cut-in line at the center; and
• By cutting in at the center, drawing the cut-in line from the center to the starting point, and by assigning it a specific length.

### 1. Admin Functions

**A)** As stated before the Admin Function of LaserWorks is controlled by the Factory and should **not** be changed without instruction from the factory.
**B)** System Settings is the important one and you verify *X-&-Y Mirror* is checked and **DXF** is in Inches.
**C)** Once connected to the motherboard, the software will automatically format the page size for the current operation. However, if the motherboard is not connected or if a custom page size is needed (as for adjusting page size to material), the user can use the page setting to reconfigure the page.

**Training Data Covered Here:**
1. Learned Admin Setting
2. Used the ZOOM Tools for View
3. Talked about Cut In & Cut Out
4. Talked more about the Edit Bar high tools.

"Tip" .

You have to Zoom in and Zoom out of a graphic to really see what is there.

Figure 1
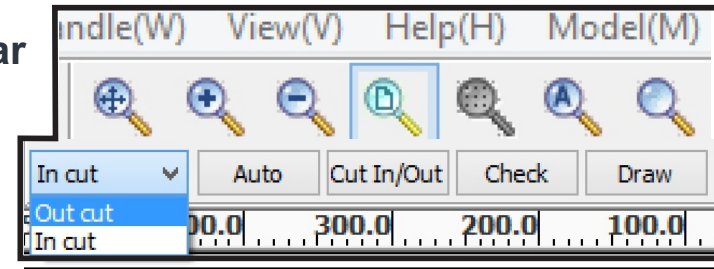
### 2.Zoom & Show Path Tools
**A)** Zoom in and out of a graphical Layout can show any errors and are easily corrected.
**B)** 'Show Page' ZOOM is the one I use the most to reveal all that is on the Work Pallet. Remember, you cannot fix it if you do not know it is broken.
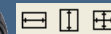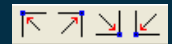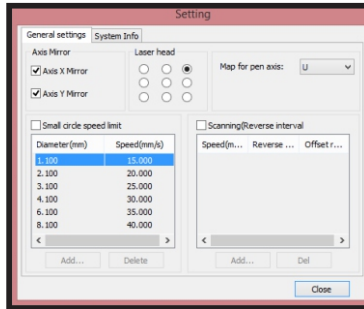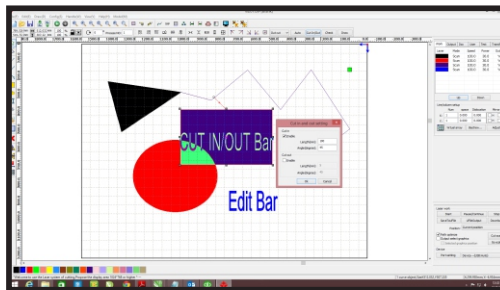**C)** Show path: By checking the "Show Path" button at the bottom right of the cutting properties dialog box, the user can see the current graphics cutting order and the cutting direction. This will help you control when and where something engraves on the material.

Figure 2

### 3.Edit Cut In and Out
**A)** The **Cut in & Cut out** Menu Bar can be activated for your '**View**' Pull-Down menu.
**B)** It will allow the laser to start to cut from outside or inside the object to be cut.
**C)** You can control the Angle and length of the cut from the 'Cut In/Out' tab; so it will start from the outside of the cut and end from the outside. If you were cutting circles on a control panel I would start the cut on the inside of the circle and end there. Thus getting a very clean edge all around the circles edge.

Figure 3

### 4.Edit Cut Parameters
**A)** Of the Tools on the Edit bar or Toolkit the rectangle is used the most. If you hold the 'Shift and/or Ctrl' modifier Keys down you draw a perfect centered box.
**B)** Using the Matrix or Array Tool. Once I have set up an Array then I hit **Ctrl-A** to *Select All* and click the **Group icon** then center to the Work Pallet.
**C)** Then use the Text tool that add test information or change to a true Single Font by clicking SHX font, there are about 25 of them.

Figure 4

## Key Steps to our Goal

**ZOOM ICONS:**
To move an object, click [Menu][Edit] > [Move}, or click the icon. Then, with the cursor in the drawing area, keep the left mouse key depressed and drag pan the image.
• **To zoom out**, click [Menu] [Edit] > Zoom Out, or click the icon. Then, each time the mouse is clicked while the cursor is in the drawing area, the drawing area zooms out.
• **To zoom in**, click [Menu] [edit] > Zoom In, or click the icon. Then, each time the mouse is left-clicked while the cursor is inside the drawing area, the image will be zoomed in.

You can select a portion of an existing object and magnify it to fit within the existing drawing area by using the [View Select] function. To do this, enter [Menu][Edit] > [View Select], or click the icon. Then move the cursor to the drawing area, and then drag the mouse while holding the left button down. A dashed border appears. When the left button is released, the portion of the image that had been enclosed by the dashed border fill up the drawing area. You can display the page frame fully by either entering [Menu][Edit] > [View Page Frame], or by clicking on the icon. Selected data objects can be completely displayed by either entering [Menu][Edit] > [View Data Frame], or by clicking the icon.

Figure 2

**RDWorks Standard Bar II**

1. Smooth Curve

2. BMP/ Vectorization

3. Curve Auto-Close

4. Cut Optimize

Figure 3

## More RDWorks System Bar Functions

Vectorization turns Bitmap Logos to Lines

**WATCH FOR THIS:**
Cut Optimize
Figure 1

Before processing After processing
Female Male
Laser head. zThe arc length of the cut-in arc is set by the user. As the figure below shows, there are two types of cut in/cut out arc, female and male: Path optimization relates primarily to the re-ordering of vector graphics. To begin the path optimization process, click [Menu][Handle] > [Cut optimize], or click the the icon. These keystrokes "Cutting optimize handle" dialog box, To view the cutting path before and after processing, the user should click [Menu][Edit] > [Show Path], or click the icon. The graphics cutting path always starts from the laser head.
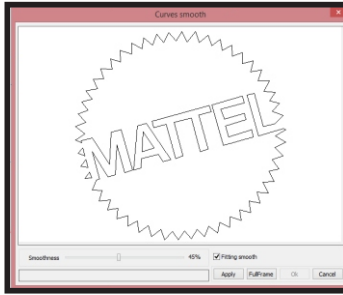
## RDWorks Standard Bar II

**1.Smooth Curve**

A) Smooth Curve does one main function and that is to remove machining pixels toward smoothing the look or cut of the graphic.

B) With your object on the Work Pallet, select a single section and click the '**Smooth Curve**' icon on the Standard bar, and select the Custom tab.

C) Now adjust the look and click '**Apply**' then '**OK**'. Next select another part of the Graphic, repeat until you are done. I usually do this in EngraveLab or Corel, but it works very well here, and I cleaned up the item fast here, as well.

**Training Data Covered Here:**
1. Learned to Smooth Curves of Vector Graphics
2. Used the Bitmap Handle to Adjust Logos and Photos
3. Talked about Closing Curves
4. Talked about Optimizing the cut and order of engraving

"Tip" .

Doing photos will many times require you to Purchase EngraveLab
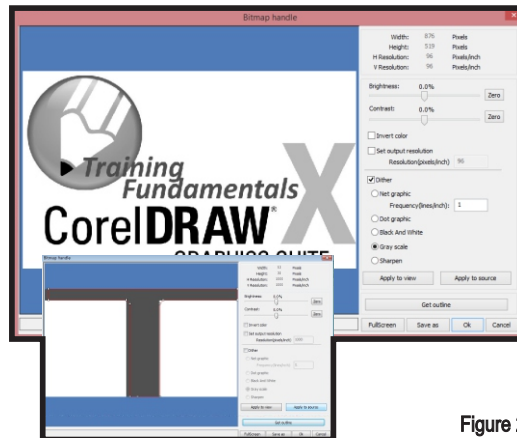
Figure 1
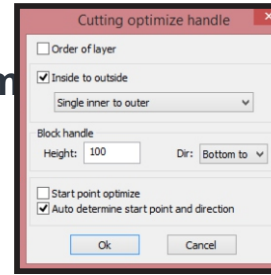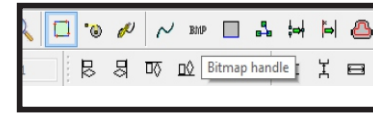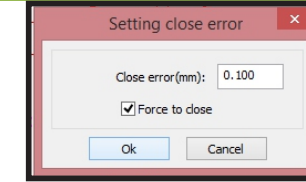
**2. BMP/ Vectorization**

A) The Bitmap Handle function sets such image characteristics of bitmap images as size, resolution, brightness, contrast, and color. Click "**Bitmap handle**" dialog box (below),click the icon, select a bitmap, and then click [Menu][ Handle] > [Bitmap handle].

B) This process will prep a Logo or Photo to be lasered.

C) Many times with Photos we use EngraveLab BOSS Edition II to process them. This is done with Photo Laser PLUS, this generator will dither the Photo so it appears clear on Materials especially wood and plastic.

Figure 2

**3.Curve Auto-Close**

A) When using Scan or Raster we need closed images; to do that if they are not Bitmaps, we use this tool.

B) To check closure, invoke the "Setting close error" dialog box by clicking [Menu][Handle] > [Curve auto close], or by clicking the System Bar icon. Using the "Close error" define the distance in millimeters from starting to ending point. When the distance is less than this "Close error" tolerance, the curve is closed automatically. The "Force to close" box forces the closing of all selected curves.

C) This is important with Vectors or Cuts as well as for a smooth cut.

Figure 3

**4.Cut Optimize**

A) Cut Optimize controls direction and order of Cut and is important that we cut the inside of letters before we do the outside of letters.

B) Path optimization relates primarily to the re-ordering of vector graphics. To begin the path optimization process, click [Menu][Handle] > [Cut optimize], or click the icon. Use "**Cutting optimize handle**" dialog box, To view the cutting path before and after processing, click [Menu][Edit] > [Show Path], or click the icon.

C) Production output and Quality is the key reason for this feature of LaserWorks.

Figure 4

## Key Steps to our Goal

**Bitmap Handle Process:**

[Apply to view]. Until this button is clicked, the most recent changes are only previewed without affecting the original bitmap. [Apply to view] button has been clicked, the [Cancel] button at bottom right of the dialog box can be pressed to return to the original image, thus, this option is good for trial-and-error adjustments.

• [Apply to source]. With this setting, changes are made directly to the source image, and pressing [Cancel] will not restore an altered image. Therefore this option is mainly used in a multi-step operation, such as transforming general pictures into gray scale.

[Save as]. This button retains the results of the previous operation, allowing a processed image to be exported/saved to the hard drive.

[Gray scale]. Because most images need to be in gray scale, this function is often applied as the initial step in a multi-step transformation of colored images. After the gray scaling has been done, the user should click the [Apply to source] button. It is important to remember that gray scale requires less memory than a colored image, so it is especially useful to gray scale large images as the first step in a processing sequence to avoid memory problems.

## Major **CheckPoints**

**RDWorks Standard Bar III**

1. Combine Curve/Delete Overlap

2. Offset Polygon

3. Check Data/Preview

4. Group/ UnGroup

---

**Figure 3**

Setting combine error
Combine error(mm): 0.1
Ok    Cancel

## Finishing up on RDWorks System Bar Features

### Logo Control of Graphics

**Figure 4**

Data check
☑ Check close
☑ Auto close    Error(mm): 0.01
☑ Check self-cross
☑ Check cross
☑ Check overlap
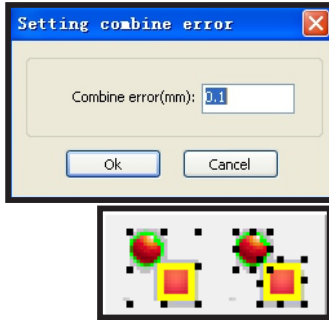☐ Enable error    Error(mm): 0.01
Check

RDWorks
⚠ No selected curves for check!
OK

### Data Check

**Figure 1**

To check graphics data, click the "Data Check" dialog box by clicking the menu command [Handle][/ data check ], or the system toolbar icon. When the user clicks the "Check" button at the lower right of the dialog box, data problems will be shown in the dialog box. The Problems/results will be shown in selected stated graphics. The data inspection process should be repeated until all of the data conforms to the requirements of the processing.

## RDWorks Standard Bar III

**1.Combine Curve/Delete Overlap**

**A)** It is difficult to Vector or Cut lines or shapes if they are NOT closed, it is also important for quality of a scan or rastered image.
**B)** To combine or merge curves, use "Setting combine error" dialog box by clicking [Menu][Handle] > [Combine Curve], or clicking the icon. The software automatically merges selected curves when the merge tolerance is less than the value set in the "Combine error" box in millimeters.
**C)** Once you use the Shape tool or Node Edit tool to move the point of the ends together then activate the tool.

**Training Data Covered Here:**
1. LEARNED TO COMBINE AND DELETE CURVES AND OVERLAPS
2. USED OFFSET POLYGON TO CREATE LINE THICKNESS
3. TALKED ABOUT CHECK DATA AND PREVIEW
4. GROUPED AND UN-GROUPED

"Tip" .

*Offset Polygon is the main way*

*to create line thickness or Line*

*WEIGHT for Scan/Raster.*
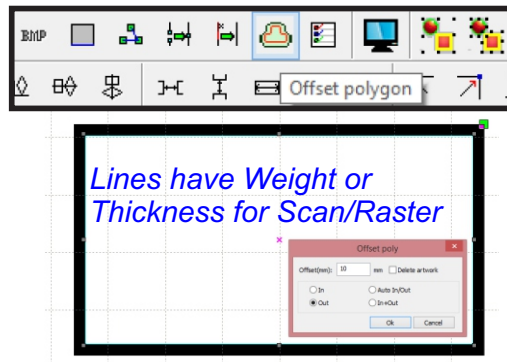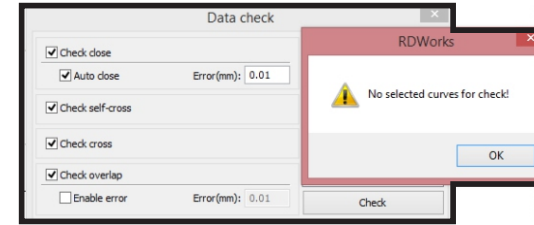
**2.Offset Polygon**
**A)** Main use for 'Offset Polygon' is to either create additional lines or Shapes around an object. To cut around the outside of a shape or to effect a line weight or thickness to a raster or scan.
**B)** Select the Vectored Logo or Shape and then Click the Offset Polygon and have one extra line created around the item (Distance = Thickness).
**C)** Now Group the two selections and run the Hatch graphics to see the Line thickness or weight. You can even Process it through the Preview to see if it lasers correctly.

**Figure 2**

**3. Check Data/Preview**
**A)** The Check Data will not only review the line art and objects on the Work Pallet but will correct items as it goes.
**B)** To preview processing, use the "Preview" dialog box by clicking [Menu][Edit] [Preview], or clicking the System Bar icon. LaserWORKS supports the preview of the documents undergoing processing.
**C)** The user can get important basic information from the preview. The preview shows the path of the actual output of the processing, general processing time, & tprocessing distance.

