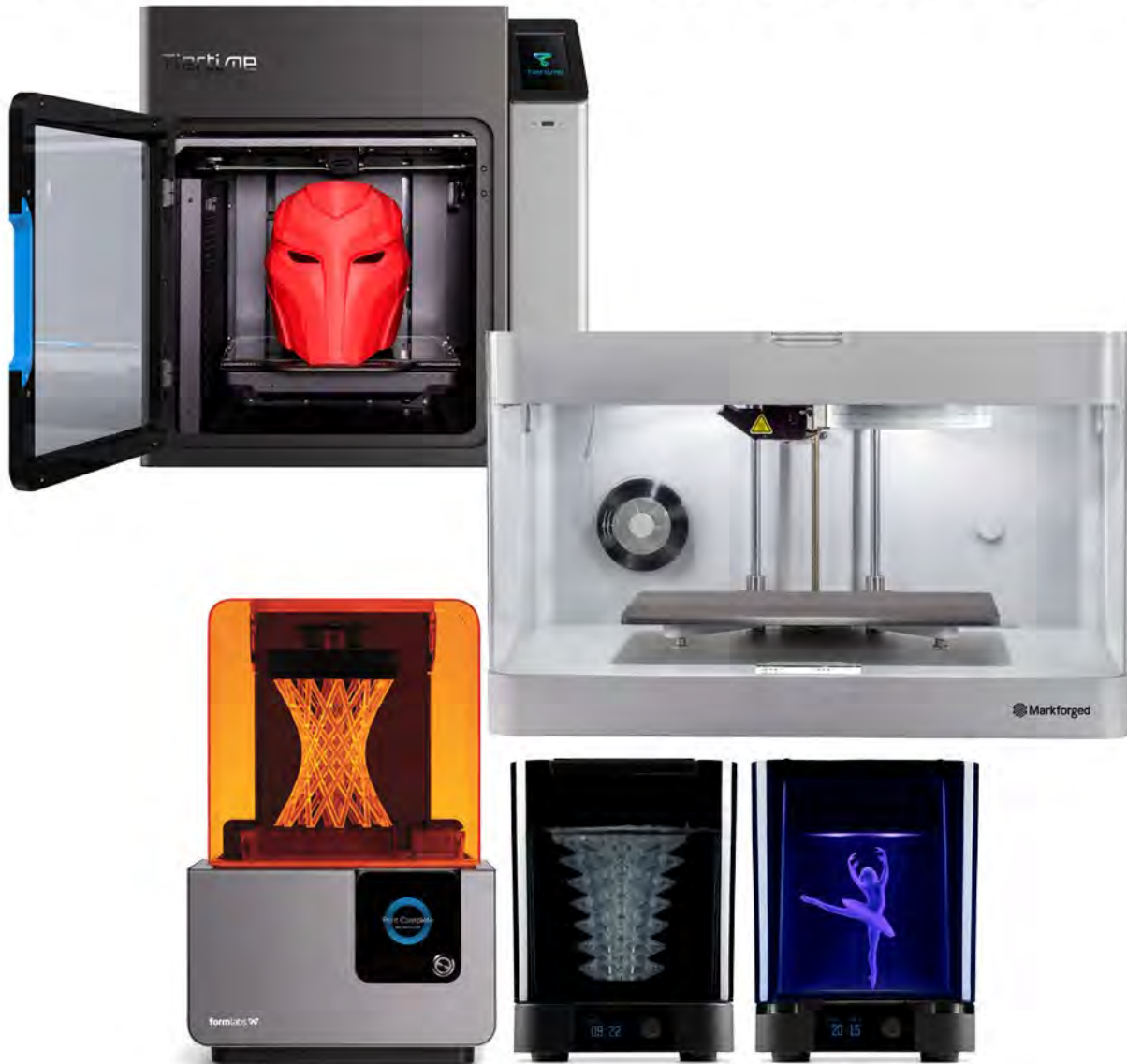


3D Print Your Future!




3D Printers by
 Learning Labs, Inc.

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Form 2

Engineered for precision. Designed for reliability.

The Form 2 brings the power of rapid prototyping with professional-level 3D printing to the desktop. Using advanced stereolithography technology, the Form 2's powerful laser is capable of producing smooth prints with spectacular detail. Our library of versatile, reliable Engineering Resins is formulated to help you reduce costs, iterate faster, and bring better experiences to market.

FORM 2

Technology	Stereolithography (SLA)	
Dimensions	35 × 33 × 52 cm	13.5 × 13 × 20.5 in
Build Volume	145 x 145 x 175 mm	5.7 x 5.7 x 6.9 in
Layer Height Options	100, 50, 25 µm	0.001 in
Laser Spot Diameter	140 µm	0.006 in
Warranty	One year. Optional Pro Plan available in some regions.	

Solve Complex Engineering Challenges With a Range of Functional Materials

Whether you're optimizing your manufacturing process, rapidly iterating through designs, or assessing form and fit, our Engineering Resins are formulated to withstand extensive testing and perform under stress.



GREY PRO RESIN FOR VERSATILE PROTOTYPING

Grey Pro Resin offers high precision, moderate elongation, and low creep. This material is great for concept modeling and functional prototyping, especially for parts that will be handled repeatedly.



RIGID RESIN FOR STIFFNESS AND PRECISION

Rigid Resin is filled with glass to offer very high stiffness and a polished finish. This material is highly resistant to deformation over time and is great for printing thin walls and features.



DURABLE RESIN FOR LOW FRICTION AND WEAR

With low modulus, high elongation, and high impact strength, Durable Resin produces parts with a smooth, glossy finish and high resistance to deformation. Use this material for applications requiring minimal friction.



HIGH TEMP RESIN FOR HEAT RESISTANCE

High Temp Resin has the highest heat deflection temperature (HDT) of 289 °C @ 0.45 MPa. Use it to print models for environmental testing or molds and masters for casting and thermoforming.



FLEXIBLE RESIN FOR ERGONOMIC FEATURES

Use Flexible Resin to produce parts that bend and compress. Flexible is excellent for simulating soft-touch materials and adding ergonomic features to multi-material assemblies.



TOUGH RESIN FOR RUGGED PROTOTYPING

Tough Resin balances strength and compliance, making it the ideal choice for prototyping strong, functional parts and assemblies that will undergo brief periods of stress or strain.



Form 3

Flawless Prints, Every Time

Scale prototyping and production as your business grows with the Form 3, an affordable, industrial-quality 3D printer that consistently delivers.

With advanced Low Force Stereolithography (LFS)[™] technology, Formlabs has completely re-engineered resin-based 3D printing to drastically reduce the forces of the print process. Low Force Stereolithography (LFS)[™] uses a flexible tank and linear illumination to deliver groundbreaking print quality and printer reliability.

