

Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

Subject to its express reservation of rights to supplement or amend its contentions as may be appropriate in view of discovery, further investigation, and/or the claim construction process, Plaintiff Stratasy, Inc. (“Plaintiff” or “Stratasy”) provides its preliminary disclosure of asserted claims and infringement contentions to Shenzhen Tuozhu Technology Co., Ltd., Shanghai Lunkuo Technology Co., Ltd., Bambulab Limited and Tuozhu Technology Limited (collectively, “Defendants” or “Bambu Lab”), pursuant to the Court’s Scheduling Order, D.I. 20; the Court’s October 30, 2024 Order extending the time to comply with P.R. 3-1, 3-2, 3-3, and 3-4, D.I. 22; and P.R. 3-1. Nothing in these contentions should be interpreted as an admission or concession regarding the scope of the asserted claims.

Disclosure of Asserted Claims for U.S. Patent No. 8,562,324 (“the ’324 Patent”) under P.R. 3-1(a): Claims 1, 3, 5, 6, 7, 8, 9, 10, 11, 17, 18, 19, 20, 21, and 22.

Disclosure of Accused Instrumentalities for the ’324 Patent under P.R. 3-1(b): For each of the Asserted Claims, all Bambu Lab devices that include branded or manufactured three-dimensional (3-D) printers with a camera, including but not limited to the Bambu Lab A1, A1 mini, P1S, P1P, X1C, and X1E printers, alone or in combination with Bambu Lab software, such as Bambu Studio and Bambu Handy, and all Bambu Lab Parts.

Bambu Lab has not yet produced any discovery. Based on information available to-date, the Bambu Lab X1C and X1E have no material differences relevant to these infringement contentions. The X1E includes several upgrades over the X1C, including an active heating chamber, an Ethernet socket, and certain air purification filters. <https://bambulab.com/en/x1e>. The X1E is also better for certain filament types and has a higher max temperature for the toolhead. *Id.* Accordingly, references to components or functionality of either the X1C or X1E in this chart—other than the heating chamber, ethernet socket, and certain air purification filters that are only in the X1E—apply to both printers.

Based on information available to-date, the Bambu Lab P1S and P1P have no material differences relevant to these infringement contentions. The P1S includes several upgrades over the P1P, including an enclosure, air filter, and cooling fans. See <https://us.store.bambulab.com/collections/3d-printer/products/p1s> (comparing P1P to P1S). The P1P is also ideal for certain filament types. *Id.* Accordingly, references to components or functionality of either the P1S or P1P in this chart—other than the enclosure, air filter, and cooling fans that are only in the P1S—apply to both printers.

Based on information available to-date, the Bambu Lab A1 and A1 mini have no material differences relevant to these infringement contentions. See <https://bambulab.com/en-us/compare> (comparing A1 and A1 mini upon selection). The A1 includes several upgrades over the A1 mini, including a larger build volume, higher max build plate temperature, and larger display. *Id.* Accordingly, references

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to components or functionality of either the A1 or A1 mini in this chart—other than the larger build volume, higher max build plate temperature, and larger display—apply to both printers.

Disclosures under P.R. 3-1(c)-(d): Stratasys identifies in the chart below specifically where each element of each Asserted Claim is found within each Accused Instrumentality.

Disclosure of Priority Date under P.R. 3-1(e): The asserted claims of the '324 Patent are each entitled to a priority date of at least as early as December 8, 2011.

Disclosure under P.R. 3-1(f): At this time, Stratasys does not intend to rely on the assertion that its own products or other instrumentalities practice the claimed invention. Stratasys reserves the right to amend and/or supplement this disclosure as discovery progresses.

