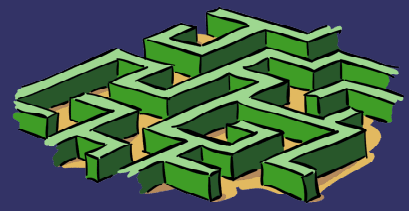
Why Buy A Diode Laser

Cost-effectiveness
Speed of Operation
Energy efficiency
Compact size
Reliability
High-quality engraving
Etching on specific materials like wood, leather, and anodized metals

Diode lasers are excellent for users seeking an accessible entry point into laser technology due to their affordability and long operational lifespan.
They are particularly useful for intricate designs
They are used by hobbyist and crafts people to medical procedures



Software

Software for diode lasers includes

Design programs

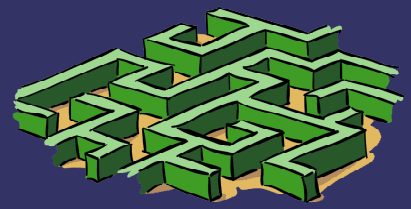
like Inkscape, Adobe Illustrator, CorelDRAW

Control Programs

that generates G-code (like LightBurn, LaserGRBL),

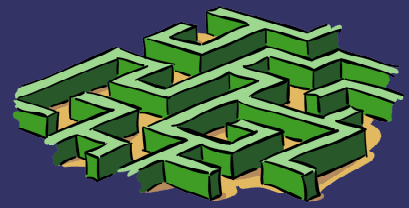
and brand-specific programs (like xTool Creative Space).

You'll need a design program to create your image or design, and then a CAM or control program to send the design to your laser.



Laser Cutters
Types of Laser

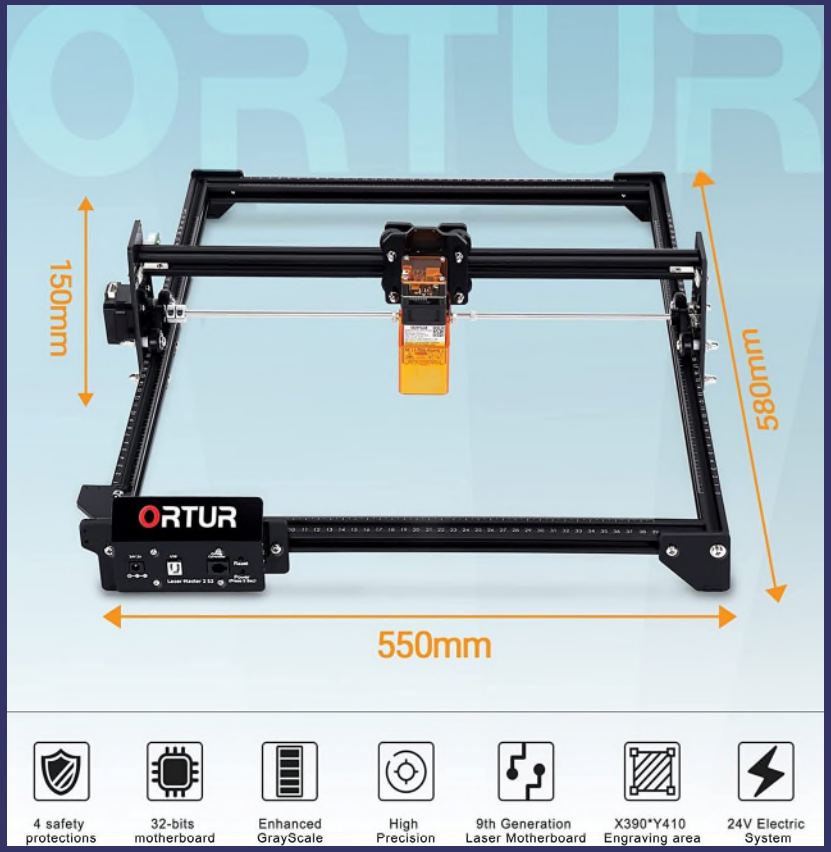
1 Gas
2 Semiconductor
3Fibre
4 Solid State
5 Liquid
6 Chemical
7 Excimer
8 UV
9 Femtosecond



Gas Laser
K40

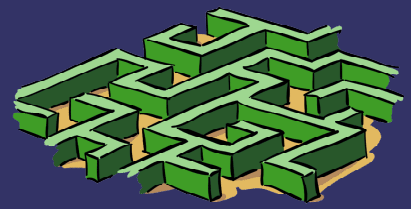
Fiber

Semiconductor (diode)