**Figure 3**

**4.Group/UnGroup**
**A)** This feature is important as many items process to the Work Pallet are ungrouped and when centered the layout can be mis-positioned, **Crtl-Z** to get it back.
**B)** Grouping & Un-grouping is accomplished by selecting a group of graphics, or previously grouped objects, then entering [Menu][Edit] > [Group] or [Menu][Edit] > [Ungroup].
**C) Items that are NOT Lasering correctly just need to be Un-Grouped or even Grouped to Process right to the laser.**

**Figure 4**

BMP    Offset polygon

*Lines have Weight or Thickness for Scan/Raster*

Offset poly
Offset(mm): 10    mm  ☐ Delete artwork
○ In    ○ Auto In/Out
● Out   ○ In+Out
Ok    Cancel

**Figure 1**

**Figure 2**

## Key Steps to our Goal

**Outline to Objects:**
**Corel:** Raster/Scan Line Thicknesses:
1. Select an object.
2. Convert outline to object.
• The outline becomes an unfilled closed object independent of the original object's fill. If you want to apply a fill to the new object, the fill is applied to the area which was the original object's outline. A star with an outline applied; the outline has been converted to an object independent of the original fill; a fountain fill was applied to the new closed object.
**\* You can also convert an outline to an object by pressing Ctrl + Shift + Q.**

**EngraveLab:**
**Create your Stars for example**
**1. Click the Line Thickness Tool**
**2. Increase the Line Weight**
**3. Now Weld the two Lines Together**

Major
**CheckPoints**

**RDWorks
Menu Bar I**

1. Image
Library

2.Cut
Direction

3.Edit Curves

4.Arrange

Figure 3

**Cut in and out setting**

Cut in
☐ Enable
Length(mm): 5
Angle(degree): 45

Cut out
☐ Enable
Length(mm): 5
Angle(degree): 45

Ok    Cancel

# RDWorks Menu Bar Features

## Direction and Logo Control Equals Quality

Figure 4

# RDWorks Menu Bar I

Arrange ►
Arrange Left
Arrange Right
Arrange Top
Arrange Bottom
Arrange Horz Center
Arrange Vert Center
Arrange Page Center
Arrange space horizontal
Arrange space vertical
Resize width
Resize height
Resize size
Top left
Top right
Bottom right
Bottom left

**WATCH FOR THIS:**
Embroidery File
Figure 1

In Corel there is a Icon that can be brought out with the LaserWorks Power cell ICON. This is for Embroidery files. Please just be aware it is there.

**1.Image Library**
**A)** The Image Library, which is under the '**File**" Pull-Down Menu is for the storage and organization of Logos and Bitmaps.
**B)** It is also great to organize layouts made in LaserWorks for quick reference.
**C)** All you do is Pull and Drag the item from the Image Library to the Work Pallet of LaserWorks, it is that simple.

**Training Data Covered Here:**
1. Learned to Use the Image Library
2. Used Cut Direction
3. Talked about Edit Cut
4. Talked about Arrange

"Tip" .

*Have a graphics morgue for logos, and*

*library of high use jobs for materials*

*and VIP clients at the ready.*

**2.Cut Direction**
**A)** Cut Direction and Optimize Cut are two shades of the same thing; It controls where the graphic starts and where it stops.
**B)** To change the processing direction: To change direction, click [Edit] > [Set cut direction]. Then you can double-click on any position on the selected graphic.
**C)** With a large job we can make the unit laser one area at a time & move in a optimal & serpentine direction.

Figure 2

**3.Edit Cut**
**A)** Edit Cut Property is brother to CUT IN/Out & deals more with the main body of the vector graphic.
**B)** By default, a drawn or imported curve does not have any cut in/cut out lines. To add such lines, select the objects, then use the "Cut in/out setting" dialog box; Clicking [Edit][Edit cut in property], or click the icon.
**C)** There are two types of the cut in/out lines: <u>straight lines & arcs</u>. There are 3 Straight line cut-ins:
• Cutting in at an angle (counterclockwise angles are positive);
• Cutting in at the center (cut-in line at the center)
• Cutting in at the center (center to the starting point, & assigning a specific length).

Figure 3

**4.Arrange**
**A)** The 'Arrange' commands are under the 'Draw' Pull-Down Menu. This is where all the Positioning commands are.
**B)** These are the same commands as on the Standard Bar.
**C) Learn these commands - specifically the spacing and alignment to center, but make sure you 'group' before your move the items selected.**

Figure 4

**Image library**

Lib name    Preview    Image number: 2
logo
BOSS box
Untitled-1

BOSS LASER    BOSS Lasers

1-[0,9999]    BOSS Laser-[0,9999]
76.923x43.541    486.879X131.576

New lib    Del lib    Add Image    Del Image
Import/Export
Open lib    Save lib    Import/Export
☐ Import as a whole
Exapt options
☑ Original size    60.000    60.000
☑ Lock scale

**omtech**

Figure 1

Figure 2

# Key Steps to our Goal

## Major CheckPoints

**RDWorks Menu Bar II**

1. System/File Settings

2. Page/Password Setting

3. Show Graphic Hatch/Show Array

4. Graphics Hatch/Copy-Paste

---

**Figure 3**



## More RDWorks Menu Bar Features

### Appearance and Defaults

**Figure 4**



## RDWorks Menu Bar II

**1.System/File Settings**

**A)** System Settings which are under the '**Config**' Pull-Down Menu are for adjusting System Parameters.
**B)** The Biggest is X-Y Mirror and Origin of Laser Head. If X or Y Mirror is not clicked the image will be upside down and reverse. Laser Head control where the layout begins from, usually top/right.
**C)** The 'File Setting' will control if a DXF in Imperial or American Inches is about in to Scale. It needs to be setup for **Inches**.

### Training Data Covered Here:
1. LEARNED SYSTEM AND FILE PARAMETERS
2. LOOKED AT THE PAGE AND PASSWORD SETTINGS
3. TALKED ABOUT VIEWS FOR GRAPHIC HATCH
4. TALKED ABOUT BITMAP CONVERSION AND COPY & PASTE

"Tip" .

*Defaults must be set from upgrade*

*to upgrade, and the old LaserWorks*

*cleaned out first.*
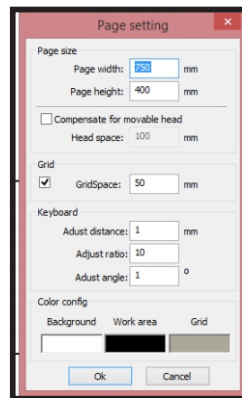
**Figure 1**
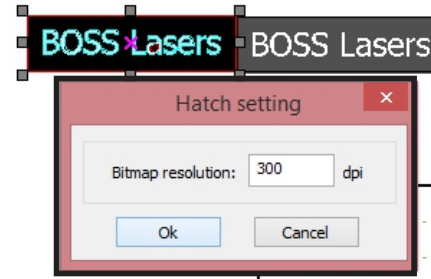


**2.Page/Password**
**A)** The Page Settings are Parameters that control how the Page or the Work Pallet will look at the start of the program.
**B)** You also make changes or adjustments to this Page Setting dialog.
**C)** The password is controlled by the BOSS factory and given out on a case by case basis. This allows you to get in the area where you could adjust the Machining Parameters for your system.
**Figure 2**

**3.Show Graphic Hatch/Show Array**
**A)** The 'Show Graph Hatch' will fill a Box for example, in the color you have chosen, only when selected, in a Scan or Raster mode.
**B)** Show Array really has no use for me at this time.
**C)** The Show Graph Hatch, can be a clue that you are in the wrong Process mode and you need to change . This along with the Simulator, can save you time and money..
**Figure 3**

**4.Graphics Hatch/Copy-Paste**
**A)** Graph Hatch will change Line art that is Vectorized into a Bitmap for Processing.
**B)** This will help to get you around problem graphics and layouts.
**C) Copy and Paste can be done from within the Text dialog within LaserWorks Software; but all other data must be imported using the Import dialog, the Image library, and the Power Cell macros.**
**Figure 4**

Sometimes when we are working, a layout needs to be simply rastered to give us the effect we wish. We can select it and turn it to a Bitmap or a Section of it to a Bitmap, and get around a problem to get the job out the door.

**Figure 2**

## Key Steps to our Goal

**Updating RDworks**
When Upgrading to Newer verison of RDWorks:
**Delete the RDWorks Directories**
But only these Folders
**Delete V8Temp**
Delete but do not empty the Trash until we are sure we are done.
**Delete the GMS files from Corel**
Go to the C:\ Drive then to 'Program File' and 'Corel' and into your verison of Corel and under the 'Draw' Directory remove all LaserWorks files.
**Control Panel**
Remove program from 'Programs and Features' and uninstall the RDWorks
**Restart the PC**

**Install RDworks**
install the LaserWorks main interface
**Install Corel Power Cell**
Click the down Triangle and select 'CorelDraw'and click install.
**Install Corel LaserWorks**
Click the Plug RDWorks and with 'Coreldraw' still selected, click install.
**Install EngraveLab**
Click the down Triangle and select 'Engravelab, then Plug RDWorks ' and click install.
**Install AutoCAD**
Click the down Triangle and select '**AutoCAD**, then Plug RDWorks ' and click install.

## Major CheckPoints

**Dialing Lasers into Materials**

1. Why We Dial Lasers in

2. Material Library

3. Test Runs

4. Material Properties

**Figure 3**

## Power and Speed for Specific Materials

### Specific Setting for Our Laser

**Figure 4**

**Figure 1**

Sometimes with two-ply laserable Plastics you will turn off the Air Pump to get the quality correct or make second, or even a third pass of the material. Which with a HP you can have it 'Blow' off for Scan or Raster and On for Cut or Vector; So you do not get a flame up.

## Dialing Lasers into Materials

**1. Why We Dial Lasers in**

**A)** 'Dialing a Laser in' is an Industry term that refers to setting the Power and Speed settings for a particular Material or Graphic.
**B)** By simply using the General settings provided to you, take the laser wattage, put in that materials Power and Speeds into the Control Panel of Laserworks.
**C)** Now slowly adjust the power and speed until you are happy with results. Start with Metal and Stone, then Plastics & Acrylics, Woods and then add to it as you go. Do Vectors or Cuts after Scan or Rasters, and you will dial in Pictures last as you may need EngraveLab to get the quality you are looking for.

**Training Data Covered Here:**

1. Learned Why we dial a laser into Materials
2. Learned to save Settings into Library directories
3. Talked about process of dialing in
4. Talked about Material properties

"Tip" .

*When Dialing a BOSS Laser into a Material, us low power at first then increase as you go.*
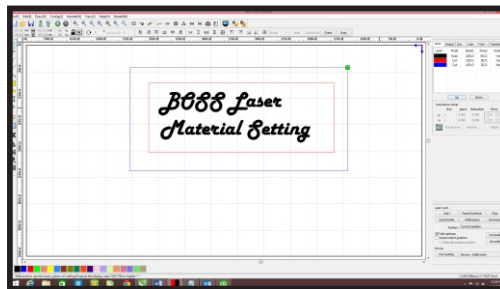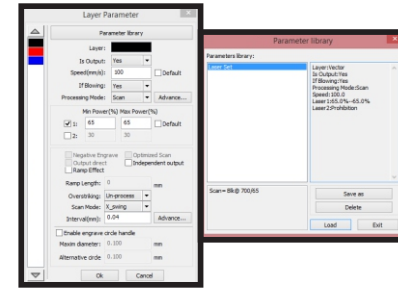
**2. Material Library**
**A)** Within your Hard-drive create a Materials library with two sub Directories; one for LaserWorks Jobs and the other for EngraveLAb or Corel Type Jobs.
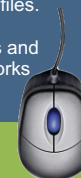**B)** Save each Material into these directories in each format. Also, within LaserWorks you can save colors to certain jobs and processes.
**C)** Always have Black as a Scan color based on your high use material, Red for Vector and Blue for Alignment. Within Corel or Engravelab just make notes off the page for future reference.

**3. Test Runs**
**A)** Create a layout in Corel or EngraveLab that is 4 x 6 with 2 lines of text with two different Fonts. Have a **Red** vector box around the text.
**B)** Put a **Blue** Positioning box at 4 x 6 on the Layout and center everything.
**C)** Save the job and send it to LaserWorks to assign the basic Power and Speed. As stated put Black/Scan at 700 speed and Power at 30% with interval of .07. **Red** is 50 speed at 45% power and Blue is 700 Speed, power at 0% and no Output. Dial these main three color settings into the material Library as a Default. There is a material Library of jobs and Parameter already present for your unit.

**4. Material Properties**
**A)** Make sure each material is Laser friendly.
**B) You will always want to do flat before round or uneven. Always cut softer material before harder materials.**
**C)** Once you have dialed all the front line materials in, make sure the **Black, Red** and **Blue** are left set for your high use materials. After that when you run into material that you have not seen before, save the dialed in jobs to the material library and save the job again for the client.

**Figure 2**     **Figure 3**     **Figure 4**

**Figure 1**

**Figure 2**

## Key Steps to our Goal

**Dialing Material Settings**

- Finding Power & Speed Setting for Materials
- All Lasers are a Little Different
- There is a Cheat Sheet by Wattage of Tube, Located in the Back of the Manual
- Treat each material like a Haircut, you can always take off more or increase the Power
- Power & Speed are in relationship to one another
- Dial in Metals before Plastics or Woods

**Create Test Layout**
Usually two lines of text with two different fonts
**Set your Speed and Power**
Using the Cheat Sheet put in the Basic Settings for Speed and Power.
**Speed before Power**
Once Speed is at 1000 to 1200 lower Power in Clips of 5-10% at a time.
**Do Raster for Scan First, then Vector or Cut**
Once dialed in Save the Material settings in the Library and save the Job into a Directory called Material Settings for BOSS
**Pictures are different Settings**
Pictures will always be different settings from Lettering or general

## Major CheckPoints

**Laser 101**

1. Optics

2. Motion System

3. Electronics

4. Cabinet & Z Axis


Figure 3
Mirrors Locations
Motion System
X
Y
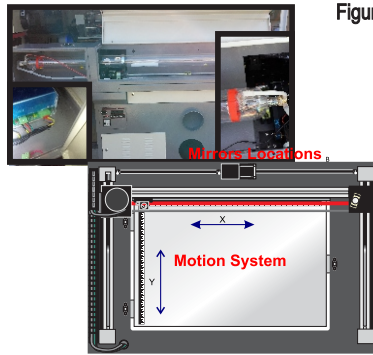
# How Lasers Work

## Main Systems of Class I & 4 Laser


Figure 4

# Laser 101

**Training Data Covered Here:**
1. Learned The optics of the laser
2. Received information about the motion System
3. Talked about the Electronics
4. Talked about the cabinet and the Z-axis Platform.

