UNIVERSAL
LASER SYSTEMS INC.

LaserKiosk

Laser Engraving and Cutting System
Operation Manual

Manufactured by:
Universal Laser Systems, Inc.
16008 North 81st Street
Scottsdale, AZ 85260 USA
Phone: 480-315-3600
Fax: 480-315-3601
Web Based Email Support: www.ulsinc.com

October 2000

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Introduction

Thank you for purchasing the LaserKiosk. Years of testing and refinements have made this unit the ultimate compact and portable laser engraving and cutting system. With its very small footprint design, large engraving area, incredible speed, and awesome power, the LaserKiosk is the laser system of choice only by true professionals.

To begin with, we highly recommend that this entire manual be read before attempting to use the laser system. The manual includes important information about safety, assembly, use, and maintenance. **We cannot over emphasize the importance of reading the Operation Manual completely.**

How To Get Help

Step 1:
Determine exactly what the problem is. Refer to the Troubleshooting Guide at the end of this manual for a possible solution.

Step 2:
Try to recreate the problem and write down the circumstances in which the problem occurred. Be prepared to describe all pertinent information about what is happening. Have the serial number of the system available. The serial number tag is located on the side of the machine, next to the parallel port connector.

Step 3:
Please contact us at:

Universal Laser Systems, Inc.
16008 North 81st Street
Scottsdale, AZ 85260
Phone: 480-315-3600
Fax: 480-315-3601
M-F 8am – 5pm Arizona Time

Step 4:
If you would like to contact us via our Web-based email support system, using your Internet web browser, log on to our website: www.ulsinc.com**.** Click on the “Technical Support “ link. Then click on the “Technical Support Request Form” and follow the instructions.

Table of Contents

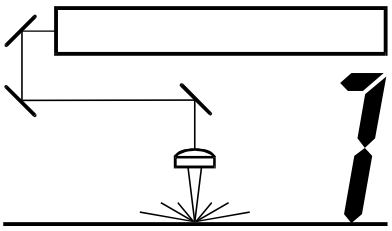
SECTION 4 – Using the LaserKiosk Step-by-Step

SECTION 5 – Maintenance

Appendices

SECTION 1

Safety



This section describes hazards that may occur if the laser is installed or used improperly.

WARNING: Failure to follow these guidelines can result in injury to yourself, others, or may cause severe damage to the equipment and your facility. Use of the equipment in a manner other than what is described in this manual may increase this risk. Operation and care of the laser must be followed in strict accordance to this manual.

Description of Appropriate Use

This device is designed for laser cutting and engraving of the materials listed in the Laser Personalization and Identification catalog of engraveable materials. This equipment must be properly installed and connected to the Exhaust Module included with the system.

General Safety

- **Exposure to the laser beam may cause physical burns and can cause severe eye damage**. Proper use and care of this system are essential to safe operation.

- **Never operate the laser system without constant supervision of the cutting and engraving process**. Exposure to the laser beam may cause ignition of combustible materials and start a fire. A properly maintained fire extinguisher should be kept on hand at all times.

- **A properly configured, installed, maintained, and operating Exhaust Module is mandatory when operating the laser system**. Fumes and smoke from the engraving process must be extracted and filtered from the Laser Module.

- **Unapproved materials, if engraved or cut with a laser, can produce toxic and caustic fumes**. DO NOT use materials other than those found in the Laser Personalization and Identification catalog. Processing unapproved material may be a safety hazard and may also cause chemical deterioration of the laser system such as rust, metal etching or pitting, peeling paint, etc. Systems damaged from this abuse will **NOT** be covered under warranty.

- **Dangerous voltages are present within the electronics and laser enclosures of this system**. Although access to these areas is not necessary during normal use, if it becomes necessary to open one of these enclosures for service reasons please remember to disconnect the power cord from your electrical supply.

- **Care should be taken when moving or lifting this device**. Obtain assistance from 1 or 2 additional people when lifting or carrying. Severe bodily injury may occur if improper lifting techniques are applied or the system is dropped.

- **This device is specifically designed to comply with CDRH performance requirements under 21 CFR 1040.10 and 1040.11**. CDRH is the Center for the Devices of Radiological Health division of the Food and Drug Administration (FDA) in the USA. It also complies with CE (European Community) safety regulations. No guarantees of suitability or safety are provided for any use other than those specified by Universal Laser Systems, Inc.

Laser Safety

- The device contains a sealed carbon dioxide (CO_2) laser in a Class I enclosure that produces intense invisible and visible laser radiation at a wavelength of 10.6 microns in the infrared spectrum. For your protection, this enclosure has been designed to completely contain the CO_2 laser beam. However, the intense light that appears during the engraving or cutting process is the product of material combustion or vaporization. **DO NOT STARE AT THE BRIGHT LIGHT OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS.**

- The Top Door and the Laser Cartridge Access Door are safety interlocked and will disable the invisible CO_2 laser beam from firing when the either door is opened.

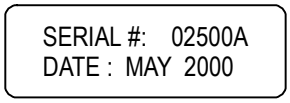
- Do not operate any system that has had its safety features modified, disabled, or removed as this can expose your eyes and skin to invisible and visible CO_2 laser radiation which can cause permanent blindness and/or severe burns to your skin.

- Improper use of controls and adjustments, or performance of procedures other than those specified in this manual, may invalidate the safety of this system.

Safety Labels

CDRH and CE regulations require all laser manufacturers to affix warning labels in specific locations throughout the equipment. The following warning labels are placed on the laser system for your safety. **DO NOT** remove them for any reason. If the labels become damaged or have been removed for any reason, **DO NOT OPERATE** the laser system and immediately contact Universal Laser Systems, Inc. for a free replacement. Labels shown are NOT to scale

221-0004-0



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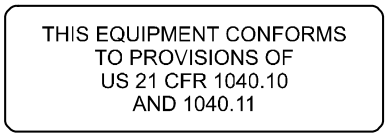

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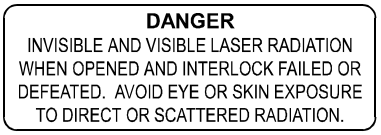

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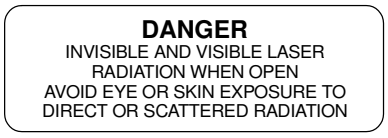

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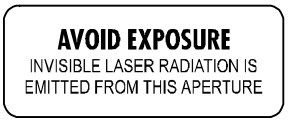

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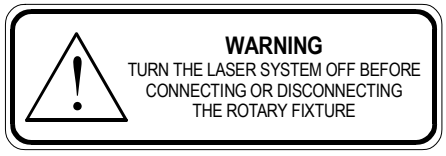

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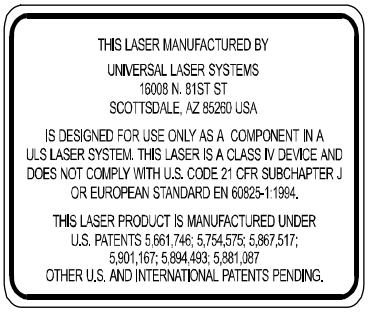

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INPUT POWER:
110 VAC; 50/60 Hz; 15 A

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INPUT POWER:
220 VAC; 50/60 Hz; 10 A

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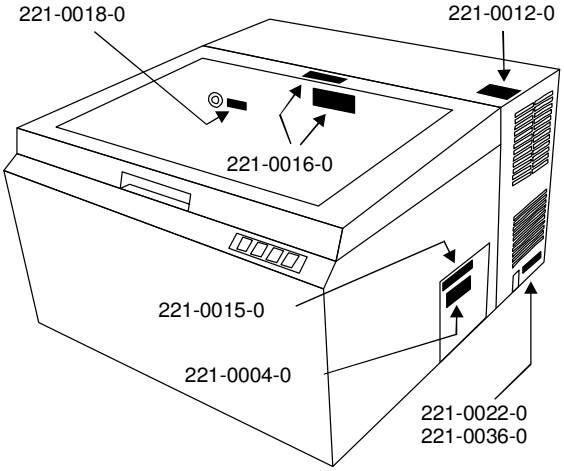
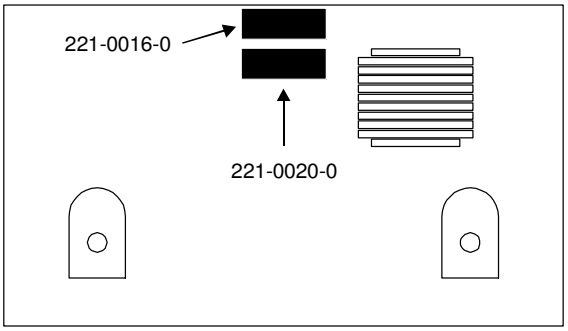
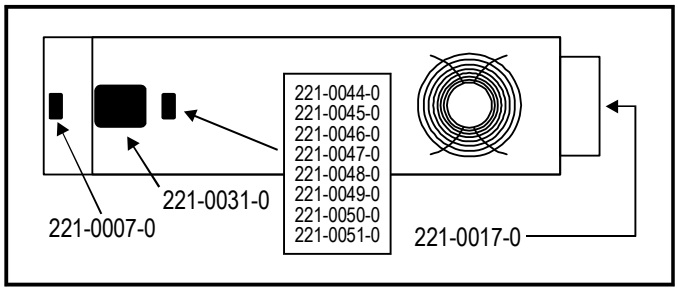
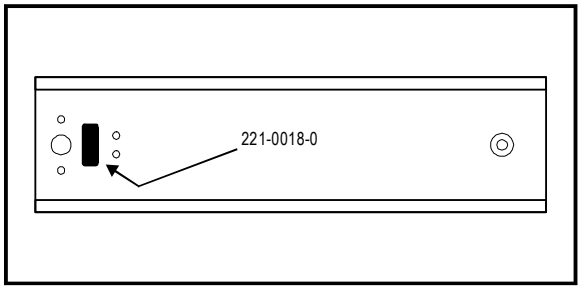
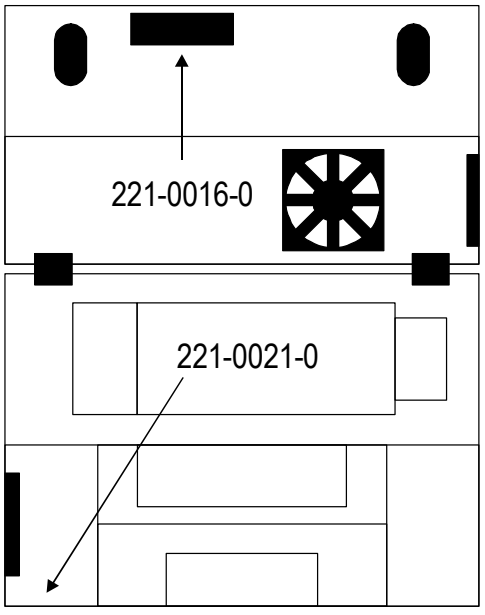
Safety Label Locations











EU Compliance (CE)

UNIVERSAL
LASER SYSTEMS INC.

