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## A huge CNC frame 6×4 meter (18×12'). Ultimate laser engraving machine

Posted on [17.03.2020](#) ([09.09.2020](#)) by [George Fomitchev](#)



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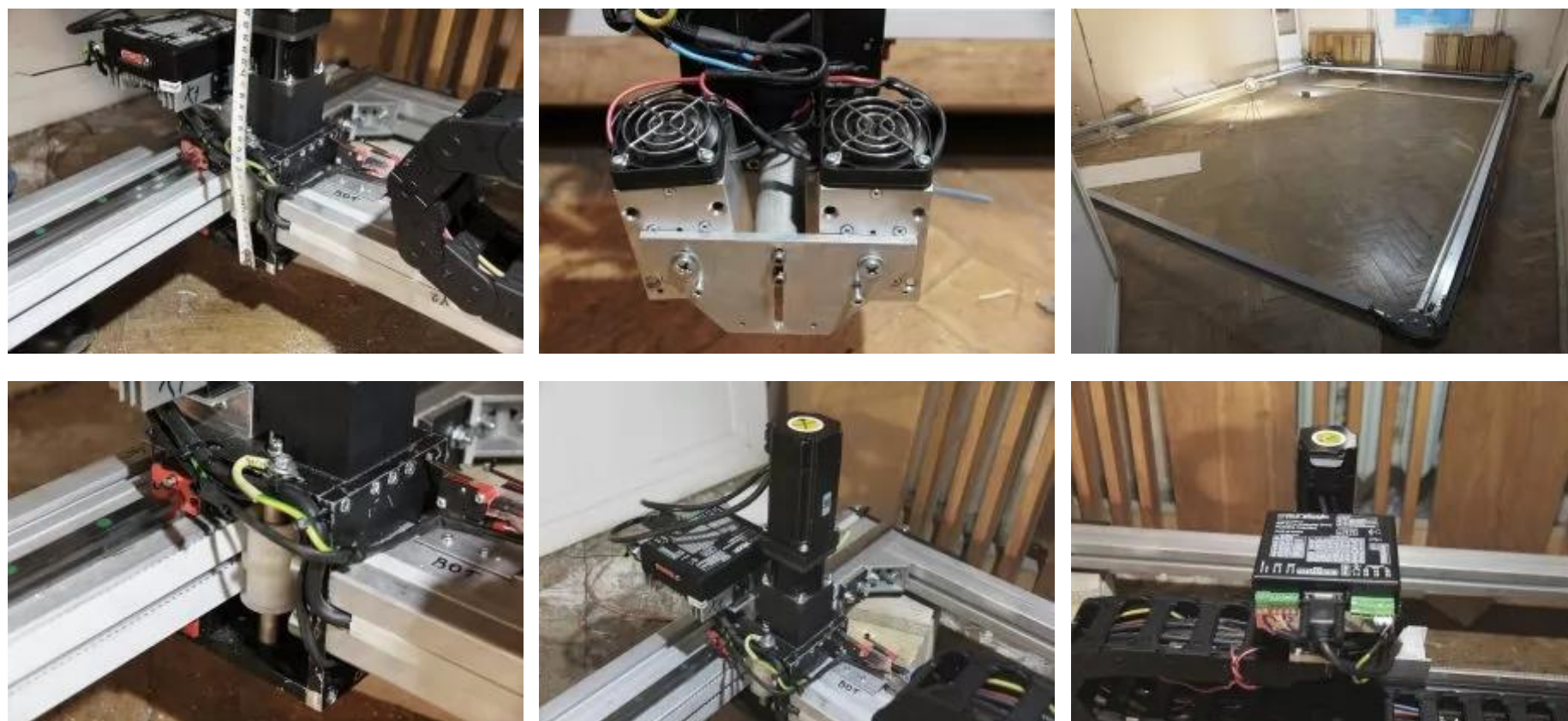


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The biggest CNC frame. Meet 6x4 meters (18x12') by Endurance pro...