**"Tip"**

*There are Flying Optics units which are Class One (Closed Cabinets) and Class 4 (Open Cabinets) Plus Galvo unit, which are spinning mirror lasers.*

### 1.Optics

**A)** The Optics System is made up of the Laser Tube, the Mirrors and the Lens; plus supporting lens and mounts.
**B)** The Laser Tube generates a laser beam that has friction. This Beam goes through a combiner lens that marries it to the red diode light to the beam.
**C)** From there the Laser beam hits the primary mirror, then to top the bridge mirror and lastly to the lens mirror. The beam alignment on the mirror mounts control the angle of the beam. It finally goes through the lens (Convex side up) to the material at its focal length usually 2.5 inches.


Rear Component Assembly
- Easy Access
- Electrical Breakers
- Board Stack
- Drivers
- Exhaust

Figure 1
Figure 2

### 2.Motion System
**A)** The main Job of the Motion is to carry the laser beam to where the Controller is told to carry it. Whether it's for Vector(Cut) or Raster (Scan).
**B)** There are three driver boards in the Electronics board stack that send signals to the motors.
**C)** X is the Left/Right Travel and Y is the Back/Forth Travel. Z is the travel of the Platform for Focus and clearance of materials. The Belt on the X Bridge connects to the Lens Carriage and complete the system.

Figure 2

### 3.Electronics
**A)** Electronics is the Muscle of the system and the Graphical interface, LaserWorks is the Brains.
**B)** There are two Shift-mode power supplies; one for the Tube and one for the system. They take A/C Voltage and convert into D/C voltage. This power is sent to the 3 driver cards that pass it on to the motors and limit switches that help with the control of the motion system.
**C)** The LaserWorks Controller is the core of the system and sends logical signals to the system to tell the tube went to fire and for how long. This in concert with the motion system is where the processing is performed. These components are all marked as to where they go and what they do.

Figure 3

### 4.Cabinet & Z Axis
**A)** The Cabinet holds the Tube in the back top, the electronics to the right side and Motion system and Optics inside .
**B)** The Z- Platform is the Table that rises and lowers either controlled by the Operator or by the Auto-Focus Function, and is there for Focusing the material to the focal length of the lens.
**C)** The Balance of the cabinet is the exhaust and wiring. Make sure everything you use to align the material or square has air flow so the fumes can escape.

Figure 4

# Key Steps to our Goal

**General Laser Systems**
- The Motion System is built into the Cabinet and is under the control of the Electronic Board Stack which in turn to the main Controller board that reads the signal from the PC Graphical Interface.
- This signal will control where the Lens Carriage travel to; and whether you cut or Scan.
- The Controller also directs the Laser Tube to Fire relaying timing and intensity of Power.
- The Optics system delivers the beam to the Mirrors mounted on the Motion system.
- This way the beam may travel through the mirrors of the flying optics systems to the Lens.

**Focus**
The Platform of the Laser will rise or lower to a focus length of the lens to material.
**The physics of a Laser Beam**
Laser Beams come down to the material like an Hour Glass and the focal length is in the middle of the hour glass and is the hot spot. Too Close or too Far and no Burn or quality burn will result.
**The Laser Pendant**
This controls the 'Origin', Auto-Focas and File Delivery of information to the Controller.
**Cabinet**
Houses all and traps the Fumes to exhaust to the outside air.

## Major CheckPoints

**PC 101**

1. Windows Explorer

2. Systems Tray

3. Electrical

4. Maintain the OS
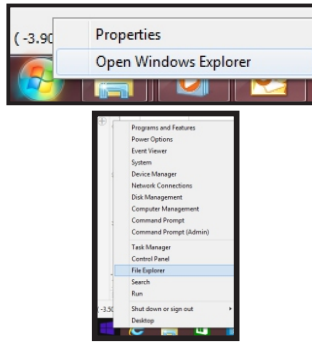
# How Personal Computers Work

## the Core of Your OS

OS=Operating System

**PC 101**

### Training Data Covered Here:

1. Learned about the Windows Explorer
2. Received information about The Systems Tray
3. Talked about the Electrical Hook ups
4. Talked about the Preventative support for the PC

### 1.Windows Explorer

**A)** *Windows Explorer* is your <u>File Manager</u>, so learn it. It is also used to install new Truetype Fonts.

**B)** Right Mouse click on the Green **Start** Icon of *Windows* and click on **Explore**; you can click on a file & hold down the Left Mouse Button and Drag it into another Directory. If you hold the **Ctrl** key you can copy a file to a new directory.

**C)** You will see a folder and see that folder has Sub-Directories and so on. This is the structure of the organization Tree, and folders can be created or deleted as you need them.

**Figure 1**

"Tip" .

*Isolated Line for your Electrical and good Surge Protector is a must for the life of your PC. .*
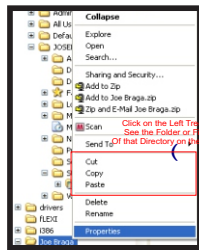
Right Mouse Click
Cut
Copy
Paste
a file

Click to Change the View
See the Folder or Files
Of that Directory on the Right!

Click to Change the View
Files, From Detail to Thumbnails

**Start**

**Figure 2**

### 2. Systems Tray
**A)** In the bottom right corner of your PC screen is the Time and Date on most PC's.
**B)** Many other Icons may be a there, click down Triangle to show Hidden Icons.
**C)** This is the **Systems Tray** and it shows the major Programs running in the background. If you Right Mouse click on the icon, there will be a command that you can use. You can exit the program or make changes to its status, this is a main area of Windows.

### 3. Electrical
**A)** Your Electrical setup or how you plug into the A/C power cords is important to the longevity of the tube and Equipment and the components of the PC.
**B)** The Laser should be plugged into a Isolated line, that has nothing, but the Laser/Chiller and Computer receiving current from that line. You can go to the Fuse box and turn off the breaker for the Laser and the only thing that goes off is those units.
**C)** If that is not possible, then no big stuff like microwaves, refrigerators, Coffee Makers etc. You must put the Laser and the Chiller on a ISOBar Surge protector and the exhaust and pump on another one so you can turn off those units without turning off the

### 4.Maintain the OS
**A)** To Maintain the OS you must have a Good Anti-Virus, I Like McAfee, and have a PC with min 8 gigs of ram, 16 if you can get based on Window 8 and 750 GIG HD.
**B)** You should run the '**Clean Disk**' program of Windows once a Month and set the Anti-virus to scan Weekly.
**C)** If I need the PC online to help support you, we will use 'SHOWMYPC.com as support interface. With that I can hook up to your Computer. You need to Tune the Laser up once every other year and the

**Figure 2**    **Figure 3**    **Figure 4**

## WATCH FOR THIS:
### File Manager
**Figure 1**

**A)** You can Right Mouse click and Copy a file, then click on the directory you wish and Paste it in.
**B)** Keep the file(s) in Common Directories with Folders and Sub-Folders this allows easy Back-up of high use files.
**C)** The way you organize your files whether they are Jobs or Clipart will save you a lot of time and effort. Again the Sub-directories under a main directory that deal with what you are doing. Client Files in Client Folders and under Clipart areas.

# Key Steps to our Goal

### Search Commands
**A)** If searching for a file, you can ask the **Windows Explorer** to search for it for you.
**B)** Especially, go to the search section which is a little different on each **O**perating **S**ystem (**OS**) and type in the File name you are looking for.
**C)** You can also use Wild Card commands to give you bigger search parameters like C*.BMP, which say search for all Bitmaps that begin with 'C'. There are other parameters that will narrow the search for you, like Date, directory, etc. They are great time savers.

### Once in the Windows Explorer
**T**his is your File Manager
* You can make Extra Folders for Jobs(.CDL) or RD JOBs from LaserWorks
* Click and Hold down the Left Mouse Key to Drag Files

* Then drag files to other directories highlight them and let go and the file will move, also if you hold the **Ctrl** key on the KB down it will copy the file, leaving the original alone. Make a main File Cabinet for _EngraveLab jobs/LaserWorks, and a Sub-Directory where your Logos will be kept.

## Major CheckPoints

**Making a Positioning Table**

1. Top Rails

2. Bottom Holders

3. Test Run

4. Pendant
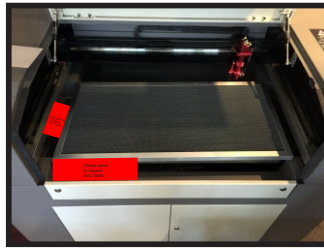


**Figure 3**

# How to Make a Positioning Table

## Make Positioning Simple



Rulers .1/8 to 1/4 Thick

Jog Line for Square check do the same for the Y axis

Spacers for High Speed JOBS

**Figure 4**

Bottom Securing Rails

# Making a Positioning Table

### 1. Top Rails

**A)** With Your BOSS Laser you received a Grid Cut-out table; we are going to add rails to it, on the top to act as Rulers and ridges to butt the material up against.
**B)** Depending on the Table Size, Vector Cut 3 X-axis rails, one of which can have a ruler lasered into it. Make these .850 wide and length of the Grid (minus 1.7.)
**C)** Cut 6 Y-Axis rails, the total length of the Y-Axis; two of them with the Rulers for the Left and right. Now double-side tape them onto the Grid Edges, Y-axis first then the X-axis into the middle . Do this one Layer at a time Left, Right then Center, putting the rulers on last.

### Training Data Covered Here:

1. Put the Rails and Rulers together
2. Put the Bottom Rails Holder on
3. Ran Tests
4. Used the Pendant to Finalize the Process

"Tip"

*A position Table is not a must but can ease the process of aligning material to the Laser. We do have more advanced tables that can be purchased.*



Industrial Rails

Grid Table
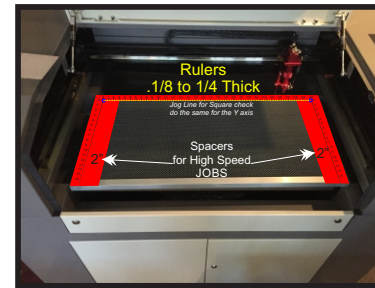
**Figure 1**

**Figure 2**

### 2. Bottom Holders

**A)** Laser out 12 side rails the same size as your top ones, 6 for the Left and 6 for the Right. Mount them on the bottom of the Grid Cut-Out table on the outsides under the ruler-ed rails squared to them .
**B)** Put a strip of a Steel Laser Brass 2 inches shorter than the Industrial Wedge Rails, Tape it to the 2nd Industrial Wedge (on the flat side) on the Left and Right Sides towards the outside.
**C)** Remove the Far Industrial Rails from the base of the Tables; from the left and right sides. Double-side tape 2 Badge Magnets to the inside of the new Plastic Bottom Rails towards the bottom and top areas. The Table should set into the area where we removed the Wedges and magnet up to the second wedges too.

**Figure 2**

### 3. Test Run

**A)** Once the Grid is squared up jog the Red positioning pointer light left/right across the grid at the Zero point and back/forth on the Y-Axis to verify it is square.
**B)** Once you are very sure that you can remove the Grid table and replace it in the same spot and it is square by jogging the position light across the axis at the Zero/Zero point, set the **Origin** to the that Top/Right corner of the Positioning table.
**C)** Now put on a 2x4 test plate and Vector/Cut a Capital 'L' in a Single Line font with a 1" baseline and 1" from the Left Margin and check it, adjust your Origin point as needed.

**Figure 3**
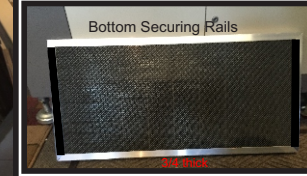
### 4. Pendant

**A)** Now the Table is in Place use the Pendant again to jog the Red Diode light from its position across the X/ Y Axises.
**B)** There will be some play in the grid Table, just push it up and to the right . To get a standard position, shim it up to hold it in place with your magnets or Steel Plates.
**C)** You may have to run another test plate and adjust the origin again if you have to pull the table out to gain Z- Travel area for thick pieces, if you need to repeat the final testing, you use the same shim in the same place.

**Figure 4**

# Key Steps to our Goal

### Why a Positioning Table

**A)** If you need to square up your Material, the Positioning Table is the way to go.

**B)** It allows us to square up materials and Jigs and gives us an easy to find Origin Point.

**C)** I can butt up against the Left or Right rails and put in cheater spacers to push the Left, Right or even top origin into the center. This is a big thing as I increase speed and get over travel.

### The Industrial Positioning Table

Has the more polished Ruler Rails for both Metric and Imperial.
* Is a Magnetized table with additional 6 inch moveable rails that can be placed on the table anywhere.

* There are Dowel pin holes every 1/2 inch for air flow and to put the Dowel pins into for either butt up against or to raise objects off the table surface.

* Call us today to order one.

## Major CheckPoints

**Project Basic Job**

1. Basic Five Steps

2. Plate Size & Text

3. Fonts & Alignment

4. Corel to EngraveLab

---

Figure 3

## Making A Basic Job In RDWorks

### Simple Tools for an Easy Task

Figure 4

## WATCH FOR THIS: Saftey

Figure 1

**A)** Make sure the Fume Exhaust and Air Pump are running.

**B)** If you get a Flame up just stop the job or raise the lid.

**C)** Never walk away from the laser while in operation.

**Boss Laser BASIC Job**

## Project Basic Job

---

**1. Basic Five Steps**

**A)** All Graphics fall into 5 Basic steps; the first and most important is the '**Size of Plate**' then **Text on Screen**, **Change Fonts**, **Resize, Reposition.**

**B)** You will need to make sure you have set your **Origin** to the top/right of the Plate or where the Origin Point is in LaserWorks.

**C)** Once the Layout is finished, you can press '**File**' on the Pendant and select the Job. Then press the '**Frame**' Key and watch the Laser find the Perimeters of the outside of the engraving area.

Figure 1

---
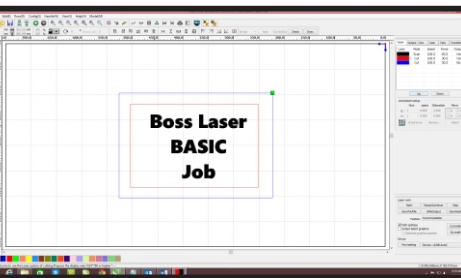
**Training Data Covered Here:**

1. Talked about the Five steps of a job.
2. Input the Size plate, added the Text and changed Font.
3. Resized and Reposition
4. Talked about Machine Setting and Power Speed assignments.

**"Tip"**

*The Five Steps to create a job in LaserWorks are the same as CorelDraw or EngraveLab: Size of Plate, Text on the Screen, Change Fonts, Re-Size, and Re-position!*

**Boss Laser BASIC Job**

Figure 2

---
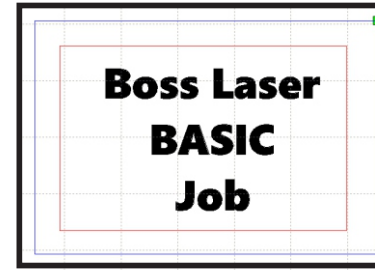
**2. Plate Size & Text**

**A)** Draw box with the 'Rectangle Tool' and size it to (Step One) Plate Size and move it into a corner for now.

**B)** Click on the 'Text Tool' and type out your line of (Step Two) text, repeat this for each line you wish, Check your Spelling.