Product Identification: LaserKiosk Laser Engraving and Cutting System

Manufacturer: Universal Laser Systems, Inc.
16008 N. 81st St.
Scottsdale, AZ 85260
Phone: (480)483-1214 Fax: (480) 483-5620
USA

This equipment Is manufactured in conformity with the following directives:

89/336/EEC (EMC Directive)
73/23/EEC (Low Voltage Directive)
89/392/EEC (Machinery Directive)

based on the standards listed.

Standards Used:

Safety:
EN 60950: 1995
EN 60825: 1994 (Class IIIa)

EMC:
EN 55022: 1995 (Class A)
EN 50082-1: 1992
EN 60801-2: 1993 (6kV CD, 8kV AD)
EN 61000-3-2: 1996 (class A)
EN 61000-3-3: 1995
EN 61000-4-3: 1997 (3 V/m)
EN 61000-4-4: 1995 (2 kV power line, 0.5 kV signal line)
EN 61000-4-5: 1996 (class 2)

Warning - This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC Compliance

This ULS laser system has been tested and found to comply with Federal Communication Commission (FCC) directives regarding Electromagnetic Compatibility (EMC). In accordance with these directives ULS is required to provide the following information to its customers.

FCC Compliance Statement and Warnings

This device complied with FCC Rules Part 15. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and

2. This device must accept any interference received, including interference that may cause undesired operation.

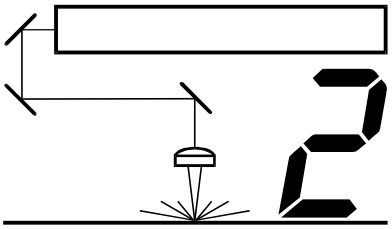
This equipment has been tested and found to comply with the limits for a Class A digital device as set forth in Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his or her own expense.

Users should be aware that changes or modifications to this equipment not expressly approved by the manufacturer could void the user's authority to operate the equipment.

This equipment has been type tested and found to comply with the limits for a Computing Device per FCC part 15, using shielded cables. Shielded cables must be used in order to insure compliance with FCC regulations.

SECTION 2

Installation



Proper operating conditions are vital to a safe and productive environment. This section describes the ideal environment and setup of the laser system. Failure to operate the laser system within these guidelines can seriously damage the laser system and may cause an unsafe operating environment. Although conforming to these guidelines will greatly reduce the chance of a problem occurring, it does not guarantee it. **It is your responsibility to provide a safe and proper operating environment.**

Operating Environment

- Ambient room temperature **MUST** be between 50 and 95 degrees F (10 and 35 degrees C). **The Laser Cartridge is equipped with a special temperature sensor that detects if the ambient room temperature is not within specifications and will prevent the Laser Cartridge from emitting a laser beam until proper room temperature is achieved.**
- Ambient room dewpoint temperatures **MUST** be less than 50 degrees F (10 degrees C).
- Avoid dusty or dirty air environments that can damage the laser system. Also, keep the laser system isolated from any type of sandblasting, sanding, grinding, milling, sawing, or any other machinery that produces airborne particles or caustic fumes.
- Provide a worktable or storage area next to or nearby the system. This prevents the operator from using the system as a table or storage facility.

Electrical Requirements

- Refer to the “INPUT POWER” sticker near the system’s ON/OFF switch and power inlet for your system’s electrical requirements. Make sure that your electrical outlet is capable of providing the proper voltage, frequency and amperage that your laser system needs.
- Noisy or unstable electricity as well as voltage spikes can cause interference and possible damage to the electronics of the laser system. It may be necessary to connect the laser system to a dedicated electrical line if this is a problem.
- If electrical power fluctuations, brown outs, or constant power outages are a problem in your area, an electrical line stabilizer, UPS (Uninterruptible Power Supply), or backup generator might be required. If installing any of these devices, make sure that they meet the electrical requirements of the laser system.

- **Never remove the ground lead to the electrical cord and plug the system into a non-grounded outlet**. This is very dangerous and can lead to a severe, if not fatal, electrical shock. Always plug the system into a 3 prong grounded outlet.

- **Do not operate the laser system near devices that emit high levels of radio frequency (RF) emission.** High levels of RF will interfere with the operation of the laser system and can damage your system or seriously effect engraving or cutting quality.

If the above requirements cannot be met, you may need the services of a qualified, licensed electrical contractor to certify your installation. Remember, it is your responsibility to provide a quality electrical source. **Damages to the laser system due to neglect, abuse, or improper or unsuitable electrical supply will not be covered under warranty.**

Laser Module Cooling Requirements

The Laser Module uses fans to keep the Laser Cartridge and electronics cooled during operation. Maintaining the proper ambient temperature, as outlined previously in the Operating Environment section, is essential to proper and reliable operation.

WARNING: Do not confine the back of the machine by surrounding it with furniture, shelving, backing it into a corner, etc. The backside of the laser system must be allowed to “breathe” otherwise the Laser Cartridge, Power Supply, and/or the CPU may overheat which can cause serious and very costly damage to the system and may invalidate your warranty.

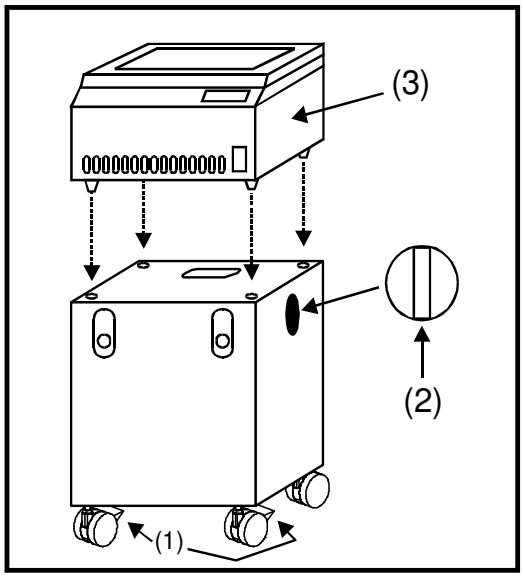
System Assembly

- Remove all materials from the shipping container.

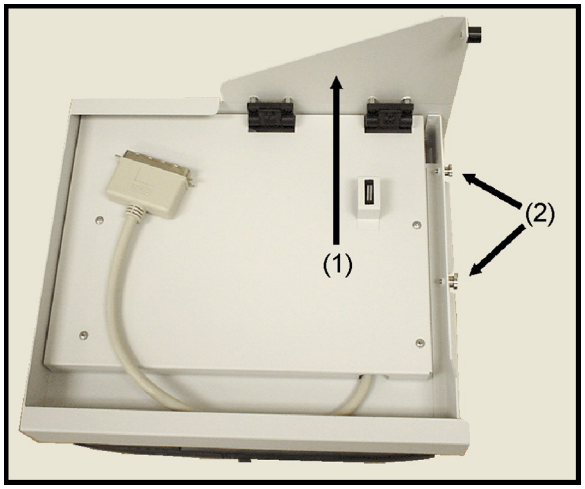
- Place the Filter Module on a level surface. Press down on the locking tabs of the two front casters to prevent it from rolling (1).

- Make sure the circular handle on the side of the Filter Module is pointing vertically(2).

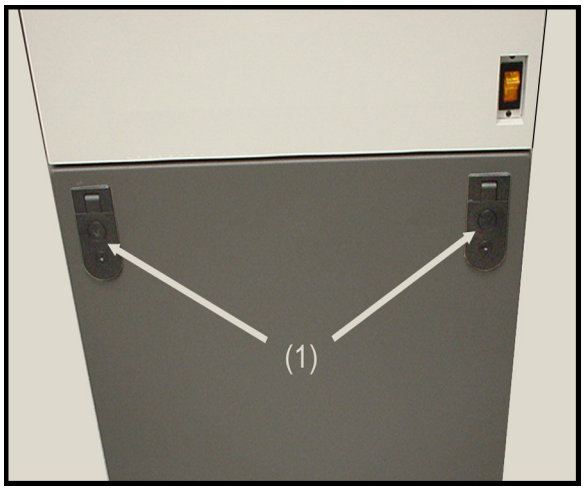
- With the assistance of another person, pick up the Laser Module (3) noting that there are four (4) alignment feet on the bottom. Keeping it balanced, guide the feet of the Laser Module into the holes in the top of the Filter Module

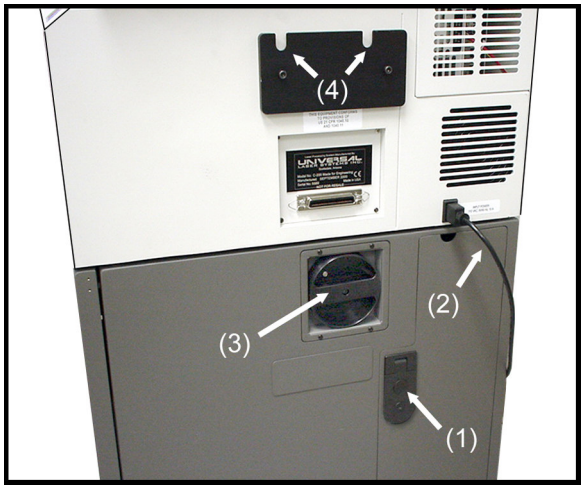


- Open the Computer Module storage compartment door by pressing the round button on the latch (1) and pulling it open. Remove any packing materials.
- Locate and plug in the Power Cord (2).
- Turn the circular handle clockwise until it engages and rests in a horizontal position (3). This clamps and electrically connects the Laser Module to the Filter Module.