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Claim	Contention
1. A device comprising: a three-dimensional printer including a build volume;	To the extent the preamble of the claim is limiting, the Accused Instrumentalities each include a three-dimensional printer that includes a build volume. For example, Bambu Lab's X1C, X1E, P1S, P1P, A1 and A1 mini printers are 3D printers that include a build volume. See e.g., https://bambulab.com/en/x1:  Bambu Lab X1 Series • 16 Multi Color • 7 μm Lidar Resolution • CoreXY 20 m/s^2 Acceleration • Dual Auto Bed Leveling Shop Now > build volume

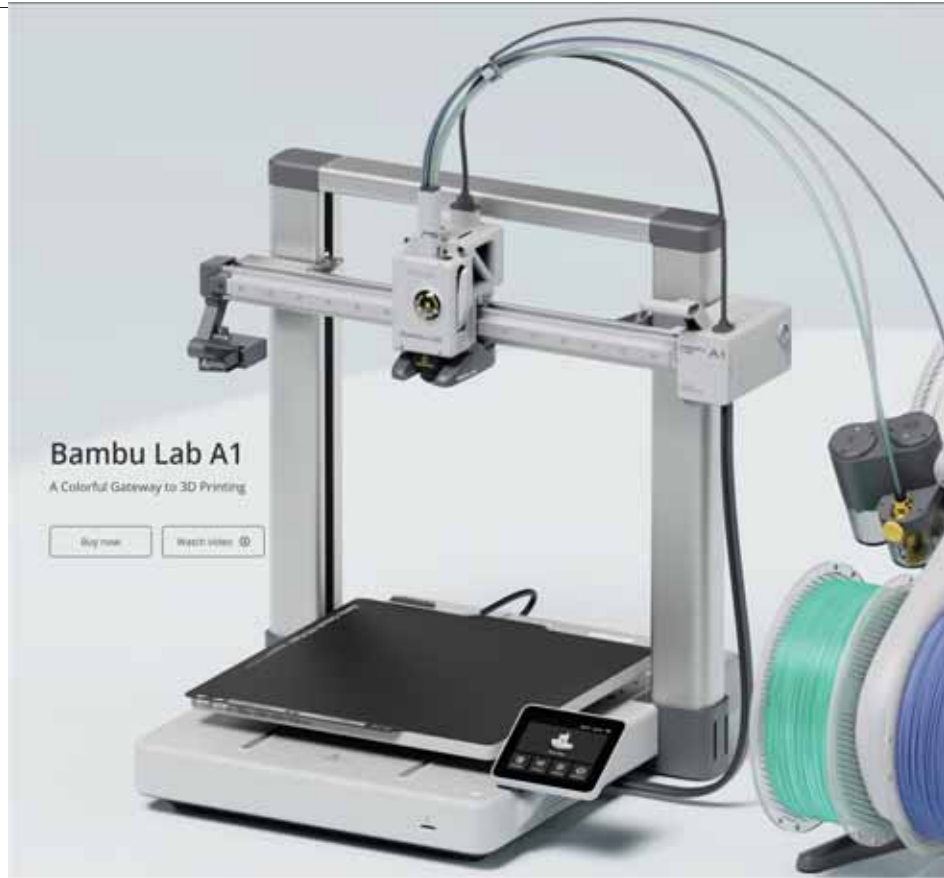
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See also, <https://bambulab.com/en/p1>:



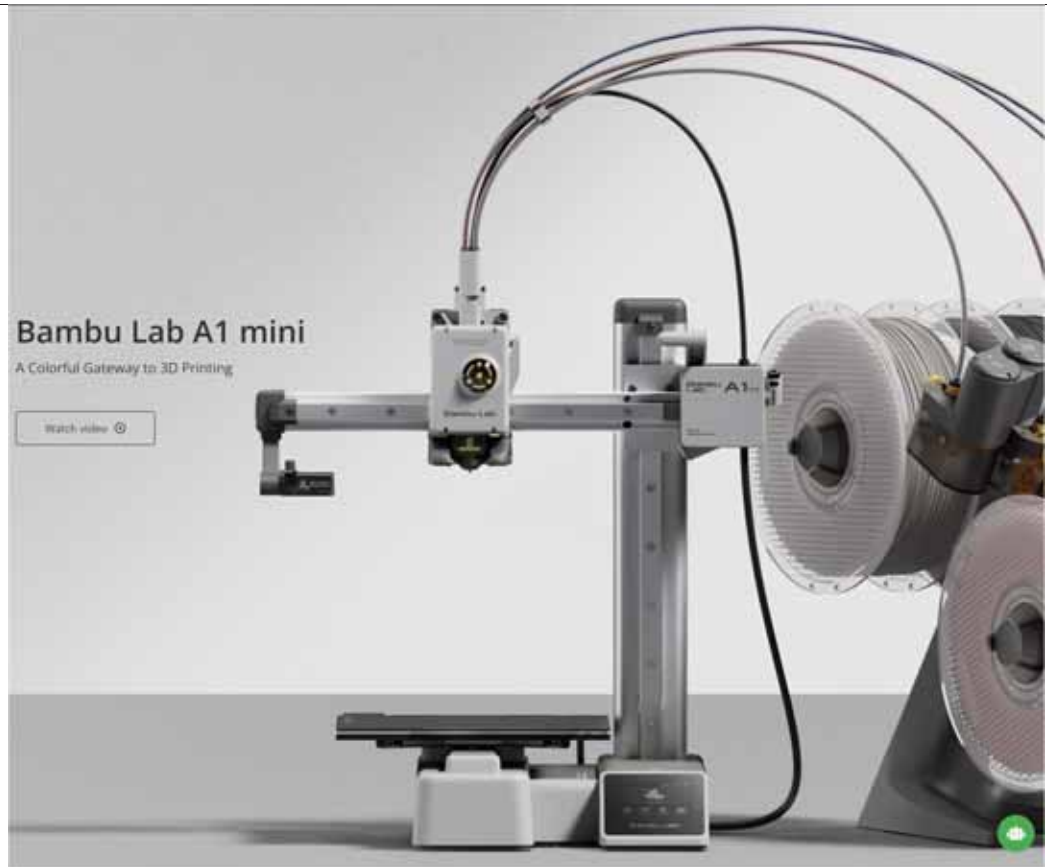
See also, <https://bambulab.com/en/a1>:

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See also, <https://bambulab.com/en/a1-mini>:

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See also, <https://bambulab.com/en/x1e>:

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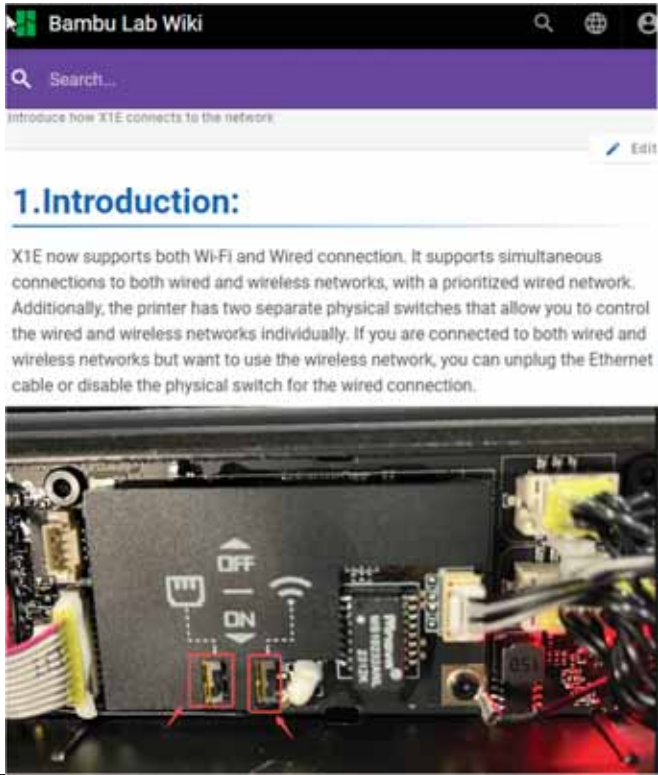
a network interface coupled to a data network;	The Accused Instrumentalities each include a network interface coupled to a data network. For example, Bambu Lab's X1C, X1E, P1S, P1P, A1 and A1 Mini printers include a network interface (e.g., Ethernet, Wi-Fi, LAN, etc.). As an example, the X1E has both Wi-Fi and wired connections. See https://wiki.bambulab.com/en/x1/manual/x1e-network-connection-guide:  The image is a screenshot of the Bambu Lab Wiki page titled "1. Introduction:". The page header includes the "Bambu Lab Wiki" logo, a search bar, and a globe icon. Below the header, there is a sub-header "Introduce how X1E connects to the network" and an "Edit" button. The main text states: "X1E now supports both Wi-Fi and Wired connection. It supports simultaneous connections to both wired and wireless networks, with a prioritized wired network. Additionally, the printer has two separate physical switches that allow you to control the wired and wireless networks individually. If you are connected to both wired and wireless networks but want to use the wireless network, you can unplug the Ethernet cable or disable the physical switch for the wired connection." Below the text is a photograph of the printer's internal network interface. The photo shows a black printed circuit board (PCB) with various components. Two red arrows point to specific ports on the PCB: one points to an Ethernet port labeled "Ethernet" and the other points to a Wi-Fi port labeled "Wi-Fi". Above these ports are two physical switches, one labeled "OFF" and "ON" with a Wi-Fi symbol, and the other labeled "OFF" and "ON" with an Ethernet symbol.
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Further, the P1 Series (and X1 and A1 Series) of Bambu printers include a Wi-Fi network connection. See e.g., <https://wiki.bambulab.com/en/p1/maintenance/wifi-antenna>:

WIFI antenna

The WIFI antenna is an electronic accessory used for wireless network connection. The WIFI antenna of the P series printers is installed on the inside of the front cover and is connected to the AP main board.



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Also see, <https://wiki.bambulab.com/en/x1/maintenance/replace-wifi-antenna>:

What it is

The WIFI antenna is an electronic accessory used to enhance wireless network signals. The WIFI antenna of the X1 series printers is installed on the inside of the front cover and is connected to the AP main board.



Also see, <https://wiki.bambulab.com/en/a1/manual/intro-a1>:

Circuit board

The main control board of the A1 printer consists of a low-power SoC (System-on-Chip) with a dual-core processor, Wi-Fi baseband, Bluetooth baseband, RF module, and other peripherals. It also includes a dual-core MCU (Microcontroller Unit) and a single-core MCU. Additionally, it incorporates stepper motor drivers and connectors required for connecting various electronic devices to the printer.

The SoC is primarily responsible for handling the user interface of the A1 printer and managing the connection between the slicing software/mobile application and the printer. On the other hand, the MCU controls the printer's heating and movement after receiving the CPU's G-code stream.

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Also see, <https://wiki.bambulab.com/en/a1/maintenance/wi-fi-antenna-replacement-guide>:

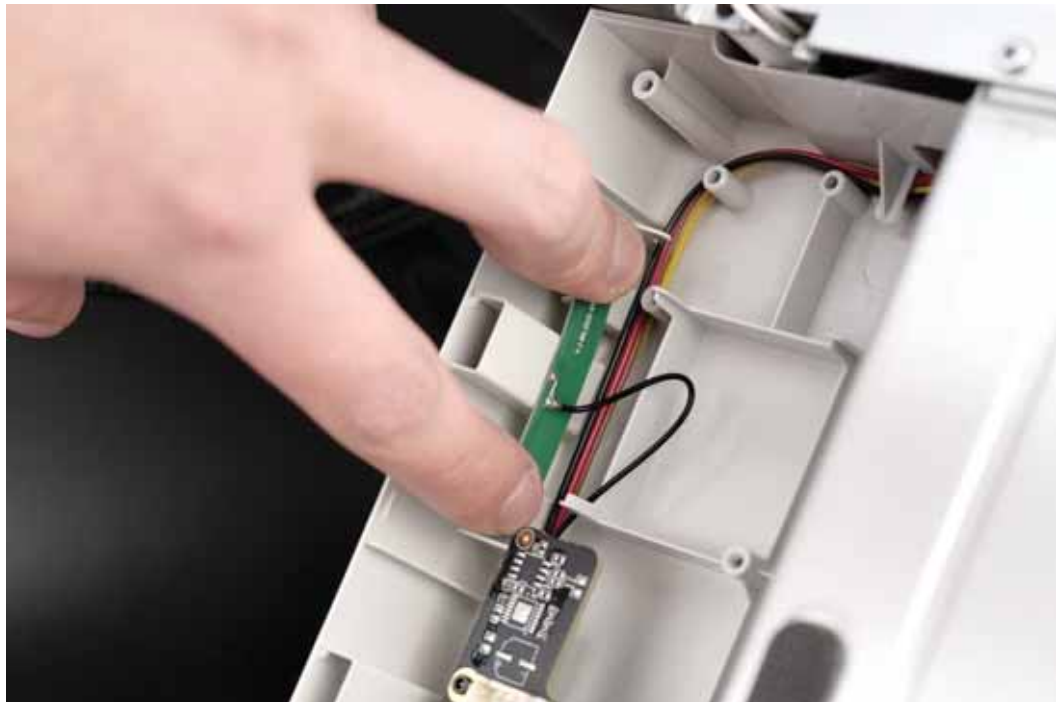


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Also see, <https://wiki.bambulab.com/en/a1-mini/maintenance/wi-fi-antenna-replacement-guide>:

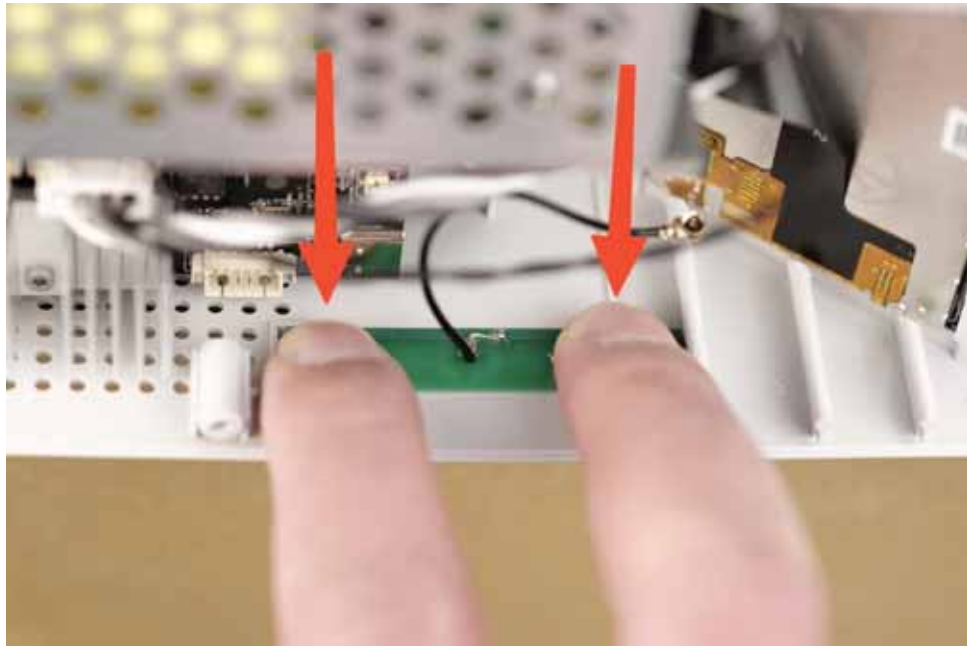


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a video camera positioned to capture video of the build volume from a point of view; and	The Accused Instrumentalities each include a video camera positioned to capture video of the build volume from a point of view. For example, Bambu Lab’s X1C, X1E, P1S, P1P, A1 and A1 Mini printers include a video camera. The following image of a Bambu Labs X1 printer shows where a “chamber camera” is mounted within the build chamber and is positioned to capture video of the build volume. See e.g., https://bambulab.com/en/x1: 
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See also the following image from <https://bambulab.com/en/x1>