**C)** (Step Three): While in the 'Text Tool' dialog you can change your **Font** to truetype or Single Line, and control kerning and size. Do not have the Rectangle Selected, if so click 'No'. Once on the Screen select all the Letters and 'Group' them by clicking on the 'Group' Icon' on the Standard Bar. Again, Verify that all is typed correctly before moving on.

Figure 2

---

**3. Fonts & Alignment**

**A)** if you need different fonts add them one line at a time, be sure to add a 2nd box color to the outside **BOX blue** and inside box **red**.

**B)** The Text will come from the Text Dialog box and size of the rectangle was determined by you when you drew them.

**C)** Select All using the **Ctrl**-A Key and click the 'Center to screen' icon on the ToolKit or Edit Bar on the Left.

Figure 3

---

**4. Corel to EngraveLab**

**A)** Usually you will use Corel or **EngraveLab** to create layouts and just send them over to the Graphical Interface that is LaserWorks.

**B)** You will need to assign the '**BLACK**' as your Scan or Raster color; assign 30% Power and 700 on the Speed with the Interval at .07.

**C)** **Red** is the Cut or Vector Process at 50 Speed and 45% power. **BLUE** is at 0% Power, 700 Speed and NO **OUTPUT**.

Figure 4

---

## Key Steps to our Goal

### 5 Basic Steps to a Job

**A)** Put in the **Size of Plate** in this case the BLUE Vector Box.

**B)** **Add the Text** and make sure it is correct.

**C)** **Change Fonts**, if needed

**D)** **Re-Size** text and Objects

**E)** **Re-Position** the Layout

### Pendant Quick Steps

**A)** Save Job

**B)** Assign Process Power and Speed

**C)** Download to Laser

**D)** Check or Set Origin Position

**E)** Press the 'File' on the Pendant

**F)** Select the Job you want

**G)** Press the 'Frame' Button

**H)** Press 'Start'

---

## Major CheckPoints

**Project Plastic Job**

1. Layout – Quick Steps

2. Color Properties

3. Logos and Shapes

4. Power - Speed Review
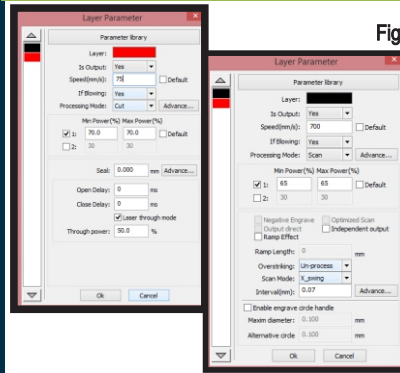
Figure 3

## Making a Plastic Sign In RDWorks

### Plastic Signs and Name Plates

Figure 4

### Importing Logos
Figure 1

## Project Plastic Job

### 1. Layout – Quick Steps

**A)** Draw box with the 'Rectangle Tool' to 200 x100 MM and color it **Red** we will be cutting these out.
**B)** Import your Logo, and size it and place it to the Left side of the Plate.
**C)** Click on the Text Tool and Type your First Line of the text. Change the Font.   Do the same for the second line and change the Font. The two evolutions are due to the font change.  Now group first and second lines and center them to one another, and Group again. Lastly, place it to the right side of the Plate and position it. Now Group whole layout and center to the Work Pallet.

**Training Data Covered Here:**
1. Did a Layout of a Plastic job.
2. Assigned Power and speed by color.
3. Reviewed Importing and Shapes.
4. Talked about Precautions and Focus Tricks.

*"Tip"*

*Plastic settings will be very close to Wood. The setting for Photos will vary from the main Plastic Settings.*
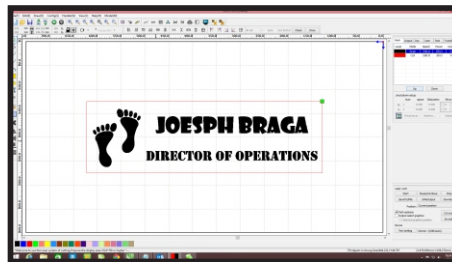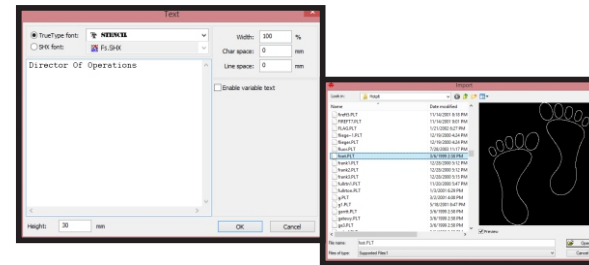
### 2. Color Properties
**A)** Ungroup the layout and color the text **Black** and the Vector Box Red.
**B)** The Black should be 500 on Speed and 55% on Power based on a 100 watt, if not dial the unit for your wattage, make your interval .07.
**C)** For the Red Cut  box use 65% Power at 55 speed based on 100 wattage tube. Run a few tests to verify the quality.  Also you may have to turn off the Air pump for the Raster or Scan to keep the fume from staining the lettering. Just download selected only and run the vector separate as you need the air for that.

Figure 2

### 3. Logos and Shapes
**A)** Importing of Logos falls into two categories: 1 - Bitmaps (.BMP & Jpegs; 2 - Vector images (.DXF & .AI).
**B) With shapes that come with LaserWorks get used to drawing and sizing them in Metric.**
**C)**  For Shapes not there that you may need, just import them as you see fit.

Figure 3

### 4. Power-Speed Review
**A)** With Power and Speed the number one concern is quality and the one mistake made is  that it is out of focus.
**B)** Make sure that the Auto-Focus is correct by checking it with the Manual Focus tool. Usually if you change materials or you are doing Glass or Acrylic then focus on every Piece - they will change without warning.
**C)** With Plastics you may lower the platform just little to widen out the beam, for effect.

Figure 4

To import a file, follow the procedure below. Click menu [File] > [Import], or click the icon, to use the following dialog box Then select a file and click open or preview to see a particular file. For most vector files, the RDWorks v8/LaserWORKS v8 software will automatically import the file into the corresponding layer of RDWorks v8/LaserWORKS v8 according to the layer description.

Figure 1

Figure 2

## Key Steps to our Goal

**5 Basic Steps to a Job**

**A)** Put in the **Size of Plate** in this case the BLUE Vector Box.

**B) Add the Text** and make sure it is correct.

**C) Change Fonts**, if needed

**D) Re-Size** text and Objects

**E) Re-Position** the Layout

**Pendant Quick Steps**

**A)**  Save Job

**B)** Assign Process Power and Speed

**C)** Download to Laser

**D)** Check or Set Origin Position

**E)** Press the 'File' on the Pendant

**F)** Select the Job you want

**G)** Press the 'Frame' Button

**H)** Press 'Start'

## Major CheckPoints

**Project Stone Job**

1. Layout – Quick Steps

2. Photos

3. Positioning

4. Simulation Review

---
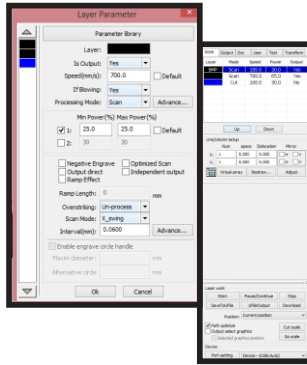
# Making a Marble Plate In RDWorks

**Figure 3**

### Stone: Marble-Granite-Tile



# Project Stone Job

**Figure 4**

## WATCH FOR THIS:
### Bitmap Handle
**Figure 1**

The Bitmap Handle function sets image characteristics of images as size, resolution, brightness, contrast, and color. The "Bitmap handle" dialog box, click the icon, select a bitmap, and then click [Menu][Handle] > [Bitmap handle], or click the icon. The top right of the dialog box displays the information.
**[Apply to view].** Click the [Cancel] button at bottom right of the dialog box can be pressed to return to the original image. This option is good for trial-and-error adjustments to an image.
**[Apply to source].** A sequential processing saves computing time for follow-up operations.
**[Save as].** Image to be exported/saved to the hard drive. [Apply to view]. In general, use the [Save as] function to facilitate subsequent processing.
**[Gray scale].** After the gray scaling has been done, the user should click the [Apply to source] **b**utton. It is important to remember that gray scale requires less memory than a colored image, For color images, adjust contrast and brightness to have some auxiliary effect to following dither processing.

---

### 1. Layout – Quick Steps

**A)** Draw box with the 'Rectangle Tool' to 300x140 MM & color it **blue** but we will NOT be cutting it out.
**B)** Import your Photo in and size it. Then place it to the Left side of the Plate.
**C)** Click on the 'Text Tool' and then type your Line of text & change the Font. Now group the line and center it. Place the right side of the Plate & position. Next select the line of text and hold the **Ctrl** key and hit your right arrow key to slant the text within the plate. Now Group whole layout and center to the Work Pallet.

**Figure 1**

### Training Data Covered Here:

1. Laid-out a Stone JOB
2. Processed a Photo for Lasering on a Dark Surface.
3. Resized and Repositioned.
4. Simulated the laser process.

**"Tip"**

*Good marble and granite is must. To*

*get great results with photos use*

*EngraveLab: Laser Photo Plus.*
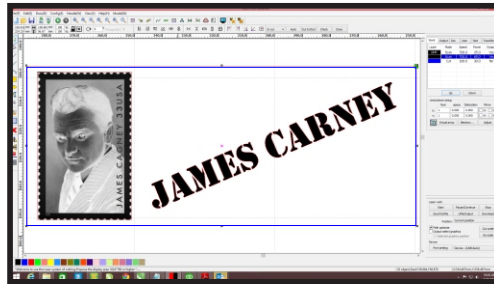


**Figure 2**

### 2. Photos
**A)** Import your Photo into the LaserWorks software, SIZE it and place it into the left side of the plate or within the **Blue** Box.
**B)** The Photo must be at size before this next process. Select the Photo and click the 'Bitmap Handle' on the Standard Bar.
**C)** The Dialog will come up. Click the 'Dither' as we are lasering this onto Black Anodized Aluminum. We need to invert it so click the invert and click 'OK'. Once the screen refreshes you will see the invert and dither on the Work Pallet.

**Figure 2**

### 3. Positioning
**A)** Recheck all your positioning for this layout.
**B) Align the photo to the center left of the Blue Box or plate.**
**C)** Align the angled text to the right center using the Position tools on the Positioning Bar of LaserWorks. Always regroup and center to the Work Pallet. Now Save the job assign the Power and Speed as shown in the Graphics

**Figure 3**

### 4. Simulation Review
**A** Select your layout and up in the Standard Bar to left side you will see a 'PC' screen, Click on it.
**B)** This is the **Simulator**, when hooked to a Laser it will tell how and where the laser will perform each task assigned.
**C)** Slide the 'Default & Simulate' to the right to speed up the process and click the 'Simulation' Tab. You see the Bitmap Laser first and the Text per the Control Panel Order.

**Figure 4**

---

# Key Steps to our Goal

### 5 Basic Steps to a Job

**A)** Put in the **Size of Plate** in this case the BLUE Vector Box.

**B) Add the Text** and make sure it is correct.

**C) Change Fonts**, if needed

**D) Re-Size** text and Objects

**E) Re-Position** the Layout

### Pendant Quick Steps

**A)** Save Job

**B)** Assign Process Power and Speed

**C)** Download to Laser

**D)** Check or Set Origin Position

**E)** Press the 'File' on the Pendant

**F)** Select the Job you want

**G)** Press the 'Frame' Button

**H)** Press 'Start'

---

Video: E24

## Major CheckPoints

**Project**
**Acrylic Job**

1. Layout – Quick Steps

2. Array

3. Logos and Shapes

4. Advanced Cut Controls

Figure 3

## Making Acrylic Awards In RDWorks

**Acrylic cuts show great Quality in a BOSS Laser**

Figure 4

**Array copy**

| XNum: | 3 | XSpace: | 0.200 |
| YNum: | 3 | YSpace: | 0.200 |

Bestrew... | Ok | Cancel

## Project Acrylic Job

**WATCH FOR THIS:**
Array

Figure 1

To replicate object arrays, the "Array copy" should first copy the object by clicking the Edit Bar, and using it to select the object to be copied. The user then opens the "Array copy" dialog box by clicking the icon. The user can replicate an array in different directions. The direction of copying is based on the original graphics. After setting the array number and array spacing, the user can click the [Apply] button to see the actual graphics array. There are two forms of array spacing, center spacing and edge spacing. To choose center spacing, the user must use the [X Distance(mm)] function to define the horizontal distance from the center-point, and the [Y Distance(mm)] function to define the vertical distance. Spacing can be adjusted by inputting values directly and then clicking [Apply]. The user can also press direction keys to adjust an object's spacing. The user can evaluate the orientation of an object inside the work area by clicking Check [Center].

**1. Layout – Quick Steps**

**A)** Draw box with 'Rectangle Tool' to 132 x123 MM and color it **Red** as we will be cutting it out. Now use the 'Edit Node tool' to remove the Top/Right corner node to make a Triangle as shown.
**B)** Import your Logo in and size it and place it to the center of the Shape and color it light Cyan.
**C)** Click on the Text Tool and the Type your text Line and change the Font. Now group the line and position it towards the bottom of the shape. Next select the line of text Color it **Black,** now Group whole layout and center it to the Work Pallet.

Training Data Covered Here:
1. LAID OUT AN ACRYLIC AWARD JOB.
2. PROCESSED A MATRIX OR ARRAY TO DO MULTIPLES ON SHEET OF MATERIAL.
3. MODIFIED SHAPES.
4. TALKED ABOUT LAYOUTS WITH MORE THAN ONE SCAN COLOR.

"Tip"

*There are Two Types of Acrylic, Cast and Extruded, ASK for what is best for Cutting and what is best for marking.*
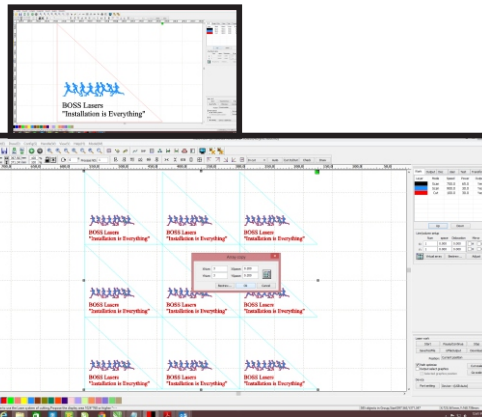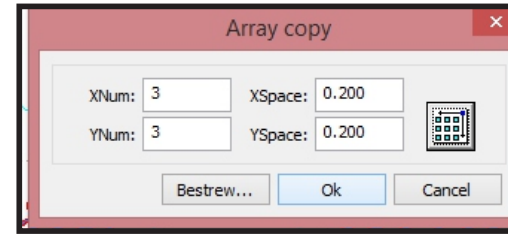
**2. Array**
**A)** Place your Group Layout to the Top/Right corner of your Work Pallet.
**B)** Select it and click on the 'Matrix Copy Tool' on the bottom of the Tool-Kit or Edit Bar.
**C)** Type into the Dialog 3 on X and 3 on Y with .200 gap on both. Now click **OK** and you will see an Array form, Populating from Right to Left and down into a row of 3 and columns of 3. Select All-Via **Ctrl-A** and Group them. Now center the Array to the Work Pallet.