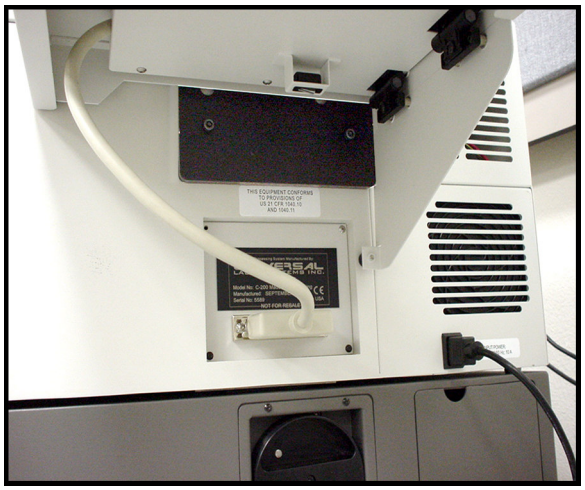


- Turn the Computer Module right side up and securely affix the two pins into the mounting plate.
- Connect the Printer Cable from the Computer Module to the Laser Module next to the serial tag.





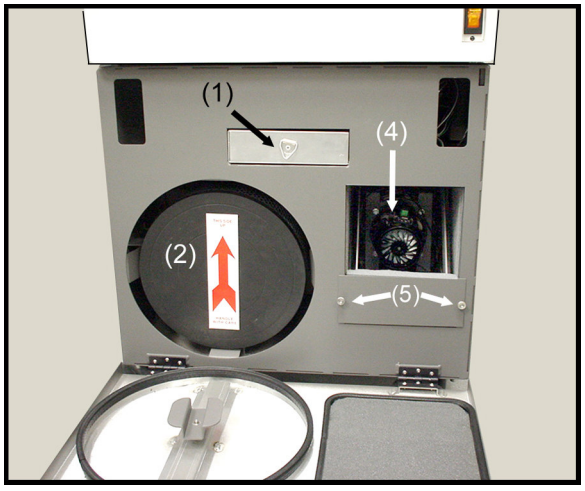
- Note the two notches in the mounting plate (4) that the Computer Module will attach to.
- Gently place the Computer Module upside down on a clean surface.
- Lift the support plate up (1) until it stops.
- Locate the two pins on the side of the module (2).



- In the front of the system, locate the two button latches. Press on the circular buttons (1) until the latch pops out.
- Grasp the latch and gently fold the access panel down to the floor.

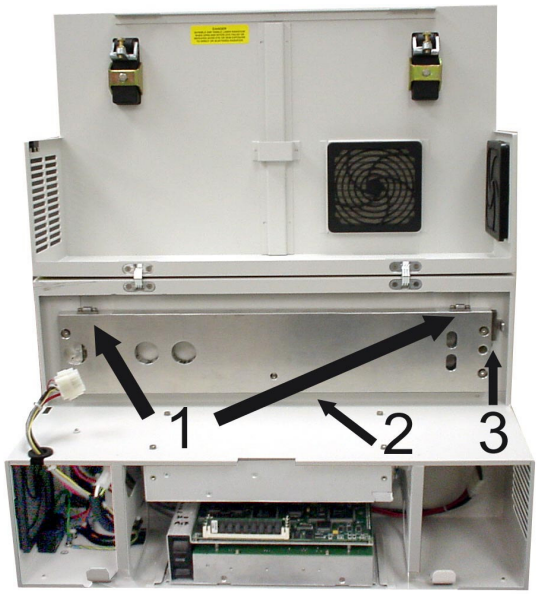
- Locate the Pre-Filter (1), the Main Filter (2) (may or may not be pre-installed), the Vacuum Motor attachment thumbscrews (3) and the Vacuum Motor (4). If the Main Filter is not installed, locate the filter, remove the plastic wrapping, and slide it into the Filter Module, as far as it will go, with the Red Arrow pointing straight up. The Filter Module will not operate if the Red Arrow is not pointing straight up.

- Close the door and secure the latches.



Laser Cartridge Installation

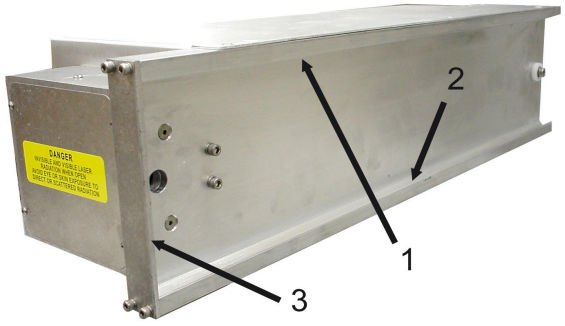
- With your finger, press the circular button on the latch and it will pop out.



1) Mounting Blocks
2) Laser Latch
3) Alignment Fork

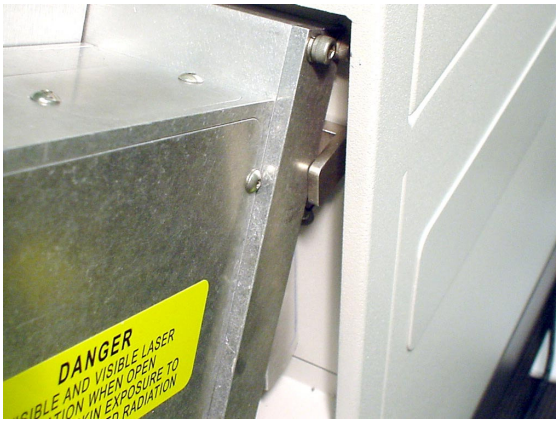
Gently fold the rear cover up and over the top door. Visually locate the two Mounting Blocks, the Laser Latch, and the Alignment Fork. Locate the small notch in the Alignment Fork.

- Observe the “V” groove along the upper and lower part of the Laser Cartridge. Also locate the Alignment Plate at the end of the Laser Cartridge.



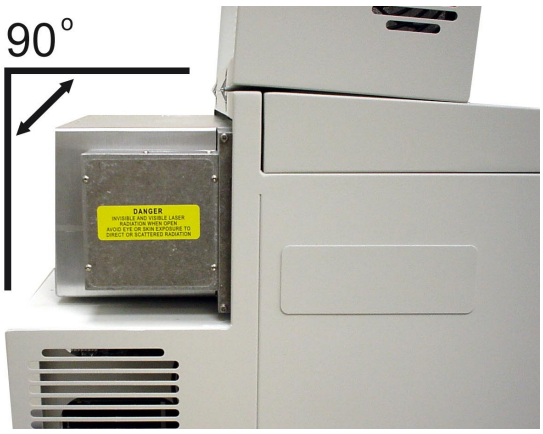
1) Upper V-groove
2) Lower V-groove
3) Alignment Plate

- Pick up the Laser Cartridge by the sides. Tilt the Laser Cartridge downward on a 30-degree angle. Mount the cartridge onto the Mounting Blocks by placing the upper “V” groove of the cartridge on top of the Mounting Blocks. Slide the cartridge to the right until the Alignment Plate of the Laser Cartridge makes contact with the inside of the large protruding plate of the Alignment Fork.

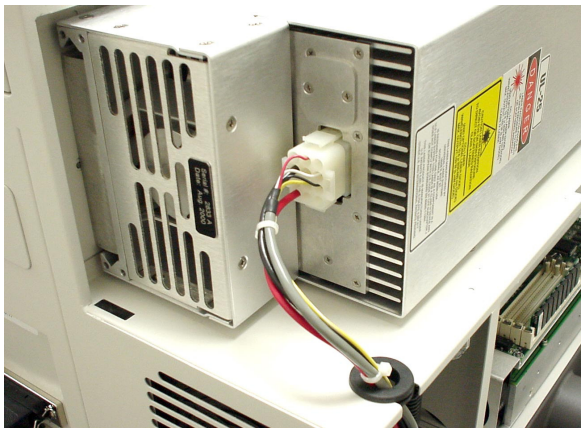


- Slowly rotate the Laser Cartridge making sure that the Alignment Plate is centered in the small gap of the Alignment Fork. And the Laser Latch “clicks” and locks the cartridge into place. It may require some slight force to actuate the latch.

Close-up view of small gap



- Verify that the Laser Cartridge is resting, at a 90-degree angle, and the Alignment Plate is centered within the Alignment Fork.



- Plug in the Power Connector. The connector is keyed so it will only insert one way.

- Close the Rear Cover and push down on the latches until they “click.

- Open the Top Door of the Laser Module. Remove any packing material from within the engraving area. Remove the rubber band that retains the X-axis arm.

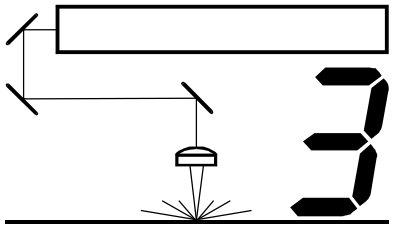
- Plug in the Power Cord into your electrical supply. The entire system, the Laser Module, Filter Module, and the Computer Module are all powered through this cord.

Computer Module

The Computer Module consists of a laptop computer attached to a removable platform. The computer is pre-loaded with the software needed to run the LaserKiosk. When you power ON the computer, the LaserKiosk software automatically starts up. From that point on, simply follow the on-screen instructions.

WARNING: Never connect or disconnect the printer cable while either the Computer Module or the Laser Module is powered ON. Always power OFF both the Laser Module and the Computer Module when connecting or disconnecting the printer cable.

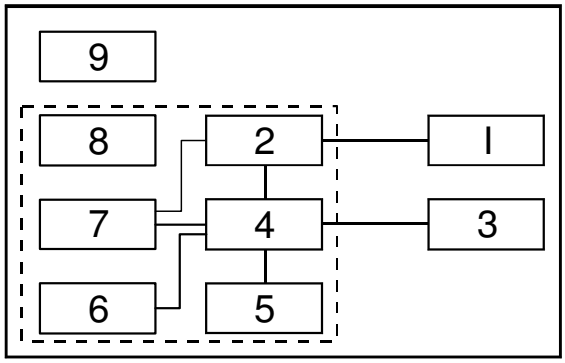
SECTION 3



System Operation

This section describes how the system functions and will familiarize you with laser terminology. Think of the LaserKiosk as just another output device such as a laser printer, dot matrix printer, or plotter. In fact, the LaserKiosk utilizes certain characteristic from each of those output devices.