Features of the Form 3 include:

- **Pinpoint precision** - The custom-designed Light Processing Unit (LPU) inside the printer uses a compact system of lenses and mirrors to deliver accurate, repeatable prints. This provides for three distinct advantages:
 - Crisp, clean features: The high-power-density laser is passed through a spatial filter to guarantee a clean laser spot.
 - Consistent printing: A parabolic mirror ensures that the laser prints perpendicular to the build plane, ensuring uniform print quality across the entire build platform.
 - Faster than ever: A high frequency galvanometer offers precise control and high speed.
- **Nonstop Printing** - The Form 3 constantly monitors print performance so you can focus on bringing your most creative ideas to life. Integrated sensors help maintain ideal print conditions and send you alerts about the state of your machine. This provides for three distinct advantages:
 - Closed-loop calibration: Optical sensors continuously correct for scale and power, and can even detect dust.
 - Hassle-free materials management: Switch between materials in seconds with a simple cartridge system.
 - User-replaceable components: The Light Processing Unit, resin tank, rollers, and optics window can be replaced in-house, reducing the need for replacement printer shipments.

Technical specs for the Form 3:

- XY Resolution - 0.001in
- Laser Power - 250mW
- Layer Thickness - 0.001 - 0.012in
- Build Volume - $5.7 \times 5.7 \times 7.3$ in

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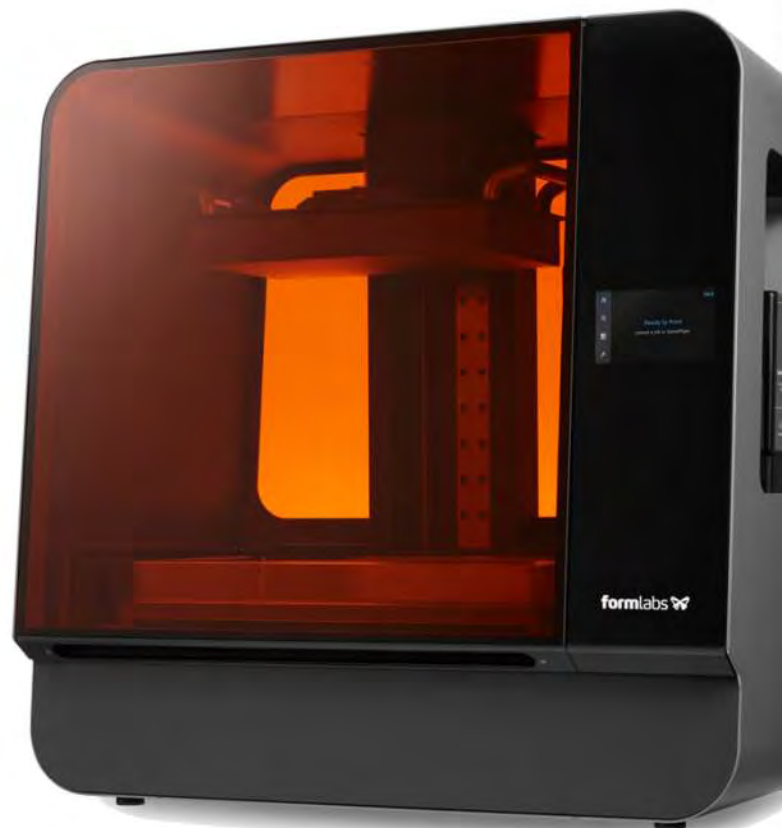


Form 3L

Small Details, Big Results

The Form 3L is an affordable large format 3D printer trusted by professionals for fast turnaround of industrial-quality parts.

With advanced Low Force Stereolithography (LFS)[™] technology, Formlabs has completely re-engineered resin-based 3D printing to drastically reduce the forces of the print process. Low Force Stereolithography (LFS)[™] uses a flexible tank and linear illumination to deliver groundbreaking print quality and printer reliability.



Features of the Form 3L include:

- **Twice the Laser Power** - Two staggered Light Processing Units (LPUs) inside the printer use a compact system of lenses and mirrors to deliver accurate, repeatable prints. This provides for three distinct advantages:
 - Faster printing: The two LPUs work simultaneously along an optimized print path to efficiently blaze through parts of all sizes.
 - Crisp, clean features: Each high-density laser passes through a spatial filter to guarantee a clean laser spot.
 - Consistent precision: A parabolic mirror ensures that the laser prints perpendicular to the build plane, ensuring uniform print quality across the entire build platform.
- **Nonstop Printing** - Integrated sensors help maintain ideal print conditions and send you alerts about the state of your machine. This provides for three distinct advantages:
 - High material capacity: The Form 3L can hold two easy-to-switch resin cartridges, preventing interruptions during large print jobs.
 - Closed-loop calibration: Optical sensors continuously correct for scale and power, and can even detect dust.
 - User-replaceable components: The Light Processing Units, resin tank, rollers, and optics window can be replaced in-house, reducing the need for replacement printer shipments.

Technical specs for the Form 3:

- XY Resolution - 0.001in
- Laser Power - 250mW
- Layer Thickness - 0.001 - 0.012in
- Build Volume (inches) - 11.8h × 13.2w × 7.9d

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BIG, GETS BETTER!

Large Format, High Resolution
Pro-class, Precise & Accurate
Incredible Price/Performance

 **Learning Labs, Inc.**

PO Box 1419
Calhoun, GA 30703
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www.lli.com
sales.dept@lli.com



UPBOX+



Features:



Enclosed Printing Environment with New **UP Flex™** build-surface

Full-enclosure in tandem with UP's proprietary multi-purpose, easy-to-clean & re-useable print surfaces ensure the highest quality output.



Quiet Operation w/ **UP ClearAir™** HEPA System

UP BOX+ operates in near-silence and utilizes **UP ClearAir™** technology, Tiertime's integrated HEPA filtering system. Work Clean and Quiet with UP BOX+!



Smart-Support™ Technology

Industry-leading support-generation algorithm automatically places support structure only where it is needed, then breaks-away with ease allowing you to print even the most complex models.



1 2 3

Powerful **UP Studio™** included

UP Studio™ software is simple-to-use, feature-rich, fast & free and now has **upCTRL™** Variable Temperature Control. Simple to use yet advanced enough for the pros.



Auto-calibration w/ **UP Calibrate™**

UP's auto-nozzle detection feature in conjunction with Tiertime's **Level-Lok™** fixed level calibration, results in incredibly low failure rates. 3D printing using UP is always consistent & trouble-free!



BIG BUILD! - EVEN BIGGER VALUE!

With a super-large build area 8"x8"x10" UP BOX+ is loaded with features that other 3D printers, 3x the price, do not even offer! Compare and see why UP BOX+ is the best price/performance value on the market!



UP Active Resume™ Now Standard!

Have you ever lost a 20-hour print after your 3D printer un-expectantly lost power? **UP Active-Resume™** changes everything by allowing you to pick-up EXACTLY where your printer left-off. Restart your UP and it will seamlessly complete your print. Teachers stop & restart prints when the school is over, then pick-up again in the morning!



UP Link™ WiFi Connectivity

UP 3D Printers now come standard with integrated WiFi connectivity. Send jobs with ease from your IOS, Android, PC or MAC|OS devices.



Filament Detection w/ **UP Fila-detect™**

UP BOX+ senses when your UP is running out of filament then automatically powers down using **Active Resume™**. Simply reload and resume your print to finish the job...seamlessly.