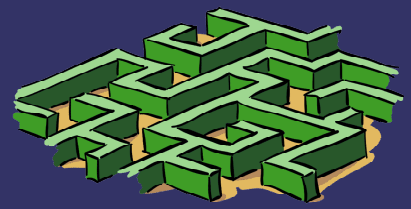
Prices

- Gas K40 £500
- Fiber £500-£18000
- Diode £120-£1000

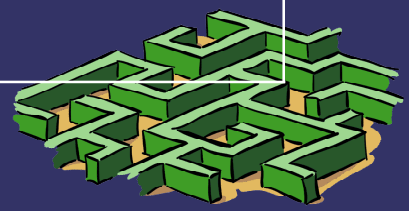


Diode Power Wavelength

COLOUR	UV	BLUE	GREEN	RED	IR
nm	375-405	450-550	510-530	630-740	>780
OUTPUTmW	1	1-5	5-20	20-100	>100



PROS	CONS
10 Watt Suitable for indoor use Compressed laser spot for high resolution Energy efficient compared to higher wattage options	10 Watt Limited workspace Less options on material to use
20 Watt Can handle larger areas I.e. classrooms Higher resolutions in deeper cuts Larger range of materials and thicknesses	20 Watt Higher wattage leads to higher enegy use
40 Watt Superior cutting depth and speed	40 Watt Can be used outdoors Larger wattage gives longer life of diodes



TYPES OF CONTROLLERS

GCode (Hobbyist)
Most entry level diode lasers use GCode based controllers

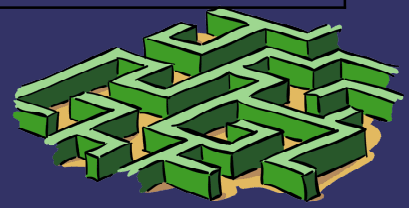
Supported controllers/software : GRBL, Smoothieware, Marlin, FluidNC, Xtool

DSP (Industrial)
DSP controllers are common in more industrial machines although most K40 type laser machines use this type of interface

Supported controllers/software : Ruida, Trocen, Topwisdom

Galvo (Industrial)
Galvo use a fixed scanning head

Supported controllers/software : EZCAD2, BSL

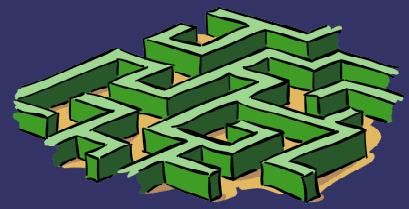


Power

Diode laser power output varies widely, from milliwatts (mW) for applications like laser pointers to kilowatts (kW) for industrial cutting and welding.

We shall limit ourselves to 10 watt to 40 watt

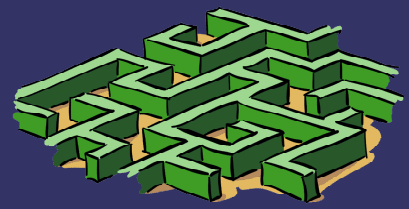
The higher the wattage generally the quicker you can cut / engrave or the thicker the material you can process