(1) AC Input Power
(2) DC Power Supply
(3) Computer Module
(4) CPU
(5) Control Panel
(6) Laser Cartridge
(7) Motion System
(8) Application Material
(9) Filter Module



(The dotted box represents the Laser Module)

1) AC Input Power

The operator must provide a suitable AC Input Power source and electrical grounding circuit. Refer to the section on "Electrical Requirements" for a complete description of what is necessary to operate the LaserKiosk.

2) DC Power Supply

The internal DC Power Supply converts the incoming AC electricity to 48 volts DC used to power both the Laser Cartridge and the CPU. It is not user serviceable nor requires maintenance.

3) Computer Module

The Computer Module consists of a laptop computer attached to a removable platform. The computer is pre-loaded with the software needed to run the LaserKiosk. When you power ON the computer, the LaserKiosk software automatically starts up. From that point on, simply follow the on-screen instructions.

4) CPU

The CPU is the "brains" of the system and controls everything. When the system is first powered ON, it goes through an initializing procedure and then "homes" the motion system (moves to the upper right corner of the engraving area so that the X and Y home sensors can detect its physical position). After the "homing" procedure is complete, it is ready to receive a file from the Computer Module.

Once the "START" button is pressed the CPU starts the Motion System movement, which places the Focus Carriage (part of the motion system that contains the Focus Lens) above the designated engraving or cutting area. The CPU then sends signals to the Laser Cartridge to precisely control the firing of the laser beam with the movement of the motion system. Once the file is complete, the Focus Carriage will go "home" to the upper right corner.

5) Control Panel

This is where the operator controls the laser system.

START: The LaserKiosk software will inform you when it is OK to press the START button. Pressing the START button will begin laser processing.

STOP: Pressing the STOP button will halt the engraving or cutting process.

STOP + START: Press and hold the STOP button then press the START button. This button sequence clears the Laser Module's file memory and re-homes the X, Y, and Z-axis.

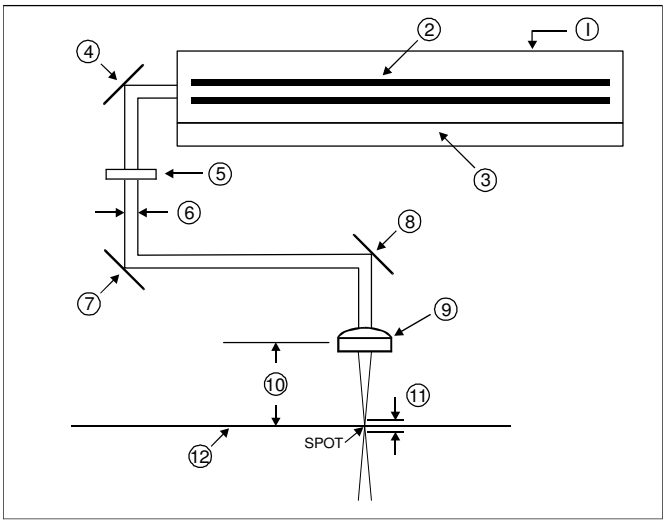
GREEN LIGHT

Flashing	System is powering ON
	System is running a file
	File is being downloaded to system
ON	Entire file is in memory indicating that transfer is complete
OFF	File has finished processing

6) Laser Cartridge

The Laser Cartridge is a very sophisticated device. It is composed of a gas filled plasma tube containing a special mixture of CO2 and other gases, two electrodes, and RF (radio frequency) electronics. The function of the entire assembly is to turn electrical energy into concentrated light energy. The word LASER is an acronym for Light Amplified Stimulated Emission of Radiation.

(1) Gas filled plasma tube
(2) Electrodes
(3) RF Power Supply
(4) #1 Mirror
(5) Beam Window
(6) Beam diameter
(7) #2 Mirror
(8) #3 Mirror
(9) Focus Lens
(10) Focal length
(11) Focal range
(12) Material
(13) Spot size



The Laser Cartridge receives power from the 48VDC power supply and its “trigger signal” from the CPU. When the trigger signal comes from the CPU, the RF electronics produce a high frequency signal across the electrodes located inside the plasma tube. This causes spontaneous photon emissions from the gas mixture that produces an invisible, infrared light beam at a frequency of 10.6 microns.

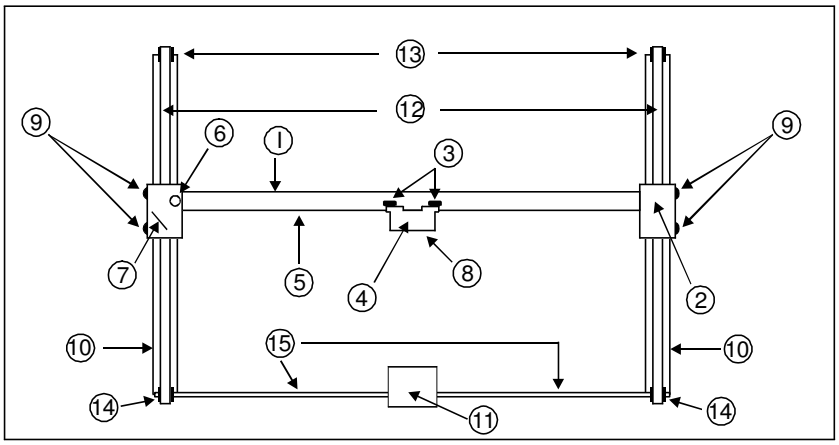
The CO2 laser beam exits the Laser Cartridge through its output optics, reflects off the #1 Mirror, passes through the Beam Window, reflects off the #2 and #3 Mirrors, to finally pass through the Focus Lens. The #2 and #3 Mirrors and the Focus Lens are all mounted to the Motion System. The width of the laser beam as it exits the tube, called the “Beam Diameter”, is about 4 mm in diameter. The Focus Lens focuses the beam into a very small spot whose “Spot Size” is dependent on the “Focal Length” of the lens. The “Focal Length” is the distance from about the center of the lens to the point where it converges the beam into the smallest spot possible. The laser system is equipped with the 1.5-inch Focal Length lens. It creates a nominal spot size of around .003 inches (.08 mm).

The term “Wattage” signifies the amount of heat energy that the laser light is producing measured over a period of time. Laser beam wattage is measured with a laser power meter. Do not confuse the electrical wattage rating of a light bulb or a hair dryer with the wattage rating of the laser system.

7) Motion System

The motion system consists of the mechanically moving parts of the laser system. It is made up of rails, motors, bearings, belts, mirrors, a lens, home sensors, and other parts. There are two directions of motion, left and right is called the “X-axis”, front to back is called the “Y-axis”, and the movement of the engraving table up and down is called the “Z-axis”.

(1) X-axis Rail (Arm)
(2) X-axis Motor and Drive Gear
(3) X-axis Bearings
(4) Focus Carriage
(5) X-axis Belt
(6) X-axis Idler Pulley
(7) #2 Mirror
(8) #3 Mirror and Focus Lens
(9) Y-axis Bearing(s)
(10) Y-axis Rail(s)
(11) Y-axis Motor
(12) Y-axis Belt
(13) Y-axis Idler Pulley(s)
(14) Y-axis Drive Gear(s)
(15) Y-axis Shaft(s)



The CPU controls the movement of the motors, which moves the mirrors and Focus Lens across the engraving area and over the material. At the same time, it is synchronizing the laser pulses that produces the highest quality and fastest speed of engraving.

The Focus Carriage contains the #3 Mirror and the Focus Lens. This is the laser beams final exit point. The Focus Carriage delivers the laser beam to the material in the X-axis direction by traveling along the X-axis Rail. The Focus Carriage moves in the Y-axis direction as a result of the entire X-axis Arm moving along the Y-axis rails. Coordinated efforts between X-axis and Y-axis movements can position the Focus Carriage anywhere in the engraving area at a resolution of 1000 DPI.

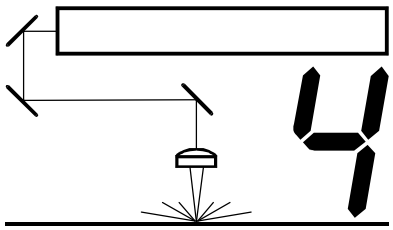
8) Material Applications

This device is designed for laser cutting and engraving of the materials listed in the Laser Personalization and Identification catalog of engraveable materials. **Unapproved materials, if engraved or cut with a laser, can produce toxic and caustic fumes**. DO NOT use materials other than those found in the Laser Personalization and Identification catalog. Processing unapproved material may be a safety hazard and may also cause chemical deterioration of the laser system such as rust, metal etching or pitting, peeling paint, etc. Systems damaged from this abuse will **NOT** be covered under warranty.

9) Filter Module

The LaserKiosk is equipped with an integral Filter Module. No external exhaust is required. The Filter Module is controlled by the Laser Module and the Computer Module and will turn on and off automatically. It contains a Pre-Filter, Main Filter, Sensors, and a Vacuum Motor. The purpose of the Filter Module is to extract and filter out particulates, smoke, and fumes during laser processing.

SECTION 4



Using the LaserKiosk Step-by-Step

This section covers how to use the LaserKiosk to engrave products from powering on the system to removing the finished product from the system.

WARNING: Before continuing, please ensure that you have completely read and understood the entire manual up to this point. It is essential that you know how to safely operate the system before you actually engrave or cut any material.

Powering ON the LaserKiosk

- Make sure the power cord is plugged in.
- Make sure that the cylindrical handle of the Filter Module is rotated fully clockwise so that it rests in a horizontal position.
- Power ON the Computer Module by pressing the small button on the left side of the computer close to the "ESC" key and the speaker.
- Power ON the Laser Module by pressing the switch in the front of the machine.
- The Laser Module will perform its homing routine. When completed the Green LED on the Control Panel will stop flashing and remain OFF. The system is now ready.