Variable Temperature Control **upCTRL™**

UP Studio™ now supports Variable Temperature Control for both the extruder as well as the build-platform, giving UP users the ultimate in control and virtually unlimited material options.



UPBOX+

Specifications

Fully-Enclosed & HEPA Filtered Commercial-Grade with Professional Features

Printing Technology	Melted Extrusion Modeling (MEM)
Build Volume	255(w) x 205(d) x 205(h) mm
Print-head	Single, quick-change
Layer thickness	0.10, 0.15, 0.20, 0.30, 0.35, 0.40mm
Supporting Structure	Smart-Support™
Platform Leveling	Build Platform Type
Build Platform Type	Heated w/ UP Flex™ or UP Perf™ build surfaces
Un-tethered Printing	Via UP Link™ integrated WiFi connectivity
Advanced Features	UP ClearAir™ HEPA System Filament run-out detection
Supported Printing Material	(1.75mm) ABS, ABS+, PLA
Bundled Software	UP STUDIO™
Compatible Formats	.STL, .UP3, .UPP
Connectivity	USB, WiFi
Operating Systems	PC MACOS IOS Android
Power Supply	110-240 VAC, 50-60 Hz, 90W
Chassis	Metal frame w/ injected molded plastic enclosure
Printer Weight	20 KG / 44 lbs.
Dimensions	255mm (w) x 365mm (h) x 385mm (d)
Onboard Controls	Multi-Function (3) button control / status pulse LED indicator

UP300

Versatility with Precision



- ▶ Three Material-Specific Print Heads
- ▶ Double-Sided Interchangeable Build Plates
- ▶ Dual Filtration System
- ▶ Compatibility with Tiertime Print Queue



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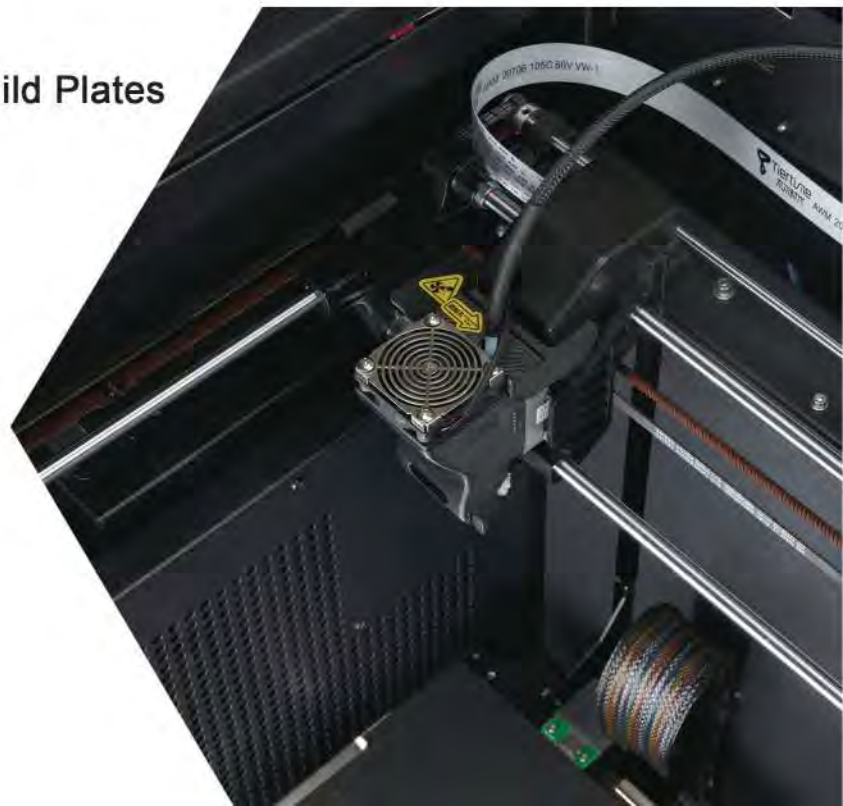
New for 2018, the UP300 is targeted for users demanding a large build volume and consistent performance across different materials. It combines new innovations and improved, popular UP features with Tiertime's renowned reliability.

Three Separate Extruders - Optimized for Different Materials

Each extruder is designed specifically for a matching material type. One is for ABS and other high temperature filaments, one for lower temperature filaments such as PLA, and the other is for TPU, a flexible polyurethane.

Double-Sided Interchangeable Build Plates

A first for Tiertime, the Glass surface provides a consistent, flat base, ensuring a smooth model underside, desirable for printing without a raft. This new print board design allows for easier print job removal due to its rigidity.



Dual Filtration System

Improving upon Tiertime's first-in-class air filtration, the UP300's advanced filtration system has a higher airflow capacity capable of maintaining minimal UFP and VOC density inside the printer's large enclosure.



Specifications

Printing Technology	MEM (Melted Extrusion Modeling)
Extruder	Single
Nozzle Diameter	0.2 mm, 0.4 mm, 0.6 mm
Extruder Maximum Temperature	299°C
Extruder Maximum Travel Speed	200 mm/sec
XYZ Accuracy	2, 2, 0.5 micron
Connectivity	USB cable, Wi-Fi, LAN and USB Stick
Touch Screen	7" Full Colored LCD Screen
Build Volume	205 x 255 x 225 mm (8.7" x 10" x 8.8") (XYZ)
Printed Object Accuracy	±0.1 mm/ 100 mm
Calibration and Leveling	Automatic
Layer Resolution	0.05/0.1/0.15/0.2/0.25 /0.3/0.35/0.4 mm
Print Surface	Perf Glass or Flex Glass, Heated
Dual Filtration System	HEPA and Activated Carbon Filters
Pause to Change Filament Type	Yes
Filament	UP Fila ABS, ABS+, PLA, TPU and more
Filament Diameter	1.75 mm
Tiertime Print Queue	Yes
Filament Spool Compatibility	500 - 1000 g
Extra USB Input for Add-on	5 V, 1 A
Compatible for 3rd Party Materials	Yes

Software

Software	UP Studio
Supported OS	Windows 7 SP1 or later Mac OS X, iOS 8.x/9.x
Importable File Formats	up3, .ups, .stl, .obj, .3mf, .ply, .off, .3ds, .gcode
Preview Support Structures	Yes
Editable Support Structures	Yes
Cloud Based Print Settings	Yes

Dimensions

Machine Dimensions	500 x 523 x 460 mm (19.6" x 20.5" x 18.1")
Net Weight	30 kg

Environment

Operating Ambient Temperatures	15 - 30°C, 20 - 70% RH non
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Requirements

Power Input	110-240 VAC, 50-60 Hz, 220 W
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X5