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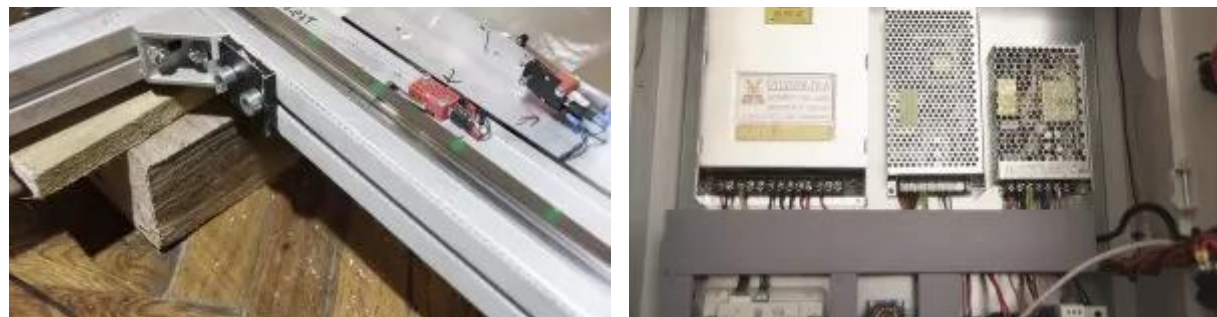
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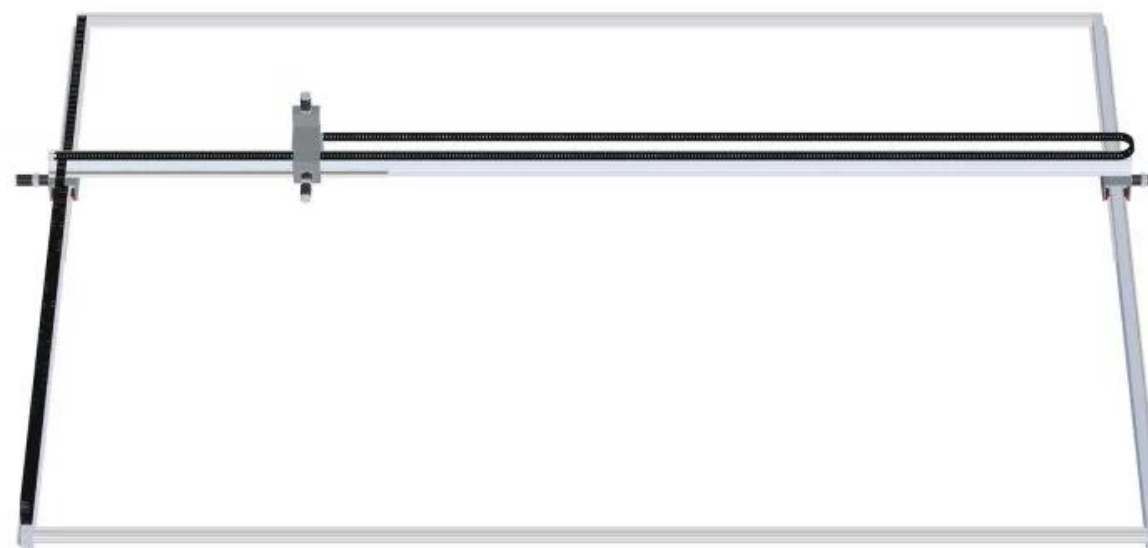
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A 3D model



Endurance has built one of the biggest engraving frames in the world!

- The total size is 6×4 meters (18×12')
- Working size is 5.5×3.5 meters (16×11')
- Ultra-reliable stepper motors controller by Purelogic.
- Professional laser box with drivers and controlling systems
- Ultra-high precision: accuracy is 0.1 mm.
- Maximum working speed is 10000 mm/min
- It can work in horizontal and vertical positions.
- It can operate with a diode laser, DPSS laser or a spindle.

## Mechanical components

ALUMINUM construction profile without coat, with a cross-section of 50x100, sections 6 m long —2 pcs

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ALUMINUM construction profile without coat, with a cross-section of 50x100, sections 4 m long, — 1 pc

Angular connector 50×50 + connection elements — 4 pcs

Solid aluminum sliding block, with a groove (slot) of 10 — 10 m

Open cogged belt XL 5.08/20mm — 34 m

Pulley XL Z=12 for a belt of 20 mm — 6 pcs (outside diameter 19 mm )

Puller 20 mm — 12 pcs

Rail GHR15   L: 4 m — 6 pcs

Rail GHR15   L: 2 m — 4 pcs

Carriage   HSAC GHH15CA — 12 pcs

Stopper plug CAPM4-GHR15 — 500 pcs

Electronic components

Axis X		
Description	Model	Features
Stepper motor with encoder	PL57H1404-D8-1K	57×126 mm, 2 phases, 28 kg.cm, spindle 8 mm, current 4.2A, step 1.8°, 0.7 Om, 1000PPR
Driver of a servo-stepper motor (SSM)	PLDS880	driver of a SSM or a stepper motor ... .. 80V/10A/200kHz
Microswitch	XV-156-1C25	7.5A/250VAC, reversible, HP+H3, roller, IP40
Axis Y		
Description	Model	Featur

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Stepper motor with encoder	PL5/H1404-D8-1K	8 mm, current 4.2A, step 1.8°, 0.7 Um, 1000PPR
Driver of a servo-stepper motor (SSM)	PLDS880	driver of a SSM or a stepper motor ... .. 80V/10A/200kHz
Microswitch	XV-156-1C25	7.5A/250VAC, reversible, HP+H3, roller, IP40
Wires and connectors		
Description	Model	Features
Signal cables 18+18+14+10з	PVC0.2x8STP	Signal shielded, wires pair, 8 pcs.(4 pairs)*0.2 mm²)
Signal cabpes 14+8+18+12+15+19+18Л+21з	PVC0.2x4STP	Signal shielded, wires pair, 4 pcs.(2 pairs)*0.2mm²
Power supply cables 18+18+14+18Л+12з	PVC1.0x4S	Signal shielded, 4 pcs.*1.0mm²
Connector	YD28J4Z	Block plug, 4 конт???
Connector	YDA28K4TS	cable socket, 4 конт???
Wires, cables and supply units		
Description	Model	Features
Supply unit70B	GY1200W-70-A	70B 17A
Supply unit24B	NES-150-27	24B 6.3A
Ferrite bread for a cable of 5 mm		