Using the Software

The specialized software used to control the Laser Module is very intuitive. Please follow the on-screen instructions to choose the item that will be engraved, add the text and/or graphic, install the correct fixture, locate the item in the correct part of the fixture, and start the engraving process.

Choosing the Material

After physically choosing the item that you wish to engrave, follow the software prompts to locate that item by entering the catalog number or by scrolling through the list and identifying the object by appearance. Once you have selected the item, you will need to add text and/or a graphic.

Creating the Graphic

Depending on the size of the object being engraved, there will be limits on the number of lines of text, the size of text, and/or the size of graphic that you can engrave on that item. The software will display how the engraving will appear on the item. It will not allow you to exceed the maximum engraveable area.

Installing Logos

While at the screen where you can add a logo, select a logo you wish to discard (use the arrow key) and then press the F1 key. Next, place a floppy disk with the .bmp (bitmap) image in the computer and press the F2 key. Select the correct file from the disk and press the enter key. The image will now be on the selection screen. To create logos, they can be scanned and saved as .bmp files or converted from other file formats to .bmp.

Loading the Material into the LaserKiosk

Follow the software prompts for loading the system. You may need to install a different tray or fixture before loading the item. After an item is loaded, the top door must be closed.

Focusing the Laser Beam

The system is automatically focused based on the selection of the engraveable item.

Printing to the LaserKiosk

After the engraveable item is loaded, the software will prompt you through the printing process.

Starting the Engraving Process

When the software is finished processing the graphic, it will power ON the Filter Module and perform some operational checks. If the filter(s) are saturated or there is an operational problem with the Filter Module, the software will prompt you of the condition and will not allow you to engrave the item until it has been corrected. If everything appears to be functioning correctly, the software will prompt you to press the "START" button to begin the process.

WARNING: Observe that the laser system is functioning as desired. If any abnormalities are present, including but not limited to, flaming, sparking, melting, or excessive smoking of the material you are engraving, **STOP THE ENGRAVING PROCESS IMMEDIATELY BY EITHER PRESSING THE "STOP" BUTTON OR OPENING THE TOP DOOR!** Re-check your entire set-up procedure, correct any deficiencies, and try again. Also, refer to the "Troubleshooting" guide at the end of this manual. If everything seems to be correct, and there is still an abnormality, you **MUST DISCONTINUE** processing this material and contact Technical Support.

WARNING: NEVER LEAVE THE LASER SYSTEM UNATTENDED DURING THE ENGRAVING OR CUTTING PROCESS. While the laser system is processing your material, you may stop the process by opening the top door, or pressing the "STOP" button. However, interrupting the engraving or cutting process may ruin your application material because you will be unable to resume operation where you left off. The "STOP" button should only be used in emergency situations.

Material Removal

Once the system has completed processing the material, the Laser Beam will turn OFF, the motion system will move to its home position in the upper right hand corner, the Filter Module will continue to run for a few seconds to evacuate the remaining fumes and then will power OFF. Open the top door and remove your material.

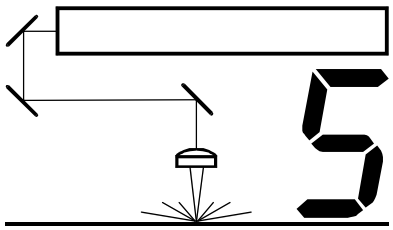
WARNING: Use only LaserKiosk provided materials (engraveable), supplies (including filters) and accessories (product modules/trays). Use of other products may damage the system, create a safety hazard, and will void the system warranty and violate the software use license. All supplies can be purchased directly from Universal Laser Systems, Inc.

Material and Machine Usage Tracking

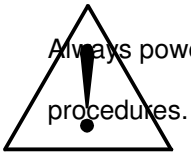
There are several administrative functions that allow you to track material use and control machine use. In the material selection field, where you type in the product code, type in the word "Universal" (without the quotes) to take you to the administrative functions area.

SECTION 5

Maintenance



Keeping the system clean will ensure the highest quality engraving. The frequency of cleaning will depend entirely on the type of material being engraved, the operating environment, and the amount of laser system usage over a given period of time. Dirt or debris that is allowed to build up on the motion system components will cause uneven or rough engraving, or loss of engraving position as well as premature component failure. Smoke or dirt buildup on the optics can cause damage to them, loss of laser power, or premature failure of these components. Use good judgment and keep in mind that a clean machine is the best performing machine.



Always power the laser engraving system OFF and unplug it before performing any cleaning procedures.

Suggested Cleaning and Maintenance Supplies

- Soap solution mixture of 1 tablespoon (2 cl) liquid soap and 1 quart (liter) of water in a spray bottle
- Paper towels
- Cotton cloth
- Denatured alcohol (**NOT** to be used on any painted surface, plastic, or the Top Window)
- Acetone (can be used on the engraving table but nowhere else)

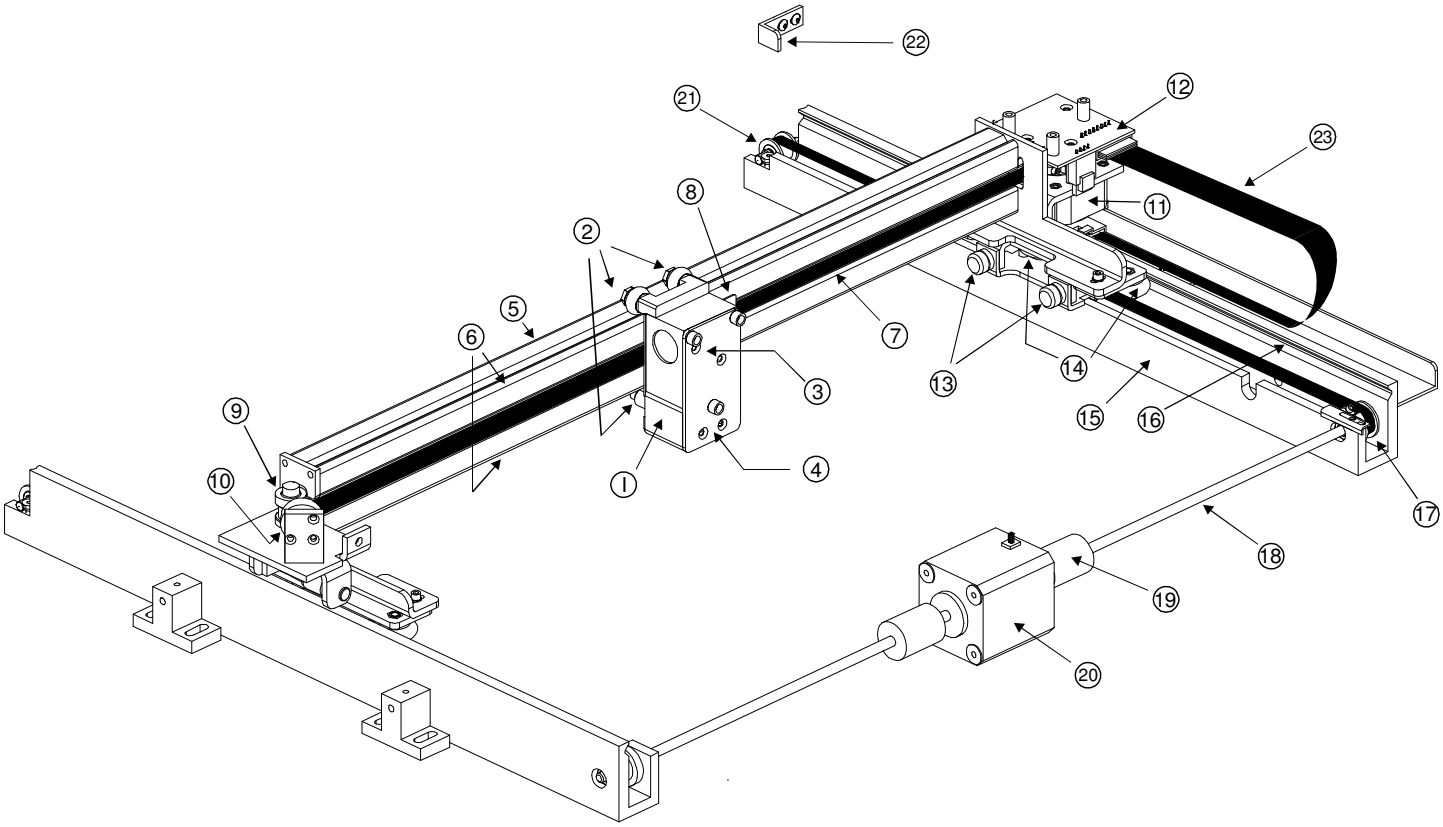
- Cotton swabs (supplied)
- Lens cleaner (supplied)
- Lens tissue (supplied)

- Vacuum cleaner
- Set of Allen wrenches sized from .050 to 3/16 inch

***NOTE:** When using acetone or denatured alcohol, please follow the instructions on the printed label of these materials for safe handling procedures.

Please familiarize yourself with the motion system components in the following diagram. It will help you understand which components need periodic cleaning.

NOTE: #2 Mirror Cover and X-axis Motor Cover Plates have been removed for visibility.



1) Focus Carriage
2) X-axis Bearing (3)
3) #3 Mirror (inside cover plate)
4) Focus Lens (inside cover plate)
5) X-axis Rail (Arm)
6) X-axis Bearing Track (2)
7) X-axis Belt
8) X-axis Home Sensor Flag
9) X-axis Idler Pulley
10) #2 Mirror and Holder
11) X-axis Motor and Drive Gear
12) X-Y Home Sensor Board
13) Thumbscrew (4) (2 on right side, 2 on left side of X-axis Rail)
14) Y-axis Bearing (4) (2 on right side Y-axis Rail, 2 on left side Y-axis Rail)
15) Y-axis Rail (2)(one right side and one left side)
16) Y-axis Rail Bearing Track (2) (one on right side, one on left side)
17) Y-axis Drive Gear (2) (one on right side, one on left side)
18) Y-axis Shaft (2) (one on right side, one on left side)
19) Y-axis Shaft Flex Coupler (one on right side, one on left side)
20) Y-axis Motor
21) Y-axis Idler Pulley (2) (one on right side, one on left side)
22) Y-axis Home Sensor Flag
23) Flex Cable

System Cleaning

- Turn off and unplug the laser system.