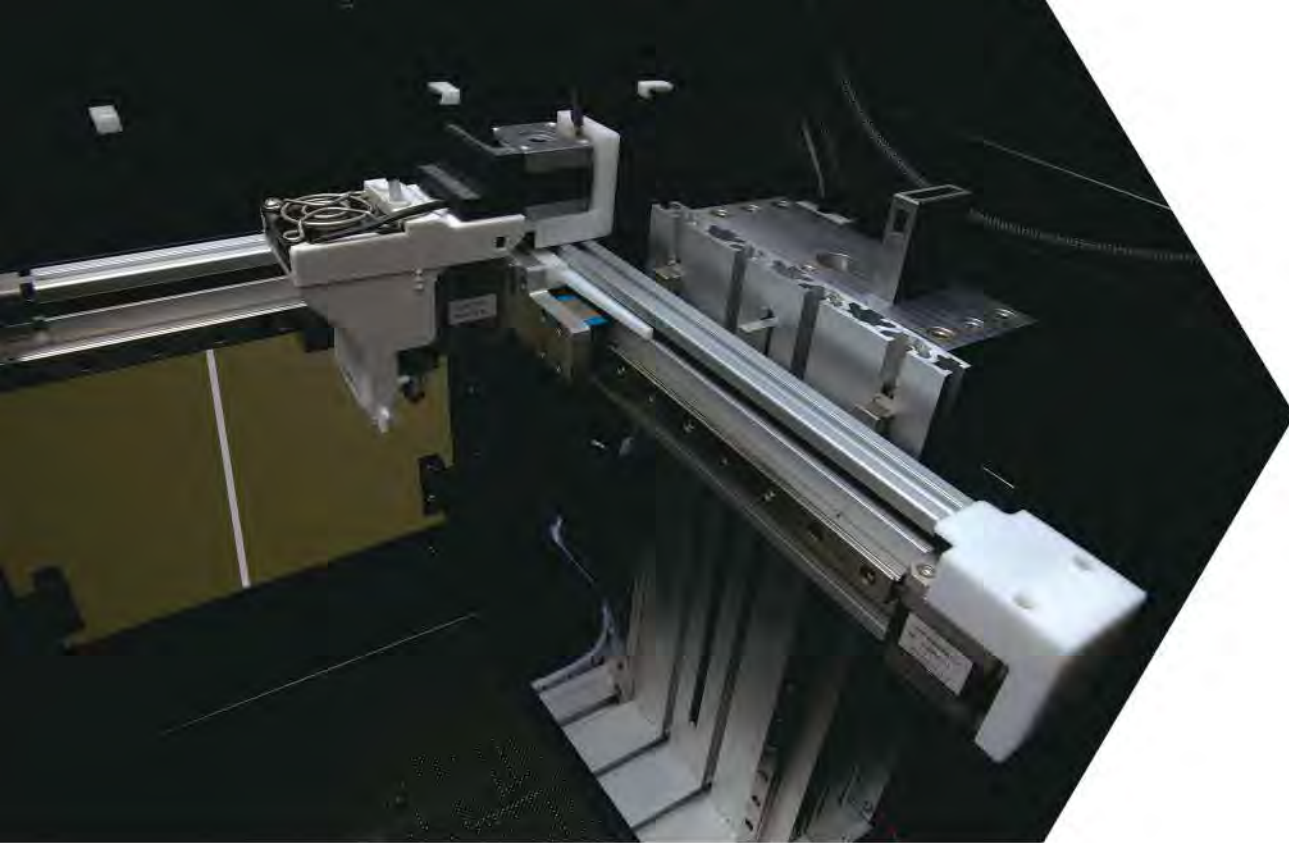
Short-Run Workhorse



- ▶ Auto-Swapping Build Plate + Tiertime Print Queue
- ▶ 7-Inch LCD Touchscreen and Clear Top Cover
- ▶ Dual Filtration System
- ▶ Three USB Ports

Designed and Manufactured by Tiertime Corporation

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The X5 is a breakthrough in 3D printing, designed from the ground up for low-volume manufacturing. Capable of automatically feeding up to 12 print beds onto its build plate and reloading during printing, it provides a continuous 3D printing experience.

Auto-Swapping Build Plate + Tiertime Print Queue

Featured with an auto-swapping print bed system, automatically loading fresh print plates onto the build bed after the previous print job is complete. Thanks to the new Tiertime Print Queue, the result is a software-controlled, multi-part production solution.

Touchscreen and Clear Top Cover

7" LCD screen reports print queue progress and the printer's transparent top makes visual build confirmation effortless.

Extra USB Port

For optional add-ons, such as a USB camera for remote print monitoring.



Dual Filtration System

The X5 includes Tiertime's 2018 air filtration system, specifically designed for large build chambers. Air is recirculated through separate HEPA and activated carbon filters, radically reducing toxic UFP and VOC emissions.



Specifications

Printing Technology	MEM (Melted Extrusion Modeling)
Extruder	Single
Nozzle Diameter	0.4 mm
Extruder Maximum Temperature	299°C
Extruder Maximum Travel Speed	200 mm/sec
XYZ Accuracy	2, 2, 0.5 micron
Connectivity	USB cable, Wi-Fi, LAN and USB Stick
Touch Screen	7" Full Colored LCD Screen
Build Volume	180 x 230 x 200 mm (7.1" x 9.1" x 7.9") (XYZ)
Printed Object Accuracy	±0.1 mm/ 100 mm
Calibration and Leveling	Manual Calibration and leveling
Layer Resolution	0.05/0.1/0.15/0.2/0.25 /0.3/0.35/0.4 mm
Print Surface	UP Perf, Heated
Dual Filtration System	HEPA and Activated Carbon Filters
Pause to Change Filament Type	Yes
Filament	UP Fila ABS, ABS+, PLA, TPU and more
Filament Diameter	1.75 mm
Tiertime Print Queue	Yes
Filament Spool Compatibility	500 - 2000 g
Filament Spool Holder Compatibility	500 - 1000 g
Compatible for 3rd Party Materials	Yes

Software

Software	UP Studio
Supported OS	Windows 7 SP1 or later Mac OS X, iOS 8.x/9.x
Importable File Formats	up3, .ups, .stl, .obj, .3mf, .ply, .off, .3ds, .gcode
Preview Support Structures	Yes
Editable Support Structures	Yes
Cloud Based Print Settings	Yes

Dimensions

Machine Dimensions	850 x 625 x 520 mm (33.5" x 24.6" x 20.5")
Net Weight	50 kg

Environment

Operating Ambient Temperatures	15 - 30°C, 20 - 70% RH non
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Requirements

Power Input	110-240 VAC, 50-60 Hz, 220 W
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FOR
DESIGNERS