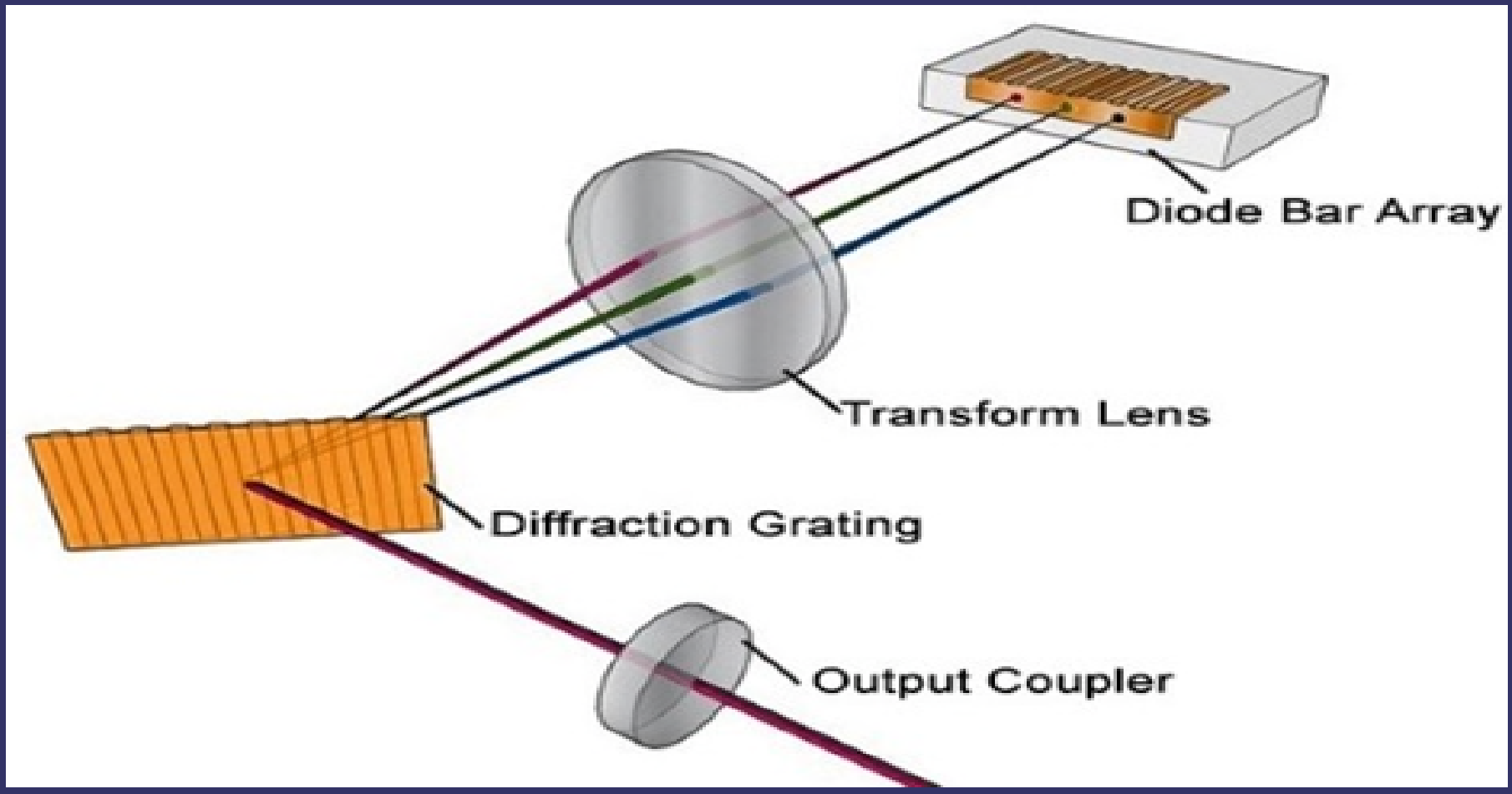
Power

Most of the diode lasers available (of the ones that we Hobbyists use) use a frequency of around 450NM

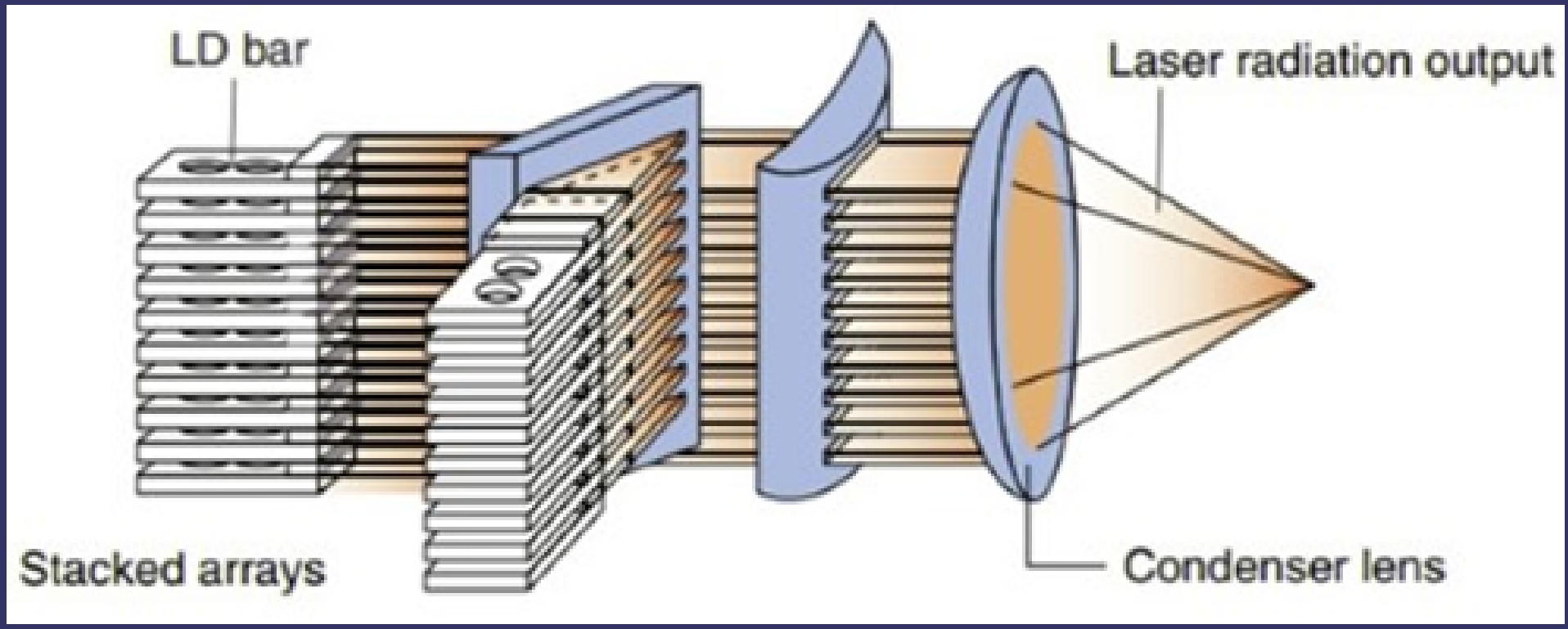
Although some of the newer lasers use a smaller wattage (2 watts) at a wavelength of 1064nm for engraving on to metal.