- Open the Top Door and thoroughly remove all loose dirt and debris from inside the machine with a vacuum cleaner.

- Clean the Engraving Table surface with either a soap solution, alcohol, or acetone, and paper towels. **NEVER** pour or spray any solution directly into the laser system. Always dampen your paper towel or cloth outside of the machine with the cleaning solution and then wipe down the parts you are cleaning with the dampened cloth.

- Clean X Rail and the Y Rails by using either the cotton swabs or paper towels, and alcohol or soap solution. Pay close attention to the bearing tracks that the bearings roll in since any debris left to build up in these bearing tracks will cause the bearings to wear and the engraving quality to become rough.

- After the rails and tracks are cleaned, use a clean swab or paper towel, and alcohol to clean all of the bearings by holding the moistened swab against each bearing and moving the motion system by hand to roll the bearings against the swab. There are seven bearings in the system, three (3) on the Focus Carriage, two (2) on the left side of the X Rail, and two (2) on the right side of the X Rail.

- Clean the Top Window with a cotton cloth and the soap solution. The Top Window is made out of acrylic. **DO NOT** use paper towels because they will scratch the acrylic. Also, **DO NOT** use window cleaner, alcohol, or acetone, as these chemicals will crack the acrylic. Only use cleaners designed for acrylic.

- Use a soft cloth or paper towels and the soap solution to clean the enclosure. **DO NOT** use alcohol, acetone, or any other harsh chemical, as this will damage the paint.

Optics Cleaning

A visual inspection of the #2 and #3 Mirrors, Beam Window, and Focus Lens should be performed at least once a day.

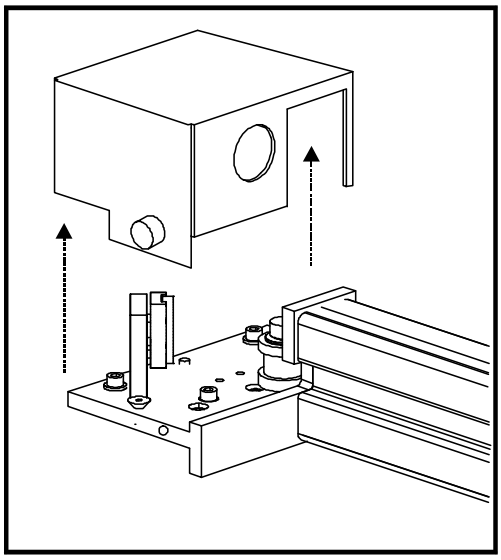
CAUTION

DO NOT clean an optic that is visually clean. Excessive cleaning can damage the optics. The #3 Mirror and the Focus Lens will need to be removed to clean them, the #2 Mirror and the Beam Window does not.

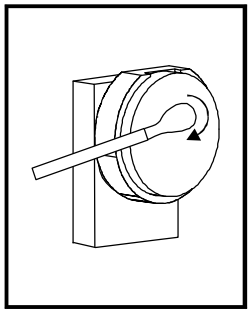
Before cleaning the optics, we recommend that you wash your hands thoroughly to prevent contamination. **NEVER** touch any optic with your fingers. The acids from your skin can destroy the coatings on the optics.

#2 Mirror

To gain access to the #2 Mirror, the mirror cover must be removed. Loosen the thumbscrew (it remains attached to the cover) and lift the cover straight up.

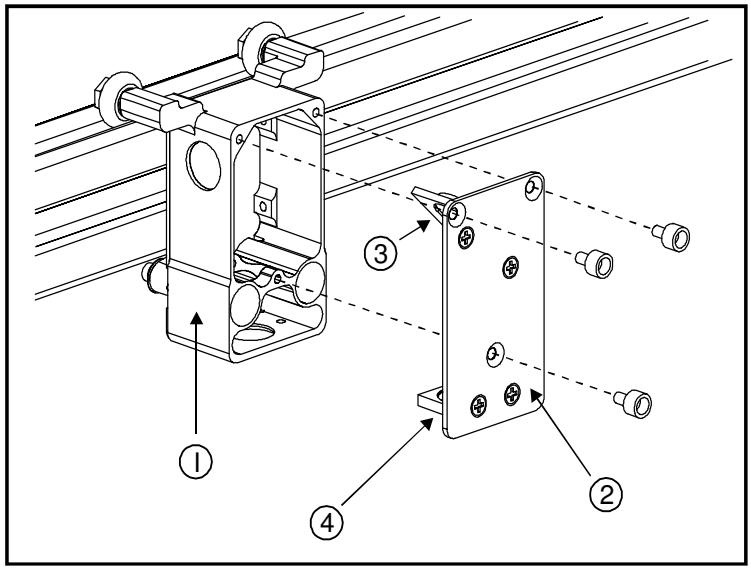


Inspect the #2 Mirror and clean it only if there is debris present. To clean the #2 Mirror with a cotton swab, moisten the cotton swab with the Lens Cleaning solution supplied with the laser system. **DO NOT** use other types of cleaners or solutions. Gently roll the cotton swab across the mirror once. **DO NOT** drag the swab or roll it back and forth as this can scratch the mirror. If the mirror did not come clean, use a fresh cotton swab and repeat the procedure. Do not worry about small pieces of lint that come off of the cotton swab. They will be vaporized as soon as the laser hits it. You can cause more damage to the mirror by trying to get it off than by leaving it alone.



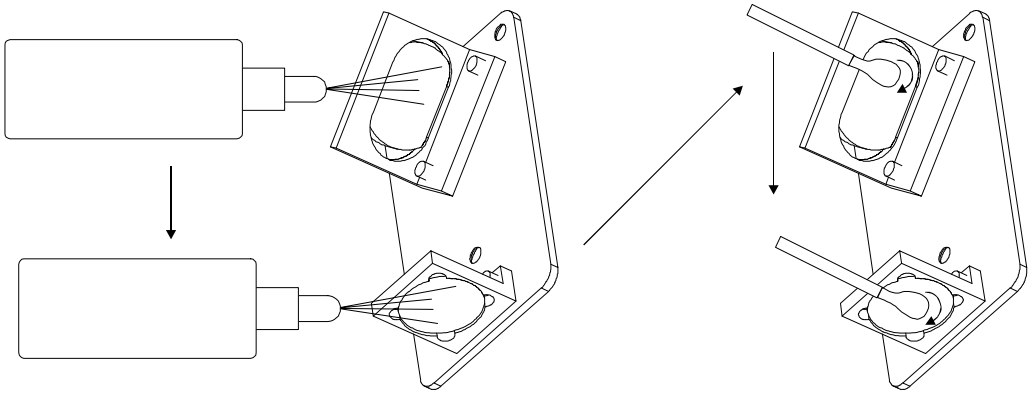
#3 Mirror and Focus Lens

You must remove the front cover to the Focus Carriage (1) to gain access to the #3 Mirror (3) and the Focus Lens (4). To do this, hold the front cover (2) with one hand and with the other hand, remove the three thumbscrews that attach the front cover to the Focus Carriage, and pull the front cover straight out. You will notice that the #3 Mirror and the Focus lens are both mounted to the front cover.



The #3 Mirror and the Focus lens are both glued to a metal bracket and the metal bracket is attached to the front plate with Phillips head screws. It is not necessary to detach the bracket from either optic in order to clean them.

1) Focus Carriage
2) Front Cover
3) #3 Mirror
4) Focus Lens



Tilt the front cover at enough angle so that you can apply the Lens Cleaning solution directly to the #3 Mirror and to the Focus Lens. Flood the surfaces with the solution. If heavy debris is present, let the solution soak in for a minute. Roll a fresh cotton swab across the #3 Mirror to dry it off. Remember that it is okay if a small amount of lint from the cotton swab remains on the mirror. Repeat this procedure for the Focus lens and always use a fresh swab.

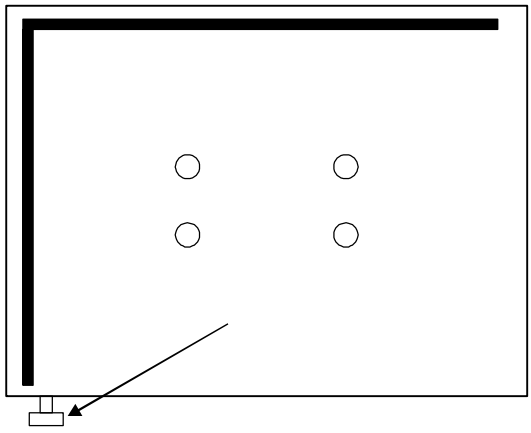
Beam Window

The Beam Window is where the laser beam enters into the engraving area. It is located in the upper left hand corner of the engraving area against the back wall and is yellow in color. It is not necessary to remove the Beam Window for cleaning since it can only get dirty on the front side. The backside is in a sealed environment. To clean the Beam Window, moisten a cotton swab and gently roll it across. Basically, clean it in the same manner as the #2 Mirror.

Z-axis Table Removal

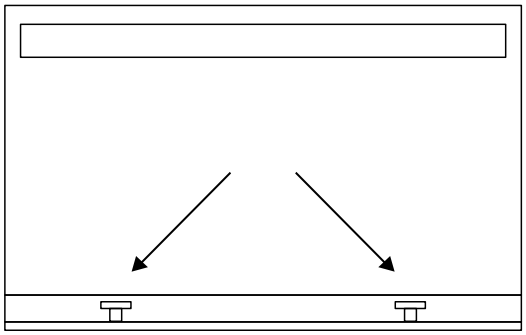
Power the system OFF. Loosen the large thumbscrew in the lower left side of the table. Place fingers into holes in table. Slide the table forward until it stops, then lift up and out of the system.

To reinstall, flip the table over and take note of how the table engages with the support brackets inside the system. Place table right side up, install into system by placing the table close to the front of the machine and sliding the table toward the rear, engaging the table with the support bracket. Tighten the thumbscrew.



Exhaust Plenum Cleaning

- Power system OFF.
- Remove the Z-axis table.
- Remove the two thumbscrews.
- Lift the Plenum straight up, off of the hooks, and out of the system.
- Clean the Plenum and inside the Laser System.
- Installation is opposite of removal. Make sure that the Plenum rests on the hooks.