**3. Logos and Shapes**
**A)** Shapes that you can draw in LaserWorks, can modified with Edit Node tool.
**B) By simply adding or removing nodes or moving nodes to different positions you can change a shape to your liking.**
**C)** If you Click and hold on the Edit Node Tool, it will show you an additional menu along side the Tool-kit for you to use in Modifying Vectors.

**4. Advanced Cut Controls**
**A)** Change the Power and Speed setting per the Graphics on this page.
**B)** Notice we have more than one Scan or Raster color allowing us to put two different power depths into the layout. If you control scan power in many parts of a layout you can make a **3D** image into Acrylic or Wood.
**C)** For Cutting metal there is a 'Laser through mode': **Only use this for Stainless.**

Figure 2　　Figure 3　　Figure 4

Figure 1

Figure 2

## Key Steps to our Goal

**5 Basic Steps to a Job**

**A)** Put in the **Size of Plate** in this case the BLUE Vector Box.

**B) Add the Text** and make sure it is correct.

**C) Change Fonts**, if needed

**D) Re-Size** text and Objects
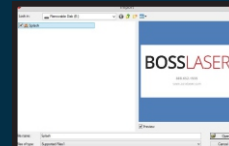
**E) Re-Position** the Layout

**Pendant Quick Steps**

A) Save Job

B) Assign Process Power and Speed

C) Download to Laser

D) Check or Set Origin Position

E) Press the 'File' on the Pendant

F) Select the Job you want

G) Press the 'Frame' Button

H) Press 'Start'

Video: E25

## Major CheckPoints

### Project Wood Job

1. Layout – Quick Steps

2. B/W Bitmaps & Outlines

3. Vector Cutting

4. Air Assist Tricks

---

**Figure 3**

# Making a Wood Job from a Vector In RDWorks

## Vectoring Bitmaps is a Art Form

**Figure 4**

# Project Wood Job

**WATCH FOR THIS:**

Outline Vector

**Figure 1**

A) Import a Bitmap into the Works Pallet.

B) Select the Images and click the 'Bitmap Handle'.

C) Convert to B/W Bitmap or Monochrome.

D) Then Click 'Get Outline'

E) Clean up with the 'Edit Node Tool'.

---

### 1. Layout – Quick Steps

**A)** Draw a box with the 'Ellipse Tool' to 109x49 MM & color it **Red** as we will be cutting it out.
**B)** Import your Bitmap & size it and place it to the center of the Shape. Click on the Bitmap Handle and Convert to a B/W Bitmap.
**C)** Now click on the B/W Bitmap and click the 'Bitmap Handle' again to a 'Get Outline'. Next ungroup the Vector logo and remove all but the Maple Leaf. Center over the Bitmap. Now color the Maple **Purple**. Do this so you can control it's vectoring out. Now center it so it cuts the outside of wood last, so it remains in Focus.

### Training Data Covered Here:

1. LAID OUT A WOOD JOB
2. PROCESSED A BITMAP TO A VECTOR
3. MODIFIED THE IMAGES
4. TALKED ABOUT AIR ASSIST TRICKS

**"Tip"**

*Changing Bitmaps, especially B/W Bitmaps to a Vector line can be done in LaserWorks with 300 DPI Artwork, but you can also use Corel or better yet EngraveLab, which is best in the World.*

### 2. B/W Bitmaps & Outlines

**A)** For LaserWorks Black/White Bitmaps will laser more easily than Grayscale or Dithered. So if you convert to Black & White and you like the image that is the way to go.
**B)** B/W Bitmaps will also Vectorize better, when you click 'Get Outline' in the 'Bitmap Handle' Dialog Screen this will give you an outline vector.
**C)** To Vectorize a Bitmap with 'Get Outline' & still Scan or Raster with the Laser, the Process is your choice; a combination of Bitmap and Vectoized Image for Scan and Cut can be Powerful.

**Figure 2**

### 3. Vector Cutting

**A)** With Shapes that you can draw in LaserWorks, those shapes can be modified with Edit Node tool.
**B) By simply adding or removing nodes or moving nodes to different positions, you can change the shape to your liking.**
**C)** If you Click and hold on the Edit Node Tool it shows you an additional menu along side the Tool-kit for you to use

**Figure 3**

### 4. Air Assist Tricks

**A)** The Quality of Air Assist is shown when rastering Plastics, but can also be used with woods.
**B) You can pulse the beam within the Cut Process & control the volume of air that is going to the nozzle.**
**C)** With LS Models you have to run the project as two separate jobs, use the 'Selected only' feature. With HP you just turn off or on the 'Blow' in your Process dialog in the Control Panel.

**Figure 4**

**Figure 1**

**Figure 2**

---

# Key Steps to our Goal

### 5 Basic Steps to a Job

**A)** Put in the **Size of Plate** in this case the BLUE Vector Box.

**B) Add the Text** and make sure it is correct.

**C) Change Fonts**, if needed

**D) Re-Size** text and Objects

**E) Re-Position** the Layout

### Pendant Quick Steps

A) Save Job

B) Assign Process Power and Speed

C) Download to Laser

D) Check or Set Origin Position

E) Press the 'File' on the Pendant

F) Select the Job you want

G) Press the 'Frame' Button

H) Press 'Start'

Figure 4

## Major
### CheckPoints

**Project Control Panels**

1. Shapes – Quick Step

2. Position & Arrange

3. Color Controls

4. Review

---

Figure 3

## Making a Control Panel In RDWorks

Control Panels show you mastered this Interface

## Project Control Panels

Offset poly
Offset(mm): 1 mm ☐ Delete artwork
○ In    ○ Auto In/Out
○ Out   ● In+Out
Ok    Cancel

---

**1. Shapes – Quick Steps**

**A)** Draw box with the 'Ellipse Tool' to 482 x 215 MM and color it **Red** as we will be cutting it out.
**B)** When doing a Control Panel you have cutouts and score lines. Draw all the cutout first then the score lines; boxes then circles.
**C)** Use the Matrix Copy to Duplicate columns and Copy & Paste to produce sized copies. You will need the 'Edit Node Tool' to round your corners and to break the inside border for the logo. Color in the areas as you go and save, save, save! The 'Edit Node tool' will give you a triangle and you can create the Logo with the 'Text Tool'. Lastly the Offset Polygon will be useful for Line thickness or weights.

Figure 1

---

Training Data Covered Here:
1. Laid out a Control Panel JOB
2. Used the Positioning and Tools to create the layout.
3. Assigned power and Speeds for Cutout and Marking.
4. Reviewed the main Responsibility of LaserWorks.

"Tip"

*Engraving Control Panels, because of the all the Position we must do. They are considered to be sign that you have conquered all positioning skills with the program.*

Figure 2

---
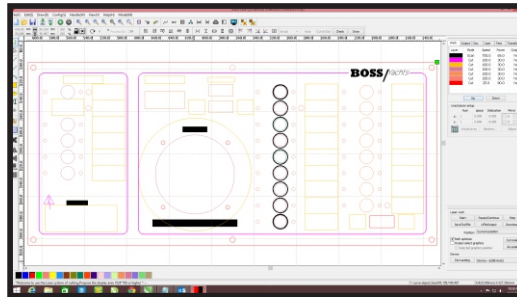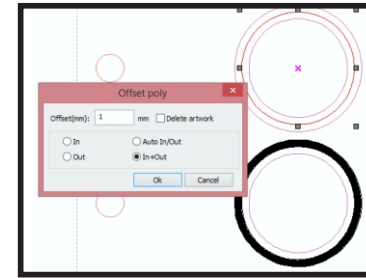
**2. Position & Arrange**

**A)** Positioning is the key feature of a Control Panel, usually you get that information from the client, but in this case you get to Eye ball the Graphics and from the sample job (CP.rld)
**B)** Watch the Standard Bar for the position measurements.
**C)** You can align items to one another then position the group. All is referenced from the Top/Right using the outside cutout as an Origin point. But you can change the reference or Origin Point to check position as you see fit.

Figure 2

---

**3. Color Controls**
**A)** The Color Controls are very important to this type of job.
**B)** **Cut or Vector** is not always about Cutout, in this case, we are scoring lines for effect and for positioning of the hardware to the panel.
**C)** So we need different Power/ Speeds to get the effect we are looking for. Please plug in these Power and Speeds per the graphics.

Figure 3

---

**4. Review**

**A)** For Control Panels produced within LaserWorks it is possible as long as you have learned the tools in question.
**B)** But Creating items from CorelDRAW and/or Engravelab would make it much easier.
**C)** As stated LaserWorks is not a *Graphics Layout Program it* is a **Graphical interface** which its main Job is to assign Power and Speeds to different colors within the Control Panel and Send that Layout to the Laser. It is Print Driver on Steroids,

Figure 4

---

## Inline/Outline

Figure 1

**A)** Select your Outline Shape

**B)** Click the 'Offset Polygon' Tool

**C)** Click inside or outside or both

**D)** Put in the offset value

**E)** Click **Ok** now select the Two layers and group them together

**F)** Change to a Scan Color or change the Process to Scan.

**H)** Now your Line has Weight or Thickness to your it.

---

# Key Steps to our Goal

### 5 Basic Steps to a Job

**A)** Put in the **Size of Plate** in this case the BLUE Vector Box.

**B)** **Add the Text** and make sure it is correct.

**C)** **Change Fonts**, if needed

**D)** **Re-Size** text and Objects

**E)** **Re-Position** the Layout

### Pendant Quick Steps

**A)** Save Job

**B)** Assign Process Power and Speed

**C)** Download to Laser

**D)** Check or Set Origin Position

**E)** Press the 'File' on the Pendant

**F)** Select the Job you want

**G)** Press the 'Frame' Button

**H)** Press 'Start'

---

Video: E27

## Major CheckPoints

**Cleaning Optics**

1. Cleaning Solution

2. Lens

3. Lens ASSEMBLY

4. Mirrors
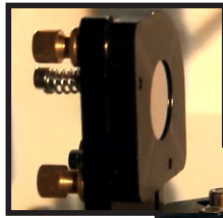
Figure 3

## Cleaning Your Optics is a Daily/Weekly Event

Maintaining Optics is Important to Quality
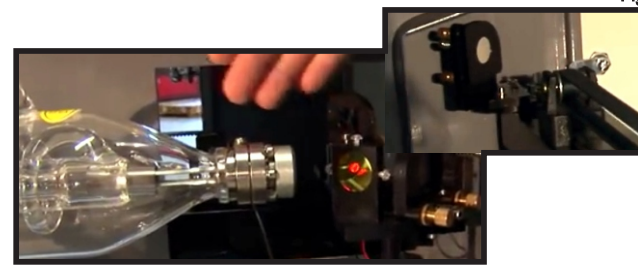
Figure 4

## Cleaning Optics

**WATCH FOR THIS:** Cabinet Dust

Figure 1

**A)** If we have alot of Dust or Dirt in the Cabinet, this is a problem for the optics.

**B)** The Fans will blow the dust onto the Optics and cause issues.

**C)** You will either have to Clean the Optics more or you will lose one to damage.

**D)** The Laser cannot be in a Dusty environment, Period.

### 1. Cleaning Solution

**A)** Only use the Cleaning solution that is recommended by BOSS.
**B)** In this case it is Camera Lens cleaner, and apply it with a moist lint free cloth.
**C)** Do not ever clean dry. Pad the Optics with a wet area to remove any materials from the optics prior to rubbing it clean, so you do not rub particulates Into the optic. So when you rub the Optic do it with another area of the Cloth. Lastly, wipe the Optic with the dry lint free cloth again.

Training Data Covered Here:
1. Learned the cleaning process for the Optics
2. Covered the Process for cleaning the Lens.
3. Processed the cleaning of the Mirrors.
4. Reviewed the Do's Don't of this very important responsibility.

"Tip"

*If dirt or dust is trapped on the Mirrors or Lens, the Laser Beam can build up heat on it and finally crack or pit the surface.*
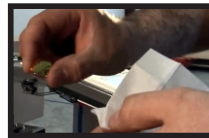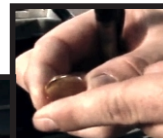
### 2. Lens
**A)** The Lens must be cleaned on both sides of the optic.
**B)** The Combiner Lens is the first Lens that you see, this is right after where the beam leaves the Laser tube.
**C)** Do not forget to clean the Laser Tube Lens and to clean the Combiner as it sets, **do not** remove it to clean it. You can lose a lot of power, if this optic is dirty and, because the combiner lens receives the highest amount of power it can crack more easily than the other Optics.
Figure 2

### 3. Lens ASSEMBLY
**A)** The Lens Assembly is where the focal Lens is mounted, check where it aligns to before removing.
**B)** You must release the Lens Assembly from the Lens Carriage that it rides on by removing the Nozzle and air hook up with the collar ring screw.
**C)** Once out, use the Lens removal tool and unscrew the *Capture Screw* and remove the Lens and rubber gasket. Clean and replace in the same place (Curved top of lens down in the assembly and **up** toward the beam in the **carriage**), remember the end of the nozzle must be slightly above the Focus plunger button, so it will auto-focus correctly.
Figure 3

### 4. Mirrors
**A)** All Mirrors except the last mirror or the Lens mirror must be cleaned as they sit.
**B) The Last Mirror can be removed to clean and then replaced, using the Mirror removal tool.**
**C) T**he Mirror must NOT be at an angle. It must be perfectly Flat, so the beam hits the focus lens and the material straight. **Clean the Optics from once a day to once every 2 weeks.**
Figure 4

Figure 1

Figure 2

## Key Steps to our Goal

**Cleaning Optics on Your Laser**

**A)** Cleaning Solution: Camera cleaner or Acetone in a emergency

**B)** Use Lid-Free cloths like KIM-Wipes and Industrial wood handled Q-tips

**C)** Clean Optics as you need to, but usually once a Week to once every **two Weeks**.

**D) DO NOT remove the Mirrors to clean them**

**Tips for Cleaning Optics**
**A)** Pad the Optic with the wet Kim wipe to collect particles

**B)** Rub the optic with another area of the cloth that is wet with Lens Cleaner

**C)** You will remove **Only** the Carriage Mirror to clean it

**D)** You will remove the Lens to clean it

**E)** Rounded end of the Len is up torward the beam, when replaced

## Major CheckPoints

**Beam Alignment**

1. Tube

2. Mirror Mounts

3. Optics Replacement

4. Tube Replacement
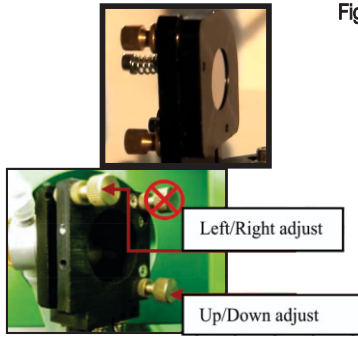
Figure 3

## Doing a Beam Alignment

### Performing a Beam Alignment

Left/Right adjust

Up/Down adjust

Figure 4

## WATCH FOR THIS: Tube

Figure 1

NOTE: All machines go through a QA process & are already aligned, ready for use. So there's no need for any adjustments with the Mirrors - tube - bracket. The laser tube and optics are the heart of the laser machine. Once tuned the laser machine should stay aligned for months of work. Check it once every month to insure no bumping or mechanical failure has occurred.
You can see the simplicity of the system: One long glass tube, two small mirrors and a laser head, that's it. The light/laser travels in a straight line, adjusting the laser tube in the rear to hit first mirror (A) Center first, then adjust mirror (A) to hit mirror (B) dead center. And finally adjust mirror (B) to hit laser head center. Be careful with this procedure. Never have the machine on while working around the laser tube. Make an adjustment, then turn on the laser and fire a test shot by pressing the LASER button on the LED panel.