UP Plus 2



PROFESSIONAL
QUALITY



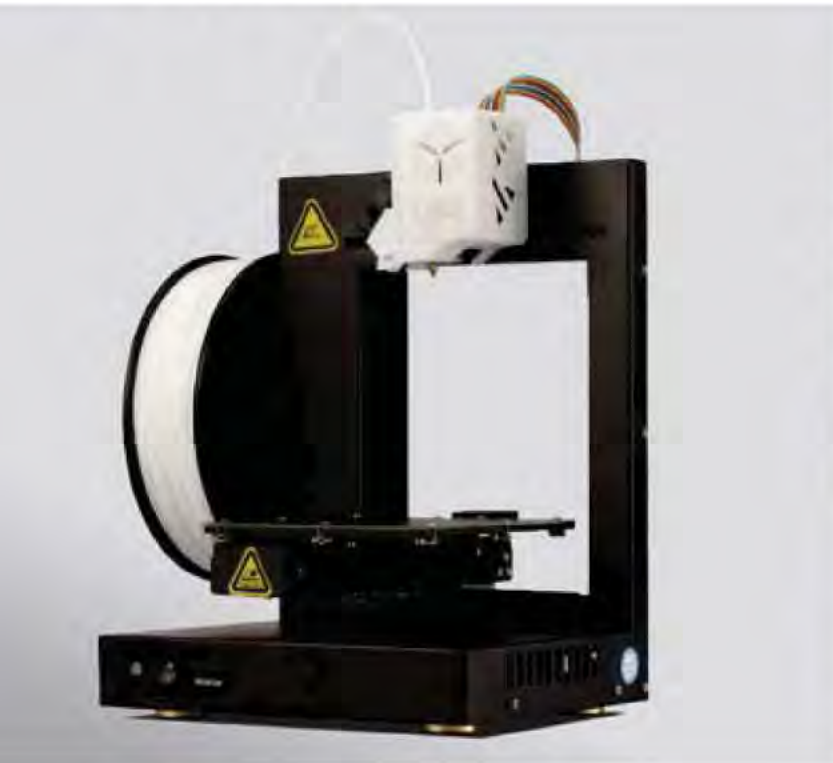
PRICE /
PERFORMANCE



EASY-
TO-USE



UP Plus 2



Price	\$1299	Material Options	ABS ABS+ PLA
Build Volume	138mm (w), 138mm (d), 135mm(h) 5.5"(w), 5.5"(d), 5.3"(h)	Bundled Software	STL 3D layout and printing software included - simple to use, feature rich, fast and free
Layer Resolution	0.15, 0.20, 0.25, 0.30, 0.35, 0.40mm 150, 200, 250, 300, 350, 400 microns	Operating System	Win XP/Vista/7/8, Mac OS
Platform Leveling	Automatic leveling and automatic detection of nozzle height	Warranty	1-Year limited, parts only manufacturer's warranty included. Optional extended warranty available.
Supporting Structure	Smart Support Technology - automatically generated with the same material and at a lower density, easy to remove and fine-tunable.	Service	1-Year online support included. Optional MasterCare Service Plan available.
Print Surface	Heated with Perf Board - resists warping		
Chassis Type	Open-concept, minimal frame structure Full-metal, sturdy.		

UP mini 2 ES

3D Printer Accessibility Redefined



- ▶ Compatible with TierTime Print Queue
- ▶ Enhanced 3D Printing Workflow
- ▶ HEPA and Activated Carbon Filter



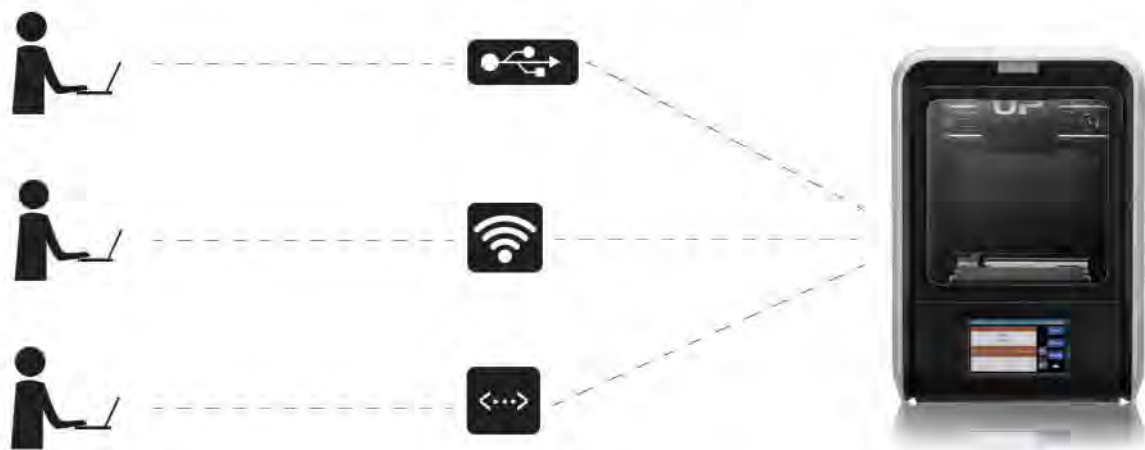
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The UP mini 2 ES is a more advanced mini 2 with updated hardware and software. It retains its predecessor's full enclosure with built-in HEPA filtration, providing a perfect combination of emissions protection and build chamber temperature stability, crucial for ABS printing.

Tiertime Print Queue

Tiertime's new Print Queue allows more than one user to send print jobs to the printer simultaneously. The Admin of Print Queue has permission to start, stop, and pause the printer as well as adjust the queue list's order and remove print jobs.



Input sources for the Print Queue can include USB, Wi-Fi, and LAN. Whether you are a STEM teacher, a designer, an engineer or the proprietor of a miniature factory, the UP mini 2 ES Print Queue offers a robust, easily-accessed, multi-job print experience for extended production cycles.

Enhanced 3D Printing Workflow

An Ethernet socket allows you to connect your printer to a wired Local Area Network for maximum security in a wireless environment. A second USB port allows you to load sliced print tasks from a USB memory stick and launch the print job from the printer's LCD touchscreen.



HEPA and Activated Carbon Filter

Effectively reduce these toxic elements, known to be triggers for those suffering from asthma and other pulmonary disorders.



Specifications

Printing Technology	MEM (Melted Extrusion Modeling)
Extruder	Single
Nozzle Diameter	0.4 mm
Extruder Maximum Temperature	299°C
XYZ Accuracy	2, 2, 2 micron
Connectivity	USB cable, WiFi, LAN and USB Stick
Touch Screen	4.3" Full Colored LCD Screen
Build Volume	120 × 120 × 120 mm (XYZ)
Printed Object Accuracy	±0.15 mm/ 100 mm
Layer Resolution	0.15/0.2/0.25/0.3/0.35 mm
Build Plate Calibration	Automatic Nozzle Height Detection, Software-Assisted Leveling
Build Plate Maximum Temperature	70°C
Print Surface	UP Perf or UP Flex, Heated
Filtration System	HEPA and activated carbon filters
Print Resume On Power Interrupt	Yes
Pause to Change Filament Type	Yes
Filament	UP Fila ABS, ABS+, and PLA
Filament Diameter	1.75 mm
Filament Spool Compatibility	500 g
Compatible with 3rd Party Materials	Yes
Tiertime Print Queue	Yes
Operating Sound	47 db

Software

Software	UP Studio
Supported OS	Windows 7 SP1 or later Mac OS X, iOS 8.x/9.x
Importable File Formats	up3, .ups, .stl, .obj, .3mf, .ply, .off, .3ds, .gcode
Preview Support Structures	Yes
Editable Support Structures	Yes
Cloud Based Print Settings	Yes

Environment

Operating Ambient Temperatures
15 - 30°C , 20 - 70% RH non

Dimensions

Machine Dimensions
255× 365 × 385 mm
(19.1" x 20.5" x 19.5")

Requirements

Power Input
110-240 VAC , 50-60 Hz , 90 W



MANUFACTURING REINVENTED

ABOUT

MARKFORGED

Markforged was founded to change the way products are made. At the intersection of traditional manufacturing and cutting-edge material science, we believe in a future where going from your design to finished parts is easy, simple, safe and affordable. That's why we've created the world's only ecosystem of plastic, metal and composite 3D printers— so you can focus on building products that change the world.