Adjustments and Lubrication

There are no periodic adjustments required. The X-axis bearings in the motion system will self adjust to take up any clearances as they begin to wear. The belts are fiber reinforced and will not stretch under normal use so that periodic tension adjustment is not necessary. Optical alignment is not necessary because the laser and the #2 Mirror are fixed.

All bearings in the system are sealed and do not require lubrication. **DO NOT** lubricate the tracks that the bearings ride in. The only lubrication that may be required is the screw threads for the table lifting mechanism. After some time, contaminants can adhere to the lubricant, which can cause the engraving table to bind up or sound squeaky. If this is the case, wipe off the contaminated grease with a soft cloth and apply fresh white lithium grease to the screw threads. Run the table up and down to work in the fresh grease.

Electronic Upgrading

The laser systems onboard computer is equipped with a special “Flash” upgrade technology. If the electronic operation of the system should ever require upgrading, it can be done electronically without the changing of any parts. The upgrade file gets downloaded from your computer to the laser system via the parallel port. This file is then run on the laser system and it only takes a few minutes. Once the file has completely run, the laser system will automatically restart and the new changes will take effect. For more specific details, please refer to the instructions that will accompany the flash disk.

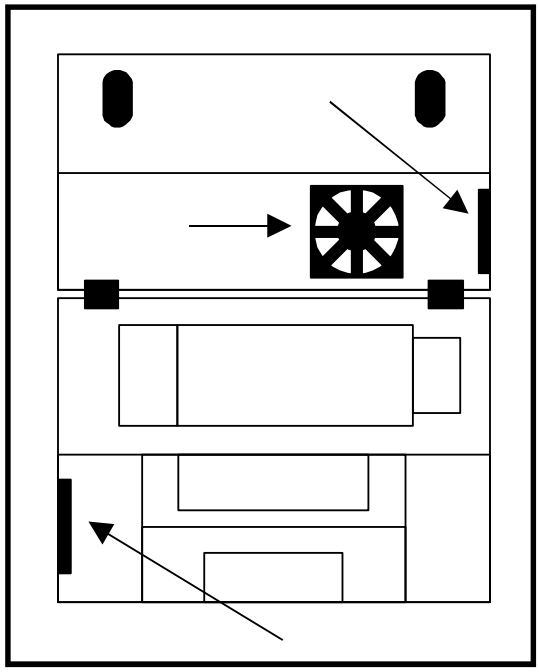
Battery Replacement

There is a battery located on top of the CPU's motherboard. This battery is used to retain Z-axis position information. Normally, this battery does not require maintenance nor needs changing. However, if instructed to change the battery by our Service Department, you will be given instructions on how to do it properly.

WARNING: There is a danger of explosion if the battery is incorrectly replaced. Replace the battery only with the same or equivalent type recommended by the battery manufacturer. Using an incorrect battery, recharging or disassembling the battery may present a danger due to fire or explosion. Dispose of used batteries promptly according to the local regulations.

Cooling Fan Filters

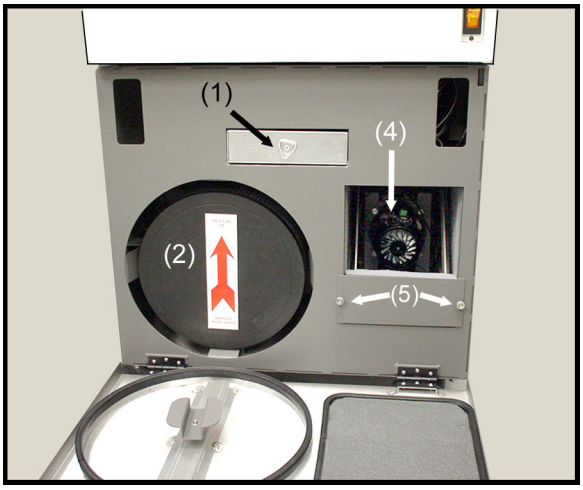
This air-cooled laser system will require periodic cleaning of the cooling fan filters. Since ambient air is used to cool the laser tube, the air must be filtered before it enters the inside of the laser system otherwise dirt and dust can build up inside of the laser system and damage it. The contaminants reduce the laser system's cooling ability and will cause the laser tube to overheat. An overheated tube will lose laser power during engraving and will eventually shut down completely. The laser tube has a built in safety mechanism that will shut the beam off before it can damage itself.



The cooling fan filters are located on the back of the laser system. To service the filters, first unplug the laser system. Unlatch the rear laser cover and lift it open. The filters are located where the arrows are pointing in the illustration. To remove the filter(s), simply snap off the black cover and remove the foam element. Wash the element in a soap and water solution, dry, and re-install.

NEVER OPERATE THE LASER SYSTEM WITH THE COOLING FAN FILTERS REMOVED. This can permanently damage the laser system. Damage from this kind of abuse WILL NOT be covered under warranty.

Filter Module



Inside the Filter Module, there are three major components: The Pre-Filter (1), Primary Filter (2), and the Blower Motor (4). Inside, there are sensors that detect if the filter(s) are saturated or the Blower Motor is malfunctioning. **FOR HIGH PRODUCTION ENVIRONMENTS, WE RECOMMEND KEEPING A SPARE PRE-FILTER, MAIN FILTER, AND VACUUM MOTOR ON HAND AT ALL TIMES.**

Pre-Filter

The Pre-Filter (1) is the only part of the Filter Module that can be serviced. It should be inspected and/or cleaned every 8 hours of engraving. To inspect, grasp the metal hook, pull out the filter and hold it up to a light source. You should be able to see light through it. If it is saturated, remove the material out of the frame and clean the filter material with a soap and water solution. If the filter material is not cleanable, then it will need to be replaced. After letting it dry or using a new piece of filter material, re-install it back into the frame and back into the Filter Module. The software will prompt you if it detects that the Pre-Filter is saturated.

Main Filter

The software will also prompt you if the Main Filter is almost completely saturated. The software will allow you to continue to run the system for a short time after you have received the first notice that it is almost saturated. Once it detects complete saturation, it will not permit further use of the system until the Main Filter is changed. The Main Filter is not cleanable and it must be replaced. To replace this filter, grasp it and slide it out. Install the new filter by first removing any plastic wrapping and sliding the filter into the Filter Module. Rotate the Main Filter until the Arrow is pointing straight up.

Vacuum Motor

If the life of the Vacuum Motor has come to an end, replacement will be required. The software will prompt you if the motor is not working. To remove the Vacuum Motor, **POWER OFF** the system and unplug it from your electrical outlet. Remove the two thumbscrews (5), grasp the plate, and pull the motor frame out of the Filter Module. Install the new Vacuum Motor by pushing it into the Filter Module the same way it came out. Attach and tighten the thumbscrews.

Maintenance Schedule

The maintenance requirements of the laser system is dependent on the type of material being run, the quantity of material being removed, and the hours of operation. As a starting point, we recommend the following schedule:

- As necessary
  - Engraving Table
  - Main enclosure
  - Top Door Window

- Every 8 hours of engraving
  - Clean X-axis and Y-axis Bearings
  - Clean X-axis and Y-axis Rails
  - Clean X-axis Belt

  Check Beam Window, #2 Mirror, #3 Mirror, and Focus Lens for contamination - clean only if dirty)

  Check Pre-Filter for saturation - clean or replace if necessary

- Every month
  - Clean Cooling Fan filters
  - Clean and re-lubricate Z-axis Lead screws
  - Check for X-axis and Y-axis Belt wear – replace as necessary
  - Check and/or clean X-axis and Y-axis Drive Gears
  - Check for X-axis and Y-axis Bearing wear – replace as necessary
  - Inspect system for loose screws and mechanical parts – tighten if necessary

- Every 6 months
  - Exhaust Plenum

- When prompted by the software
  - Clean and/or replace Pre-Filter
  - Replace Main Filter
  - Replace Vacuum Motor

If you are noticing a considerable buildup of debris on the optics and the motion system, clean the system at more frequent intervals. If your system has remained relatively clean, you can extend your cleaning intervals. You need to be the judge but keep in mind that a clean machine is a better performing machine and can extend the life of the parts as well as reduce the possibility of down time. If you have any questions about maintaining the laser system, please contact our Service Department.

APPENDIX

Appendix A - Limited Warranty

Universal Laser Systems Limited Warranty
(Domestic, Laser Personalization and Identification System)

Universal Laser Systems, Inc. ("ULS") warrants that the laser personalization and identification system manufactured by ULS (exclusive of software/firmware, which is covered by a separate license agreement and limited warranty) (the "System") will be free from defects in material and workmanship under normal and proper use and service for a period of twelve (12) months from the date of shipment of the System by ULS (the "Warranty Period"). This limited warranty does not extend to filters, which are consumable items.

This Limited Warranty applies only to the System, extends only to the original purchaser (the "Customer") and terminates upon the earlier of (i) the transfer of the System to any other person or entity, or (ii) the end of the Warranty Period. If the System or any part of the System is or becomes defective during the Warranty Period, ULS will, at its option, either (i) repair or replace the System or the defective part at no additional charge to the Customer, or (ii) refund the purchase price paid by the Customer for the System. If ULS elects to repair the System or defective part, ULS will, at its option, either (i) direct the Customer to return the System or defective part to ULS, repair the System or defective part upon its return to ULS at the Customer's expense and return the repaired System or part to the Customer, or (ii) repair, or arrange for the repair of, the System or defective part on-site at the Customer's facility.

To exercise this Limited Warranty, the Customer must notify ULS of the defect in writing before the end of the Warranty Period. Any System, or part of a System, repaired or replaced by ULS pursuant to this Limited Warranty shall be warranted by ULS only through the end of the original Warranty Period in accordance with the terms and conditions set forth in this Limited Warranty.

This Limited Warranty does not extend to any System, or to any part of a System, that has been damaged or destroyed if such damage or destruction is attributable, in whole or in part, to the act or omission of any person or entity other than ULS or any other cause outside the control of ULS including, without limitation, using the System to engrave or cut products, supplies, materials, items, consumables or accessories other than those approved and supplied to Customer by ULS; lack of supervision of use; accident; misuse; abuse (including, without limitation, incorrect voltages, power surges, fires, improper or insufficient ventilation, failure to follow ULS-provided operating instructions, and "acts of God") and service or modification of the System by a person or entity other than ULS or an authorized representative of ULS. This Limited Warranty does not extend to parts or components of the System that are not installed by ULS, an authorized representative of ULS or in a manner not approved in writing by ULS.