## Beam Alignment

**1. Tube**

A) The main item to look for from the tube is how it is mounted.
B) The tube needs to be mounted about .25 to .5" from the 1st optic.
C) The levelness of the tube is critical, if the tube hits the first mirror at an angle, the balance of the beam alignment will never be adjusted correctly. With a Carpenters level you can check it. If it has been working it is more than likely OK. Remember, we are bouncing a laser beam off mirrors to get it to the focus lens and then to the material.

**Training Data Covered Here:**

1. LEARNED WHY BEAM ALIGNMENT IS CRITICAL
2. LEARNED THE MIRROR MOUNT ALIGNMENT POINTS.
3. LEARNED ABOUT OPTICS REPLACEMENT
4. REVIEWED SAFETY PROCEDURES FOR THIS TASK.

**"Tip"**

*Beam Alignment can render high productivity or kill it. It is simply bouncing the Laser Beam off mirrors until it is delivered to the Focal Lens.*
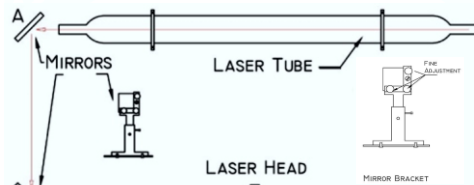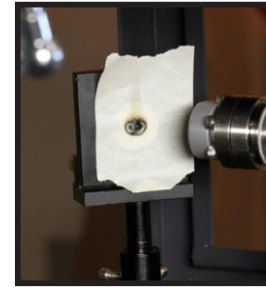
**2. Mirror Mounts**
A) You will see the **Red** positioning light on the mirror, especially when you put a post-it note or painters tape on it
B) One thumb screw adjusts the mirror left/right and other up/bottom; the third screw is touched as a last resort.
C) You adjust the Tube mirror to shoot to the 2nd mirror or the Bridge mirror to start with. These mirrors have large sweet spots and should NOT be dead in the center but very close. Now adjust the Bridge Mirror to the 3rd mirror or the Lens mirror. Lastly, the Lens mirror should hit the material straight up & down by shooting the burn dot to the center of the nozzle.

Figure 2

**3. Optics Replacement**
A) These Optics are very tough, especially the Mirrors which have a thicker coating on them.
B) This is why we do the Beam alignment to just little to one side so if we pit the mirror we can loosen the capture collar and rotate the mirror to keep from replacing it.
C) You replace the Lens the same way you clean it. Make sure when replacing the mirror you tighten the collar and do a full Beam alignment. You should keep a back-up Lens and mirror in stock. Beam alignment should only be done with a tech on the phone and after you have watched the BOSS video.

Figure 3
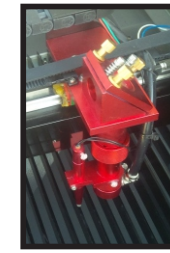
**4. Tube Replacement**
A) To replace the tube, just unplug the laser and open the tube cover on the cabinet.
B) De-solder or unscrew the connections to the right / left of the tube. Mark where it sets in the holders & disconnect the hoses.
C) Remove the old tube & put the new tube in. Attach the Hoses then the connectors to the Electrical input. Slide the tube to your mark left/right & attach the holding clamps. Make sure you have silicon sleeves on the connecter & over the power end of the tube. Lastly test fire the tube and you're ready to start.

Figure 4

A

MIRRORS

LASER TUBE

Fine Adjustment

LASER HEAD

MIRROR BRACKET

B

Figure 1

Figure 2

## Key Steps to our Goal

**Tools necessary to align the optical path**

A) Small Post-It notes or Painters Tape

B) ¼" (.25) or thicker piece of acrylic

C) With a Dry Lint free Cloth

D) 2.5mm & 6mm Allen Wrench & Pliers

E) Patience and Time

**Caution**

Remember, to use caution, if the laser is way off target, it could literally shoot into the room, missing the mirror, the cabinet and hitting someone or something. This could be dangerous.

**Use extra caution on this procedure.**

## Major CheckPoints

**Preventative Maintenance**

1. Clean Optics

2. Clean Motion System

3. Cabinet & Z-Axis

4. Inspection and Controller
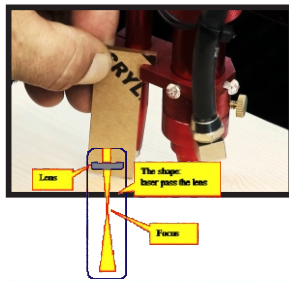

Figure 3

# General Preventative Maintenance

## Performing Preventative Maintenance

| Lens focal length | Beam dot size | Purpose | Power output |
|---|---|---|---|
| 1.5" | .003" | Tiny image engraving | Increase of power (+?%) |
| 2.0" | .005" | Happy medium for engraving & cutting | Average Power Output |
| 2.5" | .007" | | |
| 4.0" | .012" | Thicker cutting | Decrease of power (-20%) |

### 1. Clean Optics

**A)** The main items to look for from the tube is how and where it is mounted.
**B)** The tube needs to be mounted about 1/4 to 1/2 inch from the first optic.
**C)** The levelness of the tube is critical, if the tube hits the first mirror at an angle the balance of the beam alignment will never be adjusted correctly. So with a Carpenters level you can check it. If it has been working, it is more than likely OK. Remember, we are bouncing a laser beam off mirrors to get it to the focus lens and then to the material.

### Training Data Covered Here:

1. Reviewed what cleaning is done for the Optics
2. Processed the cleaning of the Motion System.
3. Processed the cleaning the Cabinet, Chiller and Z-axis.
4. Reviewed the Inspection of the Controller, Electronics AND testing of THE LASER.

### "Tip"

*The Preventative Maintenance is designed for you to do. The Bi-Annual Tune-ups, if you're a long way away from a Tech, you can go once every 4 years , as long as you do a PC-2-PC tune-up at 2 years.*
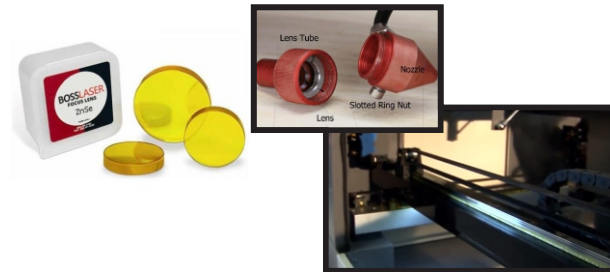

Figure 4



# Preventative Maintenance

### 2. Clean Motion System

**A)** The Motion system is the motors, belts and pulleys that traverse the Lens Carriage around the table.
**B)** With a Clean Cloth wipe off the Lens Carriage and the Auto-Focus Plunger, if you need to blow them out; remove the Lens assembly so you do not blow foreign material on top of it.
**C)** Wipe the X Bridge down and the Left and Right sides of the Y axis, both the Rails themselves and the holder they sit on. Then put a very thin layer of Silicon grease on the rails to protect it from the pits and the fumes. Do this Monthly and then jog the system around the table then raster (Scan) the width of the table.

Figure 2

### 3. Cabinet & Z-Axis

**A)** Vacuum and Blow out the Cabinet; for Safety reasons and to keep dust off the Optics. You will need to clean Optics last after a full P.M..
**B)** Grease the Z-axis lead-screws that the table travels up and down on. Then run the table up and down to work the Grease in. This should be a Quarterly task.
**C)** Check all the hosing through the cabinet for both the tube and Chiller. **The Distilled Water for the Chiller needs to be replaced every 6 months.** Also check that the chiller is a 22-18C for its temperature, and you have no leaks. Putting Tie Straps on the hose connections on either side is a good idea.

Figure 3

### 4. Inspection and Controller

**A)** Unplugged, take a screwdriver & check the connections on the Electronics Board stack.
**B)** Do a Visual inspection for items that may be out of place.
**C)** Now run a test box to the table dimensions and then run the Frame test to see if all looks square. Then Laser cut a Vectored Capital 'L' place one inch from the left and 1 inch from the top of the plate & test the positioning. Check your Auto-focus & checking it the manual focus tool & adjust it.

Figure 4



## Key Steps to our Goal

### Major Items for a P.M.

**A)** Clean Optics

**B)** Check final Lens mirror for Beam Alignment

**C)** Clean Rails and put a light film of Silicon Grease on rails

**D)** Remove all Foreign Material from Cabinet

**E)** Vacuum out cabinet

**F)** Inspect Controller and Laser as a whole

### Safety

Never do any Preventative Maintenance with the Laser on or even Plugged in, and test the unit prior to doing Maintenance and if there is a problem afterwards then review the Maintenance process, it is the cause of the problem.

WATER CHILLER SETUP

Figure 1

Figure 2

**Linear bearings:** The linear bearings are found under the gantry (to mount the gantry to the side rails and under the focal head . These bearings have grease fittings for pushing lubricant into the ball bearing areas. 1)Remove the grease fitting, 2) Apply the grease to your finger, 3) Push the grease into the little hole, **Rubber belts:** The rubber belts should be checked for appropriate tension at least every six months. These side belts work together to move the gantry from front to rear. If the belt appears to be worn on one side, check the bearing alignment or damage to the matching bearings. It is normally a method of tightening a screw and then applying a lock nut to keep the screw in place.

## Major CheckPoints

### Trouble shooting 101

1. Eyes and Ears

2. Software

3. Systems Check

4. PC-2-PC Support


LIMIT SWITCHES


WATER SIGNAL BYPASS

Figure 3

# TroubleShooting for Beginners

## Performing Simple Troubleshooting


LENS RING NUT DRIVER — FOCUS GUIDE
MIRROR RING NUT DRIVER

Figure 4

# TroubleShooting 101

### 1. Eyes and Ears

**A)** When I or the Technical Support Team is helping you over the Phone, remember you are our Eyes and Ear. You are at this point a Tech.
**B)** Tell the Tech what the specific problem is, and even though they may ask you to repeat steps you have already done - repeat them for clarity.
**C)** To tell us it is **"not working,"** is too vague.
- Will the laser turn on?
-Can you test fire the beam?,
-Can you download from the PC to the Laser?
-Have you tried another job?
-Have you tested it in different spots on the table. These are big questions.

Training Data Covered Here:

1. STATED THAT YOU ARE THE MAIN TECH, AS YOU ARE THERE.
2. TALKED ABOUT THE ISSUE OF SOFTWARE AND THE PC
3. LEARNED ABOUT SYSTEM CHECKS.
4. REVIEWED THE PC-2-PC HOOK UP FOR FAST SUPPORT.

"Tip"

*When TroubleShooting with one of the Boss Technical Support team; You are their Eyes and Ears, The more accurate you are, the faster they can FIGURE OUT WHAT IS UP.*

### 3. Software
**A)** Software is usually the main cause of the majority of problems that an operator will have.
**B)** If you can load the last job that ran fine, and it is OK -then the problem is within the Job.
**C)** If not exit, the Software and reenter it, layout a test job from scratch. If Not restart Windows, if that does not do it. Attempt to clean out all the jobs in the Laser Que. Now unplug the USB/Ethernet Cable and turn the Laser Off, count to 10 and turn it back on. Now plug the cable back in to get the Driver to re-setup. You may need to reload LaserWorks and the USB Driver if you're having download issues.
Figure 2

### 3. Systems Check
**A)** You can check the system by section, starting with the system that giving the main issue.
**B)** For example if you're not firing the beam, you plug in the cheater plug in your tube power supply and test fire the laser bypassing all the inter-locks.
**C)** There are Diagnostics on the Laser Pendant for check limit switches. An out bounds can just be that you can go more to the center origin to help with the over travel. You can get this from running to fast. Again have myself or one the factory team on the horn to run through the problem and narrow it down to specific area of the lasers operation.
Figure 3

### 4. PC-2-PC Support
**A)** All PC's that are running BOSS Lasers should be hooked to the Internet so we can remote in to do faster support.
**B)** I use the Program www.SHOWMYPC.com or WWW.teamviewer.com to remote in and either give you training or help speed up the getting to a solution.
**C)** You start the Remote Dialog, feed us a Password number one section at a time . Once you have done this I will repeat it back to you to
Figure 4


TROUBLESHOOTING

Figure 1

Figure 2

# Key Steps to our Goal

### Laser not coming on

•Is it Plugged in?
•Is the emergency kill button pressed?
•Is the key turned to the on position?
•Check the 120v 5amp fuse located in the receptacle used to power up the laser. The fuse is a pull out type at the bottom of the receptacle.
•Check the re-settable fuse box (breaker), make sure the lever is in the on position. Not all units will have this fuse.

### Machine coming on but not firing
Problems with any of the Protect systems will prevent the laser from actually firing, although the head will still move around like the machine is working fine.
•Check the water supply. If the laser does not detect water flowing through the tube the laser will not fire, so make sure either your water pump (for LS-1416's) or CW-3000/5000 water chiller is on.
•Make sure all doors are closed. All our machines come with interlocks to prevent operation in the advent lid or doors are open



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Figure 1

**X or Y Slop Over Error /** Frame Over Error When running the Frame and/or START-PAUSE button, the Slop/Frame error message will appear only if the object(s)/image(s) being executed on the worktable is overextending.
**\*The file/job keeps starting at the same spot**
Every time In most cases, this happens when the "ORIGIN" was accidentally selected. To cancel the origin, press the Z/U button and cycle through the options until you see Axis Reset+. Select it and then highlight over the X-Y axis reset. Once that is selected, the laser head will go to it's home position and now the origin has been cancelled. To change the origin position, just move the laser head to your desired location, then press the ORIGIN button again to set the origin.