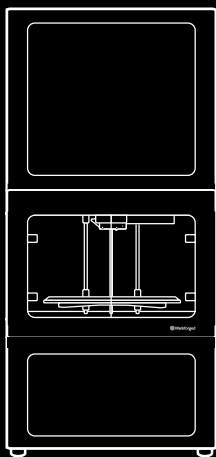


COMPLETE METAL SOLUTION

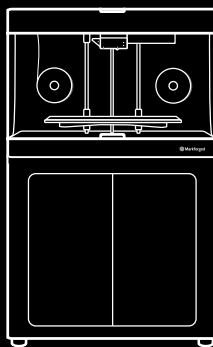
SINTER-1, METAL X, WASH-1

MARKFORGED

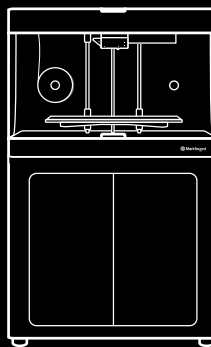
PRODUCTS



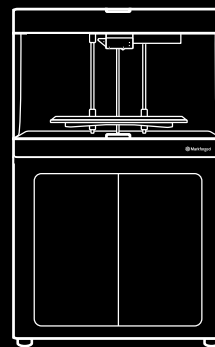
METAL X
Metal Printer



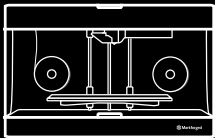
X7
Industrial Precision



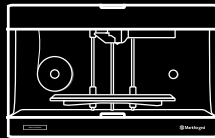
X5
Industrial Composite



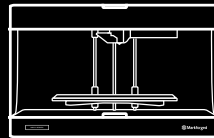
X3
Industrial Onyx



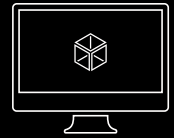
MARK TWO
Professional Composite



ONYX PRO
Onyx Composite



ONYX ONE
Onyx Desktop



EIGER
Markforged Software

HARDWARE

BUILD QUALITY

Featuring an all-aluminum unibody and kinematic bed coupling,

Markforged sets the standard in build quality and industrial design. With a fully enclosed build chamber, ultra-quiet motion system and humidity controlled material storage, our printers are equally at home whether in the office or on the factory floor.

INDUSTRIAL SERIES

Industrial Precision



HARDWARE

USABILITY

Cloud-connected software and a 4.3" touchscreen comes standard with every printer, washer and furnace. Regular over-the-air updates mean that your Markforged products keep getting better. Material usage tracking and out-of-material detection help monitor your printers and reduce waste. Just a few of the ways we're working to reduce the distance from design to part.



SOFTWARE

EIGER

With automatic version control, real-time fleet management and cloud-based collaboration, Eiger is the world's most advanced 3D printing software. Designed from the ground up to make manufacturing simpler, Eiger enables you to print plastic, metal and composite parts straight from your browser. Our internet-connected architecture ensures the latest features and performance enhancements are always available.



SOFTWARE

OPTIMIZATION

Our cloud software platform gives you an incredibly high degree of control over the final properties of your finished part. By automatically analyzing your parts we enable you to optimize for strength, weight and print time without changing your design.

Jaw - Large Coupling

Abraham Parsagi



Get Support

Visibility

2D

3D

Part Stats (up to layer 232)

	Est. part time	56 Days / 8y 10mo
	Dryer	84.86 / 37.48 cm ²
	Kevlar	2.51 / 5.67 cm ²
	Material Cost	10.61 / 16.13 USD
	Weight	91.29 / 46.82 g

Warning

Some layers have thin features that will not be preserved unless the "Expand Thin Features" setting is turned on in this Part page.

Editing Layer: 232 / 350

Use Fiber



Fiber Fill Type

Isotropic Fiber

Concentric Fiber Rings

2

Start Rotation Percent

42

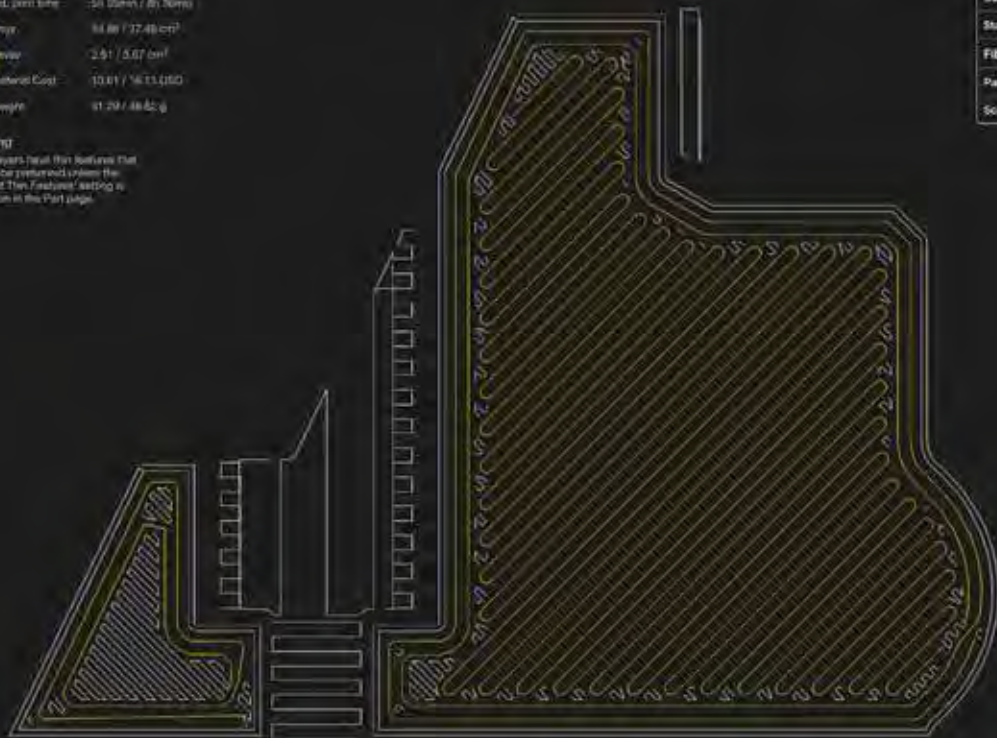
Fiber Angle

135

Pause After Layer



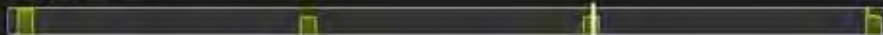
Scan After Layer



Editing Layer: 232 / 350

23.2mm

Materials



Part View

Print

TECHNOLOGY

CFF

Continuous Filament Fabrication



DESIGN

Shape your part in your favorite CAD package, upload the STL file and select from composite materials such as Carbon Fiber, Fiberglass or Kevlar.



REINFORCE

Our cloud-based printing software automatically paths the composite fibers throughout the plastic matrix for optimum strength. Customize reinforcement to meet your design requirements.