Schematic

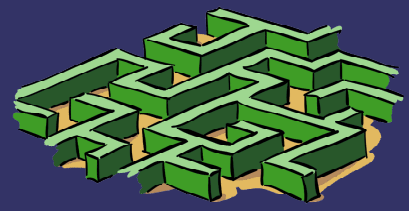

Diode Bar Array
Transform Lens
Diffraction Grating
Output Coupler

Structure


LD bar
Laser radiation output
Stacked arrays
Condenser lens

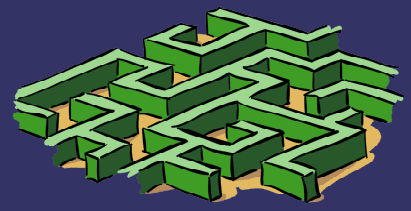
Specs of Ortur diode lasers

Laser Module	Master 3 LU2-10A	Master 3LE LU2-10A	Master 3LE LU2-4-SF/LF
Output Power (Watts)	9.5-10	9.5-10	4.5-5.5
Electrical Power (Watts)	40	40	20
Laser Wavelength (nm)	445+-5	445+-5	445+-5
Spot Size (mm)	0.05	0.05	0.12
Spot Mode	Square	Square	Square
Focal Distance (mm)	50	50	50(LF) 30(SF)
Laser Level	Class IV	Class IV	Class IV



Safety

Never leave the laser alone when working
Always use your laser safety glasses
Never look directly at the Laser
Be careful of laser beam reflections
Don't modify your machine
(unless you know what you are doing)



NEVER CUT THESE MATERIALS

WARNING:

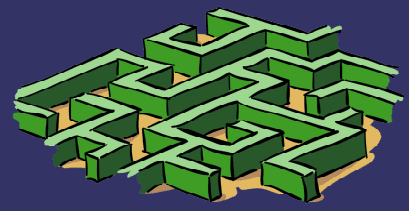
Because many plastics are dangerous to cut,
it is important to know what kind you are planning to use.

DPE/milk bottle plastic
Polystyrene Foam
Polypropylene Foam

All the above have a
habit of catching fire

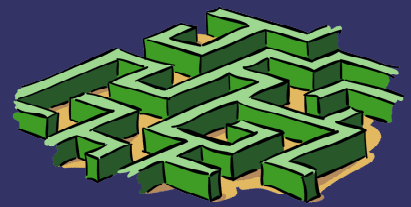
PVC (Poly Vinyl Chloride)
Leather
ABS
Fiberglass
Coated Carbon Fiber

All the above give off gases that
are poisonous or noxious



Materials you Can Work With

- Most woods
- Paper & Card
- Cork
- Acrylic
- Thin Poly carbonate Sheeting
- Delrin
- Kapton Tape
- Cloth
- PTFE
- NON-CHLORINE-Rubber
- Carbon fiber mats/weave (that has not had epoxy applied)



Etching

- Glass
- Ceramic
- Anodized Aluminum
- Painted/Coated Metals
- Stone, Slate, Marble, ETC