# Recommended Engraving and Cutting Settings for 40W Laser

This is just a starting point - many different settings can be used for different effects. Scan gap is very important when engraving for depth and detail of engraving. To increase productivity, increase speed, power and adjust scan gap proportionately.

| | Watt | Power | Speed mm/sec | Scan Gap DPI | NOTES | |
|---|---|---|---|---|---|---|
| Acrylic | 40 | 75 | 400 | 0.05 | lower speed or multiple passes to increase depth | Scan |
| Anodized Aluminum | 40 | 75 | 400 | 0.07 | | Scan |
| Brick | 40 | 85 | 10 | 0.10 | engrave or cut with lens slightly out of focus to produce glass effect | Scan |
| Cardboard Matt Board | 40 | 75 | 400 | 0.10 | | Scan |
| Ceramic | 40 | 100 | 200 | 0.05 | | Scan |
| Glass | 40 | 100 | 200 | 0.05 | | Scan |
| Laserable Plastic | 40 | 50 | 400 | 0.05 | on plastics with a white core, you can run the engraving again at a low speed to clean the dust. | Scan |
| Leather | 40 | 75 | 300 | 0.10 | | Scan |
| Marble, Granite | 40 | 100 | 200 | 0.05 | | Scan |
| MDF - 1/8" | 40 | 75 | 400 | 0.10 | use transfer tape to prevent scorch | Scan |
| Mirror Back Glass | 40 | 75 | 300 | 0.10 | | Scan |
| Painted Metal | 40 | 75 | 300 | 0.10 | | Scan |
| Paper | 40 | 20 | 400 | 0.10 | | Scan |
| Rubber Stamp | 40 | 75 | 300 | 0.10 | use grade engrave to achieve 3D stamp effect - set the angle | Scan |
| Sign Foam | 40 | 75 | 400 | 0.10 | | Scan |
| Wood | 40 | 100 | 200 | 0.10 | use transfer tape to prevent scorch | Scan |
| Acrylic - 3mm 1/8" | 40 | 100 | 5 | | | cut |
| Acrylic - 6mm 1/4" | 40 | 100 | 1 | | | cut |
| Acrylic - 12mm 1/2" | 40 | NR | | | | cut |
| Acrylic - 25mm 1" | 40 | NR | | | | cut |
| Cardboard Matt Board | 40 | 50 | 75 | | | cut |
| Laserable Plastic | 40 | 75 | 20 | | | cut |
| Leather | 40 | 75 | 10 | | | cut |
| MDF - 1/8" | 40 | 75 | 20 | | | cut |
| Paper | 40 | 50 | 400 | | increase speed first / decrease power if scorching | cut |
| Rubber Stamp | 40 | 75 | 10 | | | cut |
| Wood - 3mm 1/8" | 40 | 100 | 10 | | use transfer tape to prevent scorch | cut |
| Wood - 6mm 1/4" | 40 | 100 | 5 | | use transfer tape to prevent scorch | cut |
| Wood - 9mm 3/8" | 40 | 100 | 1 | | use transfer tape to prevent scorch | cut |
| Wood - 12mm 1/2" | 40 | NR | | | | cut |

| Materials | Power | Speed | DPI Scan Gap | Notes |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

# Recommended Engraving and Cutting Settings for 60W Laser

**EC** www.engraverschoic.com

This is just a starting point - many different settings can be used for different effects.  Scan gap is very important when engraving for depth and detail of engraving.   To increase productivity, increase speed, power and adjust scan gap proportionately.

| Materials | Power | Speed | DPI Scan Gap | Notes |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| | Watt | Power | Speed mm/sec | Scan Gap DPI | NOTES | |
|---|---|---|---|---|---|---|
| Acrylic | 60 | 50 | 400 | 0.05 | lower speed or multiple passes to increase depth | Scan |
| Anodized Aluminum | 60 | 50 | 400 | 0.07 | | Scan |
| Brick | 60 | 80 | 25 | 0.10 | engrave or cut with lens slightly out of focus to produce glass effect | Scan |
| Cardboard Matt Board | 60 | 50 | 400 | 0.10 | | Scan |
| Ceramic | 60 | 67 | 200 | 0.05 | | Scan |
| Glass | 60 | 67 | 200 | 0.05 | | Scan |
| Laserable Plastic | 60 | 35 | 400 | 0.05 | on plastics with a white core, you can run the engraving again at a low speed to clean the dust. | Scan |
| Leather | 60 | 50 | 300 | 0.10 | | Scan |
| Marble, Granite | 60 | 65 | 200 | 0.05 | | Scan |
| MDF - 1/8" | 60 | 50 | 400 | 0.10 | use transfer tape to prevent scorch | Scan |
| Mirror Back Glass | 60 | 50 | 300 | 0.10 | | Scan |
| Painted Metal | 60 | 50 | 300 | 0.10 | | Scan |
| Paper | 60 | 20 | 600 | 0.10 | | Scan |
| Rubber Stamp | 60 | 50 | 300 | 0.10 | use grade engrave to achieve 3D stamp effect - set the angle | Scan |
| Sign Foam | 60 | 50 | 400 | 0.10 | | Scan |
| Wood | 60 | 65 | 200 | 0.10 | use transfer tape to prevent scorch | Scan |
| Acrylic - 3mm  1/8" | 60 | 100 | 15 | | | cut |
| Acrylic - 6mm  1/4" | 60 | 100 | 5 | | | cut |
| Acrylic - 12mm  1/2" | 60 | 100 | 1 | | | cut |
| Acrylic - 25mm 1" | 60 | NR | | | | cut |
| Cardboard Matt Board | 60 | 50 | 120 | | | cut |
| Laserable Plastic | 60 | 50 | 20 | | | cut |
| Leather | 60 | 50 | 10 | | | cut |
| MDF - 1/8" | 60 | 50 | 20 | | | cut |
| Paper | 60 | 35 | 400 | | increase speed first / decrease power if scorching | cut |
| Rubber Stamp | 60 | 50 | 10 | | | cut |
| Wood - 3mm  1/8" | 60 | 100 | 20 | | use transfer tape to prevent scorch | cut |
| Wood - 6mm  1/4" | 60 | 100 | 10 | | use transfer tape to prevent scorch | cut |
| Wood - 9mm  3/8" | 60 | 100 | 5 | | use transfer tape to prevent scorch | cut |
| Wood - 12mm  1/2" | 60 | 100 | 1 | | use transfer tape to prevent scorch | cut |

# Recommended Engraving and Cutting Settings for 80W Laser

www.engraverschoic.com

This is just a starting point - many different settings can be used for different effects.  Scan gap is very important when engraving for depth and detail of engraving.   To increase productivity, increase speed, power and adjust scan gap proportionately.

| Materials | Power | Speed | DPI Scan Gap | Notes |
|-----------|-------|-------|--------------|-------|
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

| Material | Watt | Power | Speed mm/sec | Scan Gap DPI | NOTES | |
|----------|------|-------|--------------|--------------|-------|---|
| Acrylic | 80 | 40 | 400 | 0.05 | lower speed or multiple passes to increase depth | Scan |
| Anodized Aluminum | 80 | 40 | 400 | 0.07 | | Scan |
| Brick | 80 | 75 | 35 | 0.10 | engrave or cut with lens slightly out of focus to produce glass effect | Scan |
| Cardboard Matt Board | 80 | 40 | 400 | 0.10 | | Scan |
| Ceramic | 80 | 50 | 200 | 0.05 | | Scan |
| Glass | 80 | 50 | 200 | 0.05 | | Scan |
| Laserable Plastic | 80 | 25 | 400 | 0.05 | on plastics with a white core, you can run the engraving again at a low speed to clean the dust. | Scan |
| Leather | 80 | 40 | 300 | 0.10 | | Scan |
| Marble, Granite | 80 | 50 | 200 | 0.05 | | Scan |
| MDF - 1/8" | 80 | 40 | 400 | 0.10 | use transfer tape to prevent scorch | Scan |
| Mirror Back Glass | 80 | 40 | 300 | 0.10 | | Scan |
| Painted Metal | 80 | 40 | 300 | 0.10 | | Scan |
| Paper | 80 | 15 | 600 | 0.10 | | Scan |
| Rubber Stamp | 80 | 40 | 300 | 0.10 | use grade engrave to achieve 3D stamp effect - set the angle | Scan |
| Sign Foam | 80 | 40 | 400 | 0.10 | | Scan |
| Wood | 80 | 50 | 200 | 0.10 | use transfer tape to prevent scorch | Scan |
| Acrylic - 3mm  1/8" | 80 | 100 | 30 | | | cut |
| Acrylic - 6mm  1/4" | 80 | 100 | 12 | | | cut |
| Acrylic - 12mm  1/2" | 80 | 100 | 3 | | | cut |
| Acrylic - 25mm 1" | 80 | 100 | 0.5 | | | cut |
| Cardboard Matt Board | 80 | 50 | 130 | | | cut |
| Laserable Plastic | 80 | 40 | 20 | | | cut |
| Leather | 80 | 40 | 10 | | | cut |
| MDF - 1/8" | 80 | 40 | 20 | | | cut |
| Paper | 80 | 30 | 400 | | increase speed first / decrease power if scorching | cut |
| Rubber Stamp | 80 | 40 | 10 | | | cut |
| Wood - 3mm  1/8" | 80 | 100 | 40 | | use transfer tape to prevent scorch | cut |
| Wood - 6mm  1/4" | 80 | 100 | 15 | | use transfer tape to prevent scorch | cut |
| Wood - 9mm  3/8" | 80 | 100 | 8 | | use transfer tape to prevent scorch | cut |
| Wood - 12mm  1/2" | 80 | 100 | 3 | | use transfer tape to prevent scorch | cut |

# Recommended Engraving and Cutting Settings for 90W Laser

This is just a starting point - many different settings can be used for different effects. Scan gap is very important when engraving for depth and detail of engraving. To increase productivity, increase speed, power and adjust scan gap proportionately.

| | Watt | Power | Speed mm/sec | Scan Gap DPI | NOTES | |
|---|---|---|---|---|---|---|
| Acrylic | 90 | 35 | 400 | 0.05 | | Scan |
| Anodized Aluminum | 90 | 35 | 400 | 0.07 | | |
| Brick | 90 | 70 | 35 | 0.10 | engrave or cut with lens slightly out of focus to produce glass effect | Scan Scan |
| Cardboard Matt Board | 90 | 35 | 400 | 0.10 | | Scan |
| Ceramic | 90 | 45 | 200 | 0.05 | | Scan |
| Glass | 90 | 45 | 200 | 0.05 | | Scan |
| Laserable Plastic | 90 | 25 | 400 | 0.05 | on plastics with a white core, you can run the engraving again at a low speed to clean the dust. | Scan |
| Leather | 90 | 35 | 300 | 0.10 | | Scan |
| Marble, Granite | 90 | 45 | 200 | 0.05 | | Scan |
| MDF - 1/8" | 90 | 35 | 400 | 0.10 | use transfer tape to prevent scorch | Scan |
| Mirror Back Glass | 90 | 35 | 300 | 0.10 | | Scan |
| Painted Metal | 90 | 35 | 300 | 0.10 | | Scan |
| Paper | 90 | 15 | 600 | 0.10 | | Scan |
| Rubber Stamp | 90 | 35 | 300 | 0.10 | use grade engrave to achieve 3D stamp effect - set the angle | Scan |
| Sign Foam | 90 | 35 | 400 | 0.10 | | Scan |
| Wood | 90 | 45 | 200 | 0.10 | use transfer tape to prevent scorch | Scan |
| Acrylic - 3mm 1/8" | 90 | 100 | 35 | | | cut |
| Acrylic - 6mm 1/4" | 90 | 100 | 15 | | | cut |
| Acrylic - 12mm 1/2" | 90 | 100 | 5 | | | cut |
| Acrylic - 25mm 1" | 90 | 100 | 0.7 | | | cut |
| Cardboard Matt Board | 90 | 50 | 150 | | | cut |
| Laserable Plastic | 90 | 35 | 20 | | | cut |
| Leather | 90 | 35 | 10 | | | cut |
| MDF - 1/8" | 90 | 35 | 20 | | | cut |
| Paper | 90 | 25 | 400 | | increase speed first / decrease power if scorching | cut |
| Rubber Stamp | 90 | 35 | 10 | | | cut |
| Wood - 3mm 1/8" | 90 | 100 | 45 | | use transfer tape to prevent scorch | cut |
| Wood - 3mm 1/8" | 90 | 100 | 45 | | | cut |
| Wood - 6mm 1/4" | 90 | 100 | 20 | | | cut |
| Wood - 9mm 3/8" | 90 | 100 | 10 | | | cut |
| Wood - 12mm 1/2" | 90 | 100 | 5 | | | cut |

| Materials | Power | Speed | DPI Scan Gap | Notes |
|---|---|---|---|---|
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# Recommended Engraving and Cutting Settings for 100W Laser

This is just a starting point - many different settings can be used for different effects. Scan gap is very important when engraving for depth and detail of engraving. To increase productivity, increase speed, power and adjust scan gap proportionately.

| Materials | Power | Speed | DPI Scan Gap | Notes |
|---|---|---|---|---|
| | | | | |
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| | Watt | Power | Speed mm/sec | Scan Gap DPI | NOTES | |
|---|---|---|---|---|---|---|
| Acrylic | 100 | 30 | 400 | 0.05 | lower speed or multiple passes to increase depth | Scan |
| Anodized Aluminum | 100 | 35 | 400 | 0.07 | | Scan |
| Brick | 100 | 65 | 35 | 0.10 | engrave or cut with lens slightly out of focus to produce glass effect | Scan |
| Cardboard Matt Board | 100 | 30 | 400 | 0.10 | | Scan |
| Ceramic | 100 | 40 | 200 | 0.05 | | Scan |
| Glass | 100 | 40 | 200 | 0.05 | | Scan |
| Laserable Plastic | 100 | 25 | 400 | 0.05 | on plastics with a white core, you can run the engraving again at a low speed to clean the dust. | Scan |
| Leather | 100 | 30 | 300 | 0.10 | | Scan |
| Marble, Granite | 100 | 40 | 200 | 0.05 | | Scan |
| MDF - 1/8" | 100 | 30 | 400 | 0.10 | use transfer tape to prevent scorch | Scan |
| Mirror Back Glass | 100 | 30 | 300 | 0.10 | | Scan |
| Painted Metal | 100 | 30 | 300 | 0.10 | | Scan |
| Paper | 100 | NR | | | | Scan |
| Rubber Stamp | 100 | 30 | 300 | 0.10 | use grade engrave to achieve 3D stamp effect - set the angle | Scan |
| Sign Foam | 100 | 30 | 400 | 0.10 | | Scan |
| Wood | 100 | 40 | 200 | 0.10 | use transfer tape to prevent scorch | Scan |
| Acrylic - 3mm 1/8" | 100 | 100 | 40 | | | cut |
| Acrylic - 6mm 1/4" | 100 | 100 | 15 | | | cut |
| Acrylic - 12mm 1/2" | 100 | 100 | 5 | | | cut |
| Acrylic - 25mm 1" | 100 | 100 | 1 | | | cut |
| Cardboard Matt Board | 100 | 50 | 160 | | | cut |
| Laserable Plastic | 100 | 20 | 20 | | | cut |
| Leather | 100 | 30 | 10 | | | cut |
| MDF - 1/8" | 100 | 30 | 20 | | | cut |
| Paper | 100 | 20 | 400 | | increase speed first / decrease power if scorching | cut |
| Rubber Stamp | 100 | 30 | 10 | | | cut |
| Wood - 3mm 1/8" | 100 | 100 | 50 | | use transfer tape to prevent scorch | cut |
| Wood - 6mm 1/4" | 100 | 100 | 20 | | use transfer tape to prevent scorch | cut |
| Wood - 9mm 3/8" | 100 | 90 | 10 | | use transfer tape to prevent scorch | cut |
| Wood - 12mm 1/2" | 100 | 100 | 5 | | use transfer tape to prevent scorch | cut |