Formed from the combination of two materials, composite parts are incredibly strong and versatile. Our unique fabrication process enables you to print parts that are an order of magnitude stiffer and stronger than typical 3D printed objects.



PRINT

The dual material system crafts the composite part one layer at a time. The first nozzle builds the plastic matrix and the second winds the fiber throughout.



FINAL PART

As strong as aircraft grade aluminum and over 40% lighter, Markforged CFF parts are more than capable of replacing machined metal tools, fixtures and prototypes.

TECHNOLOGY

ADAM

Atomic Diffusion Additive Manufacturing



DESIGN

The ADAM process gives you unparalleled design flexibility. Shape your part in your favorite CAD package, upload the STL file, and select from a wide range of metal materials.



PRINT

Metal powder bound in plastic is printed layer at a time into the shape of your part. Parts are scaled up to compensate for shrinkage during the sintering process.

Atomic Diffusion Additive Manufacturing lives at the intersection of 3D printing and metal injection molding. Building on years of experience printing plastic loaded with carbon fiber, ADAM is an all new way to create metal parts.



SINTER

After washing to remove binding material, parts are then sintered in a furnace at around 85% of their melting temperature, and the metal powder fuses into solid metal.



PART

Complex geometries and captive infills make for isotropically strong lightweight parts. Pure metal and over 99% dense, the final part is now ready for use.

METAL

17-4 STAINLESS STEEL

Combining high strength, corrosion resistance and exceptional hardness, 17-4 stainless steel is widely used in the aerospace, medical and petroleum industries.

LAYER HEIGHT

50 μm

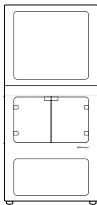
TOLERANCE

$\pm 50 \mu\text{m}$
(geometry dependent)

SINTERED DENSITY

99%

Compatible with



Metal X



X7



X5



X3



Mark Two



Onyx Pro



Onyx One

CAMSHAFT SPROCKET

MATERIAL 17-4 STAINLESS STEEL

PART COST \$12.56



PLASTIC

ONYX

Designed to combine the toughness and durability of Nylon with the dimensional stability and strength of composites, Onyx is the world's most capable 3D printing plastic.

FLEXURAL STRENGTH

TENSILE STRENGTH

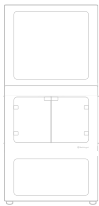
FLEXURAL MODULUS

81 MPa

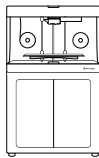
36 MPa

2.9 GPa

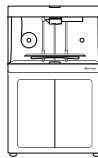
Compatible with



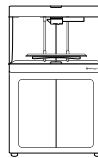
Metal X



X7



X5



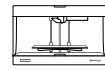
X3



Mark Two



Onyx Pro



Onyx One



TURBINE HOUSING

MATERIAL	ONYX
PART COST	\$26.51

COMPOSITE

FIBERGLASS

Using our unique composite reinforcement process, Fiberglass parts are an order of magnitude stiffer and stronger than typical 3D printed parts.

FLEXURAL STRENGTH

210 MPa

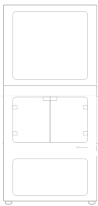
TENSILE STRENGTH

590 MPa

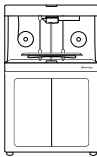
FLEXURAL MODULUS

22 GPa

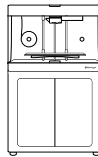
Compatible with



Metal X



X7



X5



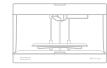
X3



Mark Two



Onyx Pro



Onyx One



AIRCRAFT BRACKET

MATERIAL ONYX & FIBERGLASS

PART COST \$112.49

EXTERIOR SHELL

ONYX

INTERIOR REINFORCEMENT

FIBERGLASS

COMPOSITE

CARBON FIBER

With excellent strength-to-weight and stiffness, Carbon Fiber is our highest performing composite material. Ideal for applications requiring high strength and low weight.

FLEXURAL STRENGTH

470 MPa

TENSILE STRENGTH

700 MPa

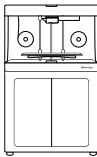
FLEXURAL MODULUS

51 GPa

Compatible with



Metal X



X7



X5



X3



Mark Two



Onyx Pro



Onyx One



INTERIOR REINFORCEMENT
CARBON FIBER

EXTERIOR SHELL
ONYX

BRAKE LEVER

MATERIAL	ONYX & CARBON FIBER
PART COST	\$16.99

MARKFORGED

ALL MATERIALS

With excellent strength-to-weight and stiffness, Carbon Fiber is our highest performing composite material.

PLASTIC	COMPOSITE	STAINLESS STEEL	ALUMINUM
Onyx	Fiberglass	17-4 Stainless Steel	6061 Aluminum
Nylon	Carbon Fiber	316L Stainless Steel	7075 Aluminum
	Kevlar		
	HSHT Fiberglass		
TITANIUM	INCONEL	TOOL STEEL	
Ti-6Al-4V	IN Alloy 625	A-2 Tool Steel	
		D-2 Tool Steel	

METAL X
Metal Printer



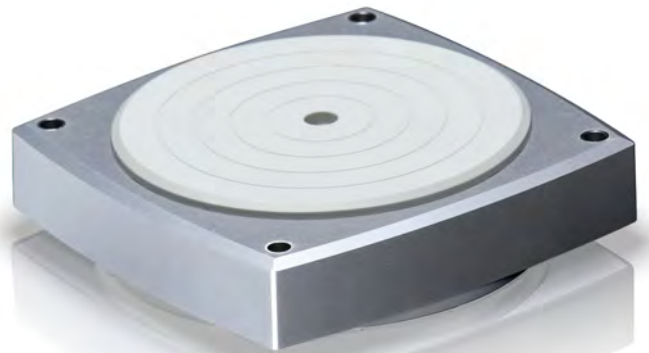


Markforged 3D Printers		Onyx One	Onyx Pro	Mark Two	Mark X
Build Size					
	mm	320 x 132 x 154	320 x 132 x 154	320 x 132 x 154	330 X 250 X 200
	in.	12.6 x 5.2 x 6.1	12.6 x 5.2 x 6.1	12.6 x 5.2 x 6.1	13.0 x 9.8 x 7.9
Layer Thickness					
	microns	100 to 200	100 to 200	100 to 200	50 to 200
Materials Available					
Onyx		Yes	Yes	Yes	Yes
Nylon				Yes	Yes
Fiber Capabilities					
Fiberglass			Yes	Yes	Yes
Carbon Fiber				Yes	Yes
Kevlar				Yes	Yes
HSHT Fiberglass				Yes	Yes
Items Included					
Onyx (cubic cm)		800	800	800	800
Nylon (cubic cm)				800	800
Fiberglass (cubic cm)			50	100	150
Carbon Fiber (cubic cm)				100	150
Kevlar (cubic cm)				100	150
HSHT Fiberglass (cubic cm)				100	150
Extra Print Bed			Yes	Yes	Yes
Extra Nozzles		3	3 sets	3 sets	3 sets
Software Storage					
Cloud		Yes	Yes	Yes	Yes
Local				Yes	Yes
Software Features					
Organization Admin Portal		Yes	Yes	Yes	Yes
Single Sign-On		Yes	Yes	Yes	Yes
Two-Factor Authentication		Yes	Yes	Yes	Yes
Early Access to New Features				Yes	Yes

Distributed by
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 1-800-334-4943
www.lli.com



NEXTEngine 3D Scanner



Learning Labs, Inc.