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См. также

Description	Model	Features
Controller	RDC6442G	
Display	RDC6442G	
For assembling of a control box		
Description	Model	Features
Mini connector 4pin	DS1110-01-4	(block cable)\Connfly
Switch	S202Z-2(S202UZ-2)	Electrick lock for PЭА \Jin Tay
Backlit toggle switch ON-OFF	ASW-14D (red)	(20A12VDC) SPST 3P\Jietong Switch
Backlit toggle switch ON-OFF	ASW-14D (green)	(20A12VDC) SPST 3P\Jietong Switch
Ventilator 220V	EC1225A2HBL	120x120x25 mm, ball bearing, 2000 rpm Evercoo
Relay 1 пер	HHC68A-1Z-24D	24VDC / 15A,240VAC\NCR
Колодка реле	PTF08A	HHC68A-2Z (LY2)\NCR
Решетка	FGF-120/M silver	Fan filter120x120 mm (metal)\Evercool
Supply unit	MDR-10-24	24B,0.42A,10 W\MEAN WELL
Button	KE-021	“Stop” red. гриб.
Signal lamp	XB7EV03MP	22mm230V green. (LED)
Signal lamp	XB7EV05MP	22mm 230V yellow (LED)
Signal lamp	XB7EV04MP	22mm 230V red (LED)
Signal lamp	XB7EV04BP	22mm 24V LED red
Button SB-7	BBT40-SB7-K06	Start green

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1105461K9A3

Signal lamp	XB7EV03BP	22mm 24v LED green
Supply block	LRS-150-12	12V,12.5A,150W
Male tab	НШВИ 0.25-8	Blue 0.25 mm 2.
Male tab	НШВИ 0.5-8	white 0.5mm
Male tab	НШВИ 0.75-12	gray, 0.75mm2, L 12mm
Male tab	НШВИ 1.5-8	(8mm) black 1.5mm2.
Faston connector 6.3 mm	KLS8-01109-FDFD1.25-250	Fully insulated, wire 0.25-1.5 (red)
Faston connector 6.3mm	KLS8-01109-FDFD2-250	Fully insulated, wire 1.5-2.5 (blue)

Testing process

- Failures that were fixed while testing
- Proper belts tightening
- Adding 1:5 gearbox on X axis (2 motors)
- More rigid cable channel mount
- Additional lubrication of bearings on X axis
- Installing the stud inside the flange from the engine to the gearbox
- Added inversion of rotation of one of the engines along the X axis for the correct movement of the portal in the same direction.
- Correct coefficients are set for step values along the X and Y axes to ensure accuracy of movement.
- The correct size of the working field is set to prevent it from exiting.

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axes was tested.

The software protection work on the voltage on the MO2 board is disabled to ensure the operation of 2 [lasers](#).

Additional stretching belts

Second bearing improvement

Stationary belt tensioners were made and installed to adjust the tension

Fixed scrolling of drive pulleys on the X and Y axis.

Major checkpoints tests

Max speed	10m/min
Max weight	10 kg on a X and Y
Vertical work	did not test
Horizontal work	tested
Non-stop operation	4 hours
Accuracy	0.1 mm

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Products

- Custom Development
- Diode Laser Units
- Download center: laser engraving programs, software tools, plugins & extensions, STL files.
- Everything you need for your laser module, laser cutting and laser engraving.
- Endurance diode lasers data sheet
- Laser Engravers & Laser Cutters from Endurance Lasers
- Quick start
- Read before running the laser
- Setting up

Articles

- About diode (solid-state) lasers
- All about diode laser components - laser diodes, electronics, datasheet.
- Choose the laser you need for your engraving machine - beginner, intermediate, professional options
- Education center
- Free diode lasers from Endurance for educators.
- Getting started with Endurance diode lasers - focusing, settings, parameters, misc
- How to connect the laser to 3D printers and CNC machines
- How to connect the laser to your CNC machine or 3D printer
- Laser beam focusing. All you need to know how to make the best laser beam focus!
- Running Endurance laser

Experience

- Compatible 3D printers and CNC machines - compatibility list
- Endurance demo videos
- Guide book for laser cutting / engraving parameters
- How to do the laser engraving.
- Full instructions using Inkscape and plugins.
- Laser cutting guidance
- Laser Engraving and laser cutting with Endurance diode laser heads
- Running Endurance Laser on a CNC machine - getting started (wiring, pinouts, settings)
- Signal inversion for some CNC machines

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