# Recommended Engraving and Cutting Settings for 130W Laser

**www.engraverschoic.com**

This is just a starting point - many different settings can be used for different effects. Scan gap is very important when engraving for depth and detail of engraving. To increase productivity, increase speed, power and adjust scan gap proportionately.

| Materials | Power | Speed | DPI Scan Gap | Notes |
|-----------|-------|-------|--------------|-------|
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| | Watt | Power | Speed mm/sec | Scan Gap DPI | NOTES | |
|---|------|-------|--------------|--------------|-------|---|
| Acrylic | 120 | 25 | 400 | 0.05 | lower speed or multiple passes to increase depth | Scan |
| Anodized Aluminum | 120 | 35 | 400 | 0.07 | | Scan |
| Brick | 120 | 50 | 35 | 0.10 | engrave or cut with lens slightly out of focus to produce glass effect | Scan |
| Cardboard Matt Board | 120 | 25 | 400 | 0.10 | | Scan |
| Ceramic | 120 | 35 | 200 | 0.05 | | Scan |
| Glass | 120 | 35 | 200 | 0.05 | | Scan |
| Laserable Plastic | 120 | 25 | 600 | 0.05 | on plastics with a white core, you can run the engraving again at a low speed to clean the dust. | Scan |
| Leather | 120 | 25 | 300 | 0.10 | | Scan |
| Marble, Granite | 120 | 35 | 200 | 0.05 | | Scan |
| MDF - 1/8" | 120 | 25 | 400 | 0.10 | use transfer tape to prevent scorch | Scan |
| Mirror Back Glass | 120 | 25 | 300 | 0.10 | | Scan |
| Painted Metal | 120 | 25 | 300 | 0.10 | | Scan |
| Paper | 120 | NR | | | | Scan |
| Rubber Stamp | 120 | 25 | 300 | 0.10 | use grade engrave to achieve 3D stamp effect - set the angle | Scan |
| Sign Foam | 120 | 25 | 400 | 0.10 | | Scan |
| Wood | 120 | 35 | 200 | 0.10 | use transfer tape to prevent scorch | Scan |
| Acrylic - 3mm  1/8" | 120 | 75 | 40 | | | cut |
| Acrylic - 6mm  1/4" | 120 | 75 | 15 | | | cut |
| Acrylic - 12mm  1/2" | 120 | 75 | 5 | | | cut |
| Acrylic - 25mm 1" | 120 | 75 | 0.7 | | | cut |
| Cardboard Matt Board | 120 | NR | | | | cut |
| Laserable Plastic | 120 | 25 | 20 | | | cut |
| Leather | 120 | 25 | 10 | | | cut |
| MDF - 1/8" | 120 | 25 | 20 | | | cut |
| Paper | 120 | NR | | | increase speed first / decrease power if scorching | cut |
| Rubber Stamp | 120 | 25 | 10 | | | cut |
| Wood - 3mm  1/8" | 120 | 75 | 45 | | use transfer tape to prevent scorch | cut |
| Wood - 6mm  1/4" | 120 | 75 | 20 | | use transfer tape to prevent scorch | cut |
| Wood - 9mm  3/8" | 120 | 75 | 10 | | use transfer tape to prevent scorch | cut |
| Wood - 12mm  1/2" | 120 | 75 | 5 | | use transfer tape to prevent scorch | cut |

# Recommended Engraving and Cutting Settings for 150W Laser

www.engraverschoic.com

This is just a starting point - many different settings can be used for different effects.  Scan gap is very important when engraving for depth and detail of engraving.   To increase productivity, increase speed, power and adjust scan gap proportionately.

| Materials | Power | Speed | DPI Scan Gap | Notes |
|---|---|---|---|---|
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| | Watt | Power | Speed mm/sec | Scan Gap DPI | NOTES | |
|---|---|---|---|---|---|---|
| Acrylic | 150 | 20 | 400 | 0.05 | lower speed or multiple passes to increase depth | Scan |
| Anodized Aluminum | 150 | 20 | 400 | 0.07 | | Scan |
| Brick | 150 | 40 | 35 | 0.10 | engrave or cut with lens slightly out of focus to produce glass effect | Scan |
| Cardboard Matt Board | 150 | 20 | 400 | 0.10 | | Scan |
| Ceramic | 150 | 25 | 200 | 0.05 | | Scan |
| Glass | 150 | 25 | 200 | 0.05 | | Scan |
| Laserable Plastic | 150 | 20 | 600 | 0.05 | on plastics with a white core, you can run the engraving again at a low speed to clean the dust. | Scan |
| Leather | 150 | 20 | 300 | 0.10 | | Scan |
| Marble, Granite | 150 | 25 | 200 | 0.05 | | Scan |
| MDF - 1/8" | 150 | 20 | 400 | 0.10 | use transfer tape to prevent scorch | Scan |
| Mirror Back Glass | 150 | 20 | 300 | 0.10 | | Scan |
| Painted Metal | 150 | 20 | 300 | 0.10 | | Scan |
| Paper | 150 | NR | | | | Scan |
| Rubber Stamp | 150 | 20 | 300 | 0.10 | use grade engrave to achieve 3D stamp effect - set the angle | Scan |
| Sign Foam | 150 | 20 | 400 | 0.10 | | Scan |
| Wood | 150 | 25 | 200 | 0.10 | use transfer tape to prevent scorch | Scan |
| Acrylic - 3mm  1/8" | 150 | 60 | 40 | | | cut |
| Acrylic - 6mm  1/4" | 150 | 60 | 15 | | | cut |
| Acrylic - 12mm  1/2" | 150 | 60 | 5 | | | cut |
| Acrylic - 25mm 1" | 150 | 60 | 0.7 | | | cut |
| Cardboard Matt Board | 150 | NR | | | | cut |
| Laserable Plastic | 150 | 20 | 20 | | | cut |
| Leather | 150 | 20 | 10 | | | cut |
| MDF - 1/8" | 150 | 20 | 20 | | | cut |
| Paper | 150 | NR | | | increase speed first / decrease power if scorching | cut |
| Rubber Stamp | 150 | 20 | 10 | | | cut |
| Wood - 3mm  1/8" | 150 | 60 | 45 | | use transfer tape to prevent scorch | cut |
| Wood - 6mm  1/4" | 150 | 60 | 20 | | use transfer tape to prevent scorch | cut |
| Wood - 9mm  3/8" | 150 | 60 | 10 | | use transfer tape to prevent scorch | cut |
| Wood - 12mm  1/2" | 150 | 60 | 5 | | use transfer tape to prevent scorch | cut |

# 8-8 M-F
# 10-2 Sat.

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# Corel Keyboard Overlay

PC

| Alt: | Linear | Lens | Exit | | | Position | Rotate | Scale | Size | Macro Edit | Align/Baseline |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ctrl: | View Manager | | | Graphic/Text | Symbol Manager | Envelope | Convert Para. Text | Contour | Text Editing | Insert Sym. Char. | Spell Check |
| Help | Zoom One-Shot | Zoom Out | Zoom to Page | Freehand | Rectangle | Ellipse | Text | Full-Screen Preview | MPU Table Offsets | Fountain Fill | Outline Tool |
| F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8 | F9 | F10 | F11 | F12 |

*Corel Draw*    Joe Bràga    949-355-4000    Joe@Coreldrawtraining.com

# All the Fast Keys for Corel

# EngraveLab
# Keyboard Overlay

PC

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Shift:** Context Help | Simplify selected | Inverse select | | ZOOM IN | | | | | | | |
| **Alt:** | | Select none | | | | | | | | | |
| **Ctrl:** | | | | | | | | | | | |
| **Help** F1 | Disable Palette But target fill F2 | Select all F3 | Refresh F4 | ZOOM F5 | ZOOM OUT F6 | ZOOM to Selected F7 | ZOOM to Plate F8 | ZOOM Toggle F9 | Select Menu Bar F10 | Pan to Mouse F11 | F12 |

EngraveLab  Joe Bràga   949-355-4000

# All the Fast Keys for EngraveLab

**Engraving Equipment Installation Procedures**
**Software Installation Procedures**
**Software/Hardware Training**
**Laser Equipment**

Dear Customer,

Thank you for your purchase of a BOSS Laser. We are confident that you will find your new equipment to be user friendly, as well as provide you with many years of reliable performance. In an effort to help ensure satisfaction of your engraving system, we are providing these Installation Procedures. Your Distributor/Installer, will walk you through the basics of setting up your equipment, as well as provide you with some basic training on the key features of both the software and hardware. In summary, you will be unpacking, taking inventory, installing the hardware/software and partake in some initial training. At the end of all this work, you will be given a chance to rate everything mentioned above. As each item is covered, please check the corresponding box and sign the bottom of the page acknowledging completion. Remember, the success of your abilities with your new engraving system stems from a basic understanding of its components and how to use them. Good luck!

**Depending on the items you purchase, the following will be covered by your instructor:**

Unpacking Your Equipment / Taking Inventory........................................................................................
Description of the Major Components and their Function........................................................................
Water Chiller ...........................................................................................................................................
Air Compressor........................................................................................................................................
Fume Exhaust...........................................................................................................................................
Laser Table Mechanics (refer to Table Manual)......................................................................................
USB PC Hook-up)....................................................................................................................................
Hardware Setup........................................................................................................................................
Software Installation.................................................................................................................................
Hardware Training....................................................................................................................................
Software Training......................................................................................................................................
Customer Specification Training..............................................................................................................
Laser Pre-Training....................................................................................................................................
Laser System Hardware............................................................................................................................
Laser System Software Customer Specific...............................................................................................

**Items not covered by BOSS Documentation or the Installer:**
    Computer Training
    Windows Environment Training
    Other Software Packages (CorelDRAW!, EngraveLab etc.)

These are areas of training that BOSS Laser is not responsible for. Although we can offer advice, and give brief instruction on the above items, it is highly recommended that you undergo formal training on these topics. Becoming proficient at computerized engraving (using the Laser Works) heavily relies on your ability to easily maneuver within the Windows environment and understand your computer hardware.

**Waiver**
The contents of this document are set up as a guide. It is designed to be used with the help of a distributor or a qualified installer. If for any reason you choose to install and set up your system on your own, we ask that you please sign the bottom and fax this page to BOSS Laser stating that you have waived any formal installation and initial training.

I_____ of _____, have elected to waive the installation instruction and initial training of my new computerized engraving equipment.

Signature_____ Date_____

**Laser Checklist**

# Laser Engraving System Checklist

## Unpacking your Equipment/Taking Inventory

You should compare what you actually received versus what you ordered. Make sure you have received all of the components, or can appropriately account for any back ordered equipment.

Did you receive all of your equipment as ordered?
" Yes  " No
If no, please make note below:

## ⬜ Software Installation

New Installs (first time, choosing proper table type)
Updates (choosing "Update Existing System")
Version Number
"New for this Release" for new/fixed features
USB and Jumped Drive downlaods
Update Policy (shipping/handling charges/website)
File Exstensions
Usage of 3rd Party Software: CORELDRAW or EngraveLab
Unless scheduled and purchased with order...

## ⬜ Laser System Quality Check Pre-Training

Tension on lid hinges are set properly
Motion System is smooth and solid
Table is rigid
Laser performs standard boot process (ends with Ready, Focus displayed on keypad)
Boot process does not occur with lid open
Keypad menu scrolls properly
Mirrors and lens are clean
Lens is secure
Light turns on/off
Pointer turns on/off
Pointer beam aligned with rulers
Offsets are properly set (engrave a box with a set baseline and left margin)
Laser beam is aligned (text can be rastered in all four corners
Raster (scan) quality is acceptable (run test job)
Vector (cut) quality is acceptable (run test job)
Table homes and Automatic Focus works properly
Laser will accept and run a Black & White, and Grayscale bitmap (run test job)

## ⬜ Laser System Hardware Training

### Description of Major Components

USB Connection & Ethernet Settings
Show where cables connect (& Relay)
Attachment of Plenum (connection of ventilation system)
Power Switch
Interlocks (Door, Lid & Access Panel)
Micro-Stepper or Servo Motors
Maintenance
Cleaning Mirrors & Lens
　　Note: Optics that are damaged from neglect or abuse will not be covered under warranty.
Cleaning and Lubricating bearing rails
Keypad
　　Zeroing the Table
　　Setting a new home position on the table
　　Pausing and canceling a job
Basic explanation of beam alignment
If applicable:
　　Use of Exhaust Blower & Air Assist Compressor
　　Use of Water Chiller
　　Use of Cylindrical Attachment

## ⬜ Laser System Software Training

LaserWorks Screen Layout Description
Title Bar
The top right 'Windows' minimize, maximum, close button
Menu Bar
Icon Bar (Drawing Tool Bar)
Toolkit
Rulers
Work space Area
Status Bar and Status Line
Commonly Used Hot Keys
Laserwork/Help Contents (How to use Help)
Basic Plate Layout (with and without Grid Cut Out)
Saving/Opening Jobs
Loading Logos (Importing Graphics)
To Engraver Dialog (setup and usage, describe variables' functionality)
Downloadkey while cursor is on a menu selection
Engraving Table defaults
Difference between raster and vector engraving
Grid cutout
Automatic Focus
Materials dialog
Loading Defaults from a saved job
Copy Input, Ornamentals and Clip Art
Scanning

## ⬜ Customer Specific Training

Customer can create and engrave "in-house" jobs or jobs specific to their business, Laser Dialed in for basic Jobs

Please list any problems, follow-ups required, questions, or unexpected observations:

The Installation process has been completed to my satisfaction and all components of the system(s) are in proper, working order. I understand that as I have operating questions, I can contact my BOSS Laser Distributor and/or the BOSS Factory for assistance. In addition, I have read the LaserWorks Software Licensing Agreement and Hardware Warranty information and I accept the same.

By: _____    Date _____    Time In/Time Out _____
Authorized Distributor/Installer

By: _____    Date _____
Customer Signature

Key Operator's Signature: _____    Company _____

**EC www.engraverschoic.com**

# Laser Registration Form

Company Name: _____

Address: _____

City / State / Zip Code _____

Business Phone (____) _____ Business Fax (____) _____

Web Address: _____ E-mail Address: _____

**Check Type of Equipment Purchased and complete serial number information:**

## Laser Model: _____

**Laser System Serial Number:** _____ :

Water Chiller works : _____  Pendant works: _____

Air Compressor works : _____  Hosings installed: _____

Wired 120/220: _____  Tube installed: _____

## Laser:

_____ 40 Watt Laser; _____ 50 Watt Laser; _____ 60 Watt Laser

_____ 80 Watt Laser; _____ 100 Watt Laser; _____ 130 Watt Laser _____ 150 Watt Laser

OTHER: _____

## Software _____ (Check all that apply): _____ EngraveLab

_____ Corel _____ LaserWorks _____ Operating System _____ Other

Distributor: _____ Date of Purchase: _____

I have read and understand the Software License Agreement set forth in this manual by BOSS Lasers
I have state that may Laser/Engraver is up and running.

Signature _____ Date_____

Name (Please Print)_____ Position_____

**Failure to complete and return this form can void your warranty.**

Please complete and e-mail or fax to:

11-01 JHF

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