PO Box 1419
Calhoun, GA 30703
1-800-334-4943

WWW.NEXTENGINE.COM



NEXTENGINE 3D SCANNER **ULTRA HD**

TECHSPECS

ARCHITECTURE

Measurement System	NextEngine Patented MultiStripe Laser Triangulation (MLT) technology.
Source	Twin arrays of four, Class 1M, 10 mW solid-state lasers with custom optics. 650 nm wavelength.
Sensor	Twin 5.0 Megapixel CMOS image sensors.
Photo Surface	Optically synchronous 7-color surface capture for precision-locked geometry correlation.
Photo Lighting	Built-in spatially diverse LED whitelight texture illuminators with wide color gamut.
AutoDrive™	High-precision rotary servo positioner, auto-incremented under scanner control. 20 lb capacity.
PartGripper™	Universal part holder to adjust height, angle, and orientation of capture. 10 lb capacity.

SOFTWARE

ScanStudio™	Software to Scan, Align, Polish, and Fuse 3D Models. High-performance OpenGL 3D viewer.	
Format Options	Scan data can be output as mesh file formats: STL, OBJ, VRML, XYZ, and PLY files.	
File Size	200MB for typical model, based on 10 facet scans.	
Modeling Tools	Assemble views into a model conveniently with built-in Smart Alignment and trim tools.	
ScanStudio™	Points-to-Mesh solution. Drives scanner and builds 3D mesh models.	Standard
ProScan™	Delivers 2X scan speed and Large Object (23" x 17") mode.	\$995
UltraRes™	Ultra high resolution imaging modes.	\$995
CAD TOOLS™	Points-to-NURBS. Adds surfacing and spline output to speed CAD modeling.	\$995
RapidWorks™	State-of-the-art Points-to-CAD engineering tool. Build solid models with feature trees.	\$2,995

PERFORMANCE

Object Size	No preset limit. Objects larger than field can be composite-captured with supplied software.
Field Size	5.1" x 3.8" (Macro) and 13.5" x 10.1" (Wide). ("Soda can" and "shoebox" sizes, respectively.)
Capture Density	Capture density on target surface is up to 268K points/in ² (Macro) and 29K points/in ² (Wide).
Texture Density	500 DPI on target surface in Macro Mode and 200 DPI in Wide Mode.
Dimensional Accuracy	±100 micron in Macro Mode and ±300 micron in Wide Mode.
Acquisition Speed	50,000 processed points/sec throughput. Typically 2 minutes per scan of each facet.
Typical Datasets	Typical small models are a quarter-million points, after oversampling and optimization.
Environmental	Desktop use under ordinary office lighting. No darkroom or special backgrounds required.

GENERAL

Minimum Requirements	2.5GHz Quad Core, 16GB RAM, Fast GPU, Windows 7 & 8 (64-bit).
Interface	USB 2.0 high-speed interface. USB cable included.
Power	100 – 240 VAC built-in worldwide auto-switching power supply. AC cable included.
Eye Safe	Beam is about 1/1000th brightness of a laser pointer (but avoid looking into beam).
Tripod Mount	Stainless steel 1/4" 20-thread standard screw mount for tripod setups.
Size	Compact 8.8" x 3.6" (letter size) desktop footprint. 10.9" high. Approximately 7 lbs.



NEXTENGINE DESKTOP 3D SCANNER



MODEL 2020i



1.0A
50/60HZ



100 – 240VAC



USB 2.0

MANUFACTURED BY NECTENGINE INC. SANTA MONICA, CA
WORLDWIDE PATENTS PENDING ASSEMBLED IN MALAYSIA



Model 2020i
with FCC-1000000
FOR HOME OR OFFICE USE



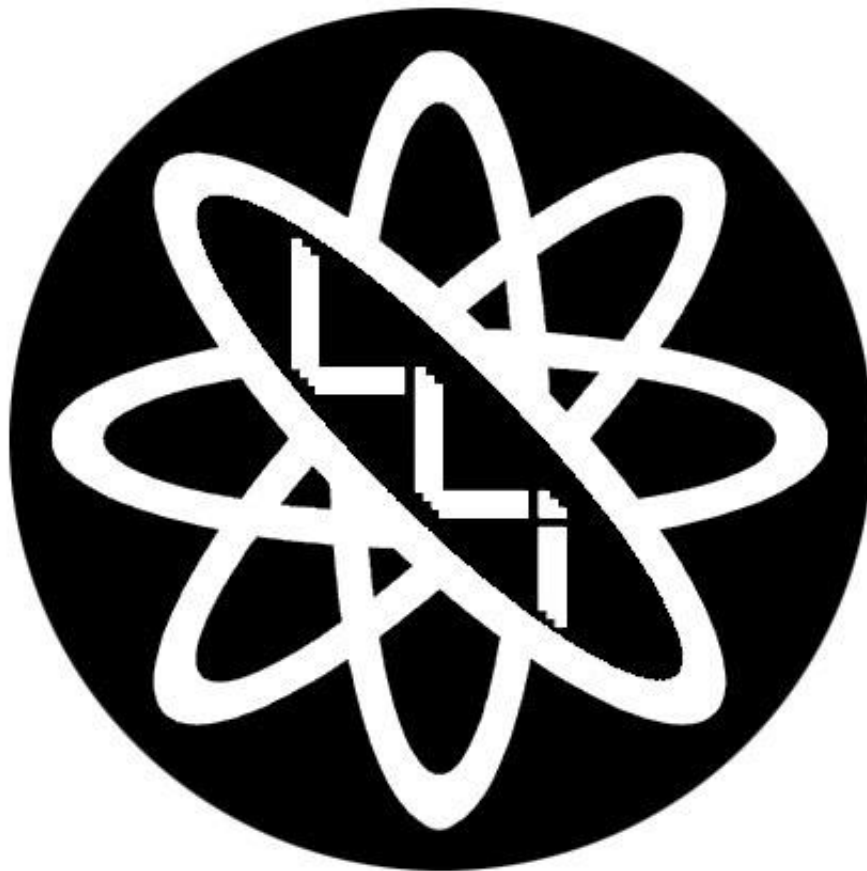
LISTED
E.T.E.
E305225
HWQ



TAMPER-EVIDENT SEAL. WARRANTY VOID IF OPENED



LASER LIGHT — DO NOT VIEW DIRECTLY WITH
OPTICAL INSTRUMENTS (MAGNIFIERS)
CLASS 1M LASER PRODUCT E30-070mm <2.28mW CW
CLASSIFIED PER IEC 60825-1:Ed. 2.2 (2001)
COMPLIES WITH FDA PERFORMANCE STANDARDS FOR
LASER PRODUCTS EXCEPT FOR DEVIATIONS PURSUANT
TO LASER NOTICE NO. 98, DATED JULY 26, 2001



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