EXCEPT FOR THE WARRANTIES SET FORTH IN THIS LIMITED WARRANTY, ULS IS PROVIDING THE SYSTEM "AS IS," AND ULS SPECIFICALLY DISCLAIMS ANY AND ALL OTHER WARRANTIES, CONDITIONS OR REPRESENTATIONS (WHETHER EXPRESS OR IMPLIED, ORAL OR WRITTEN) WITH RESPECT TO THE SYSTEM INCLUDING, WITHOUT LIMITATION, ANY AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Because some states do not permit certain warranty disclaimers or limitations on the duration of an implied warranty, some or all of the disclaimers or limitations set forth above may not apply. This Limited Warranty grants the Customer specific legal rights. The Customer may also have other legal rights, which vary from state to state.

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, THE ENTIRE LIABILITY OF ULS, AND THE EXCLUSIVE AND SOLE REMEDY OF THE CUSTOMER, FOR ALL CLAIMS, LOSSES AND DAMAGES OF ANY NATURE RELATED TO THE SYSTEM, INCLUDING ANY CAUSE OF ACTION BASED ON WARRANTY, CONTRACT, TORT, STRICT LIABILITY, PATENT OR COPYRIGHT INFRINGEMENT OR MISAPPROPRIATION OF INTELLECTUAL PROPERTY SHALL BE LIMITED TO THIS LIMITED WARRANTY. IN NO EVENT SHALL UNIVERSAL'S ENTIRE LIABILITY EXCEED THE PURCHASE PRICE PAID BY THE CUSTOMER FOR THE SYSTEM.

IN NO EVENT WILL ULS BE LIABLE FOR ANY LOSSES OR DAMAGES CAUSED, IN WHOLE OR IN PART, BY THE CUSTOMER OR ANY THIRD PARTY, OR FOR ANY CONSEQUENTIAL, INCIDENTAL, INDIRECT, SPECIAL, EXEMPLARY OR PUNITIVE DAMAGES INCURRED BY ANY PERSON OR ENTITY, INCLUDING, WITHOUT LIMITATION, ECONOMIC LOSS, PHYSICAL INJURY AND LOST REVENUE, PROFITS AND SAVINGS, EVEN IF ULS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES OR CLAIMS OR IF ANY OF THE WARRANTY LIMITATIONS SET FORTH ABOVE ARE HELD INVALID OR UNENFORCEABLE.

IN NO EVENT WILL ULS BE LIABLE FOR ANY CLAIM BROUGHT MORE THAN ONE (1) YEAR AFTER THE CAUSE OF ACTION AROSE OR SHOULD REASONABLY HAVE BEEN DISCOVERED.

Because some states do not permit the exclusion or limitation of liability for consequential or incidental damages, some or all of the limitations and exclusions set forth above may not apply.

Appendix B - Specifications

Model Number	LaserKiosk
Computer Interface	Included
Software	Included
Laser Source	UL-25 watt CO2 Quick Change Laser Cartridge
Dimensions	41” high x 23” wide x 23” deep for system 41” high x 35” wide x 23” deep for system with detachable computer
Weight	Laser System = 75 lbs. Laser Cartridge = 22 lbs. Filter Module = 67 lbs. Computer Module = 12 lbs.
Safety	Class I interlocked safety enclosure Safety tested for Laser Personalization and Identification catalog engraveable materials

Facility Requirements

Power	Single Phase 100/220V AC, 20/10 Amp, 50/60 Hz
Exhaust	Integrated filter module - no external exhaust required
Cooling	Air cooled (ambient temperature 50ºF (10ºC) to 95ºF (35º C)

Specifications are subject to change without notice.

Appendix C – Troubleshooting Guide

Engraving Quality

Problem	Possible Cause	Possible Solution
"Fuzzy" looking raster engraving or small text appears like a "double image"	• Out of focus • Dirty laser system • Worn X-axis belt and/or drive gear • Laser Tube is faulty	• Contact Technical Support • Clean all optics, rails, bearings and belts • Try engraving in the upper right corner of the engraving area. If engraving improves, send X-axis arm to ULS for repairs. • Replace laser tube
	•	•
Vertical or diagonal background pattern present when raster engraving large areas and/or large amounts of material	• Dirty laser system • Slight pattern is normal If the pattern is excessive: • Loose motion system components • Worn or damaged X-axis bearings • Worn or damaged X-axis rail	• Clean all optics, rails, bearings and belts • Check X-axis bearings, belt, optics • Replace X-axis bearings • Send X-axis arm to ULS for repairs
Horizontal background pattern present when raster engraving large areas and/or large amounts of material	• Out of focus • Dirty laser system • Slight pattern is normal If the pattern is excessive: • Laser is too cold or hot • Laser tube is faulty	• Contact Technical Support • Clean all optics, rails, bearings and belts • Check and/or clean filters • Make sure ambient temperature is within specifications • Check AC electrical supply for power instability • Replace laser tube
Raster engraving appears sharp on both ends of the engraving but fuzzy in the middle	• Out of focus • Dirty laser system • Something is loose • Worn X-axis belt and/or drive gear • Laser tube is faulty	• Contact Technical Support • Clean all optics, rails, bearings and belts • Check X-axis bearings, drive gear, idler pulley, belt, and optics • Send X-axis arm to ULS for repairs • Replace laser tube
Engraving does not appear as deep as it normally does	• Out of focus • Material or material density has changed • Dirty laser system • Laser tube cooling fan filters are dirty • Ambient temperature not within specifications • Laser beam out of alignment with the optics • Faulty laser tube	• Contact Technical Support • Check material • Clean all optics, rails, bearings and belts • Check and/or clean • Adjust ambient temperature to within specifications • Contact Technical Support • Replace laser tube
Engraving is sharp, clear and at a good depth on one side of the table and fuzzy and shallow on the opposite side of the table	• Out of focus • Dirty laser system • Fixture is not level • Laser beam out of alignment with the optics • Faulty laser tube	• Contact Technical Support • Clean all optics, rails, bearings and belts • Check Fixture installation • Contact Technical Support • Replace laser tube

Operational

The computer gives an error message “Engraver Not Detected” or "Couldn't detect air filter"	• Laser Module not powered ON • Filter Module not engaged • Parallel port cable not connected or not connected properly • Bad parallel port in computer system • Damaged port in CPU	• Turn on Laser Module • Engage by turning cylindrical handle clockwise until it rests horizontally. If already engaged, disengage by turning cylindrical handle counterclockwise, wait 5 seconds, and then re-engage by turning handle clockwise until it rests horizontally. • Connect cable or reseat connection at computer and/or laser system • Contact Technical Support • Contact Technical Support
The computer gives an error message “Unable to open com port” or "Cannot read data from engraver"	• Parallel port cable not connected or not connected properly • System malfunction	• Power everything OFF. Unplug system. Connect cable or reseat connection at computer and/or laser system • Contact Technical Support
The computer gives an error message “The Lens offset has not been initialized"	• Focus is incorrect	• Contact Technical Support
The computer gives an error message “No response from engraver".	• System malfunction	• Contact Technical Support
The computer gives an error message “Unable to detect Cylindrical (main) Filter"	• Cylindrical (main) Filter not installed or installed improperly	• Install or check to see if arrow is pointing straight up.
The computer gives an error message "The Pre-Filter pressure is very high. You may need to clean the Pre-Filter"	• Pre-Filter is saturated	• Clean or replace Pre-Filter
The computer gives an error message "The Cylindrical (main) filter's useful life is nearing its end".	• Cylindrical (main) Filter is almost saturated	• Replace Cylindrical (main) filter
The computer gives an error message "Sadly, the Cylindrical (main) filter's useful life is at an end. Please install new filter".	• Cylindrical (main) Filter is saturated	• Replace Cylindrical (main) filter
The computer gives an error message "The Cylindrical (main) Filter pressure is very high. You may need to change the filter"	• Cylindrical (main) Filter is saturated	• Replace Cylindrical (main) filter
The computer gives an error message "Insufficient blower pressure. The fan may not be working".	• Vacuum Motor is not connected or malfunctioning.	• Power everything OFF. Unplug system. Check if Vacuum motor is connected and/or replace.
Focus carriage looses X-axis position and slams into the left or right side of the rail during high speed raster engraving	• Mechanical interference • Dirty laser system • CPU overheating If the pattern is excessive: • X-axis problems	• Check if focus carriage makes contact with material or other objects • Clean all optics, rails, bearings and belts • Clean CPU filters, correct ambient temperature to be within specifications • Contact Technical Support
When homing, the arm slams repeatedly for a few seconds	• Bent Y-flag • Dirty or faulty home sensor(s) • Faulty flex cable • Faulty lower flex cable board	• Check and/or straighten • Contact Technical Support • Contact Technical Support • Contact Technical Support
When running the laser system, the laser system will “freeze” and the operator will have no control over the system. The only way to restore the system is to power the Laser Module OFF and then back ON. This is a symptom of file corruption.	• Bad printer cable • Faulty printer port in computer • Faulty internal ribbon cable • Damaged port in CPU	• Contact Technical Support • Contact Technical Support • Contact Technical Support • Contact Technical Support

Appendix D - How To Get Help

Step 1:
Determine exactly what the problem is. Refer to the Troubleshooting Guide at the end of this manual for a possible solution.

Step 2:
Try to recreate the problem and write down the circumstances in which the problem occurred. Be prepared to describe all pertinent information about what is happening. Have the serial number of the system available. The serial number tag is located on the side of the machine, next to the parallel port connector.

Step 3:
Please contact us at:

Universal Laser Systems, Inc.
16008 North 81st Street
Scottsdale, AZ 85260
Phone: 480-315-3600
Fax: 480-315-3601
M-F 8am – 5pm Arizona Time

Step 4:
If you would like to contact us via our Web-based email support system, using your Internet web browser, log on to our website: www.ulsinc.com**.** Click on the "Technical Support " link. Then click on the "Technical Support Request Form" and follow the instructions.