Tech specs of the X1 Series

Technology		X1-Carbon	X1
		Fused Deposition Modeling	
Body	Shell	Aluminium & Glass	Plastic & Glass
Tool Head	Extruder Gears	Hardened Steel	Steel
	Nozzle	Hardened Steel	Stainless Steel
Cooling	Auxiliary Part Cooling Fan	Closed Loop Control	Optional
	Air Filter	Activated Carbon Filter	Optional
Supported Filament	PA, PC	Ideal	Capable
	Carbon / Glass Fiber Reinforced Polymer	Ideal	Not Recommended
Sensors	Chamber Monitoring Camera	1920 × 1080 included	Optional
Physical Dimensions	Net Weight	14.11kg	13.18kg

Also see, <https://us.store.bambulab.com/products/chamber-camera>:

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Also see, <https://bambulab.com/en/x1e>:

Sensors	Sensors
Bambu Micro Lidar: Yes	Bambu Micro Lidar: Yes
Chamber Monitoring Camera: 1920*1080 Included	Chamber Monitoring Camera: 1920*1080 Included

See also <https://bambulab.com/en/p1>:

Liveview &Time-lapse	The built-in chamber camera enables easy print monitoring on Bambu Studio and Handy, and timelapse video creation.
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Also see, <https://us.store.bambulab.com/products/p1p-chamber-camera-led>:

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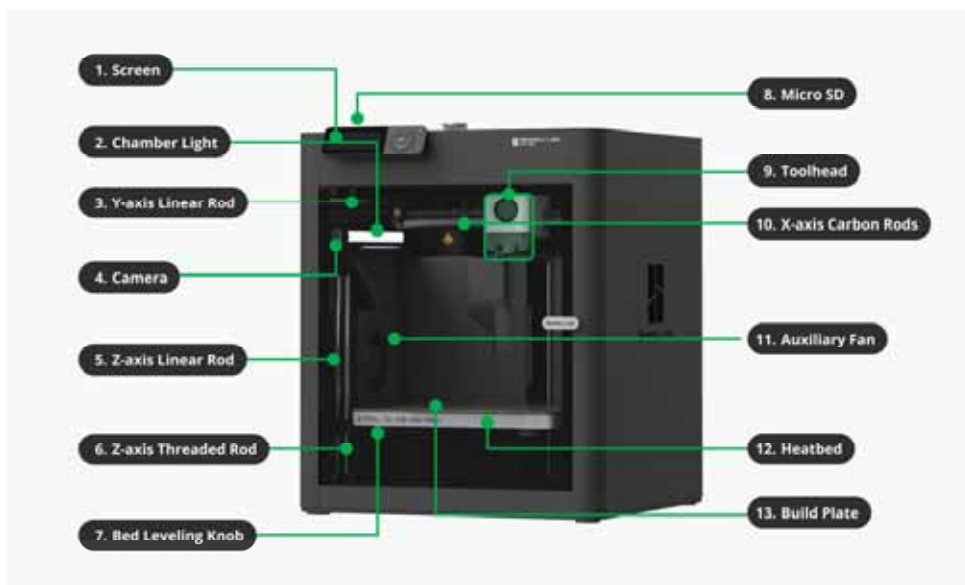


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	https://wiki.bambulab.com/en/p1/manual/unboxing-p1s: <table><tr><td>Chamber Monitoring Camera</td><td>Low Rate Camera 1280 x 720 / 0.5fps Timelapse Supported</td></tr></table>	Chamber Monitoring Camera	Low Rate Camera 1280 x 720 / 0.5fps Timelapse Supported
Chamber Monitoring Camera	Low Rate Camera 1280 x 720 / 0.5fps Timelapse Supported		

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<https://wiki.bambulab.com/en/p1/manual/glossary>:



4. Camera 	This component allows remote 3D printing monitoring and viewing in Bambu Studio and Bambu Handy.
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<https://wiki.bambulab.com/en/p1>:

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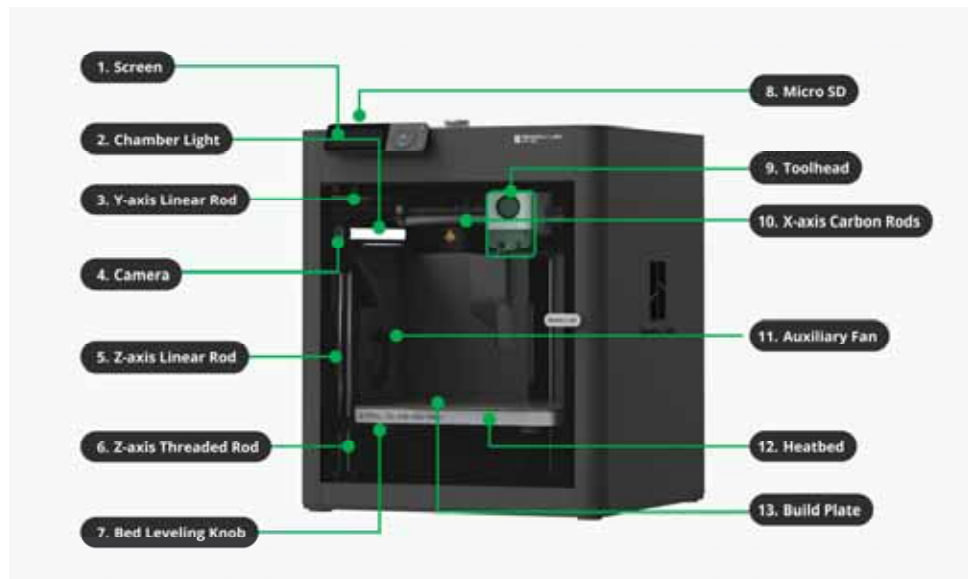
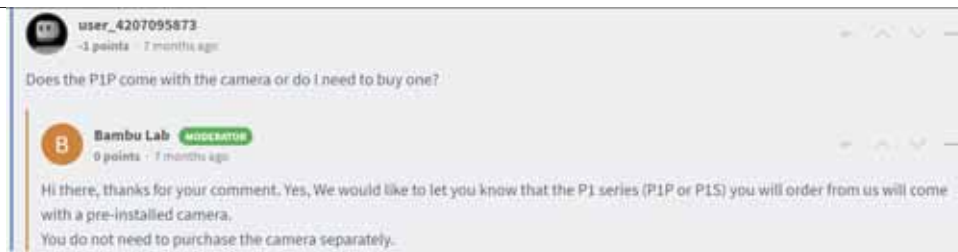
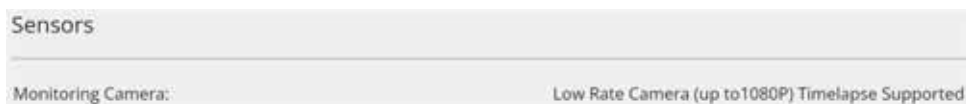


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See also <https://bambulab.com/en/a1/tech-specs>:



See also, <https://wiki.bambulab.com/en/a1/manual/intro-a1>:

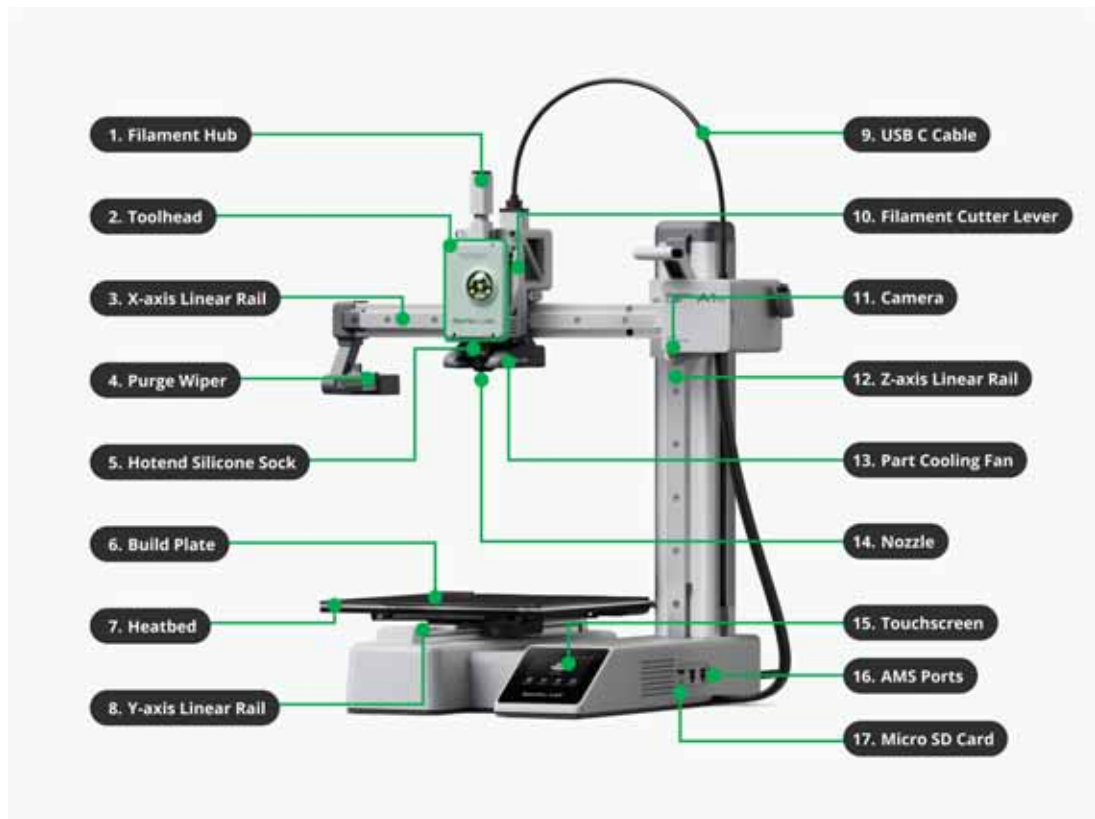
Camera

The printer integrates a camera that can be used for real-time monitoring of prints using the Bambu Slicer or Bambu Handy applications. It can also be utilized for print defect detection (supported after firmware updates).

In addition to its monitoring capabilities, the camera can record printed videos and create time-lapse videos. While the machine does not have night vision, the camera module has an LED that can illuminate the printed object.

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See also, <https://wiki.bambulab.com/en/a1-mini>:



See also, <https://wiki.bambulab.com/en/a1-mini/camera-replacement-guide>:

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a processor configured to receive a three-dimensional model through the network interface, and to control operation of the three-dimensional printer to fabricate the three-dimensional model as an object within the build volume of the three-dimensional printer,	The Accused Instrumentalities each include a processor configured to receive a three-dimensional model through the network interface, and to control operation of the three-dimensional printer to fabricate the three-dimensional model as an object within the build volume of the three-dimensional printer. For example, Bambu Lab printers include a processor configured to receive a three-dimensional model through the network interface, and to control operation of the three-dimensional printer to fabricate the three-dimensional model as an object within the build volume of the three-dimensional printer. For example, the Bambu Lab X1 series printer includes a quad-core CPU that “handles . . . the connection between the Slicer/App and the printer” and provides a “stream of g-code” to the MCU to handle actual movement. See https://wiki.bambulab.com/en/x1/manual/intro-x1: Electronics The X1 has many electronic components inside, but here are the most important: Logic Board Every 3D printer comes with a logic board that has the CPU, stepper drivers, and the required connections for different electronics attached to the printer. In the case of the X1, the board has a quad-core CPU and a dual-core MCU. The CPU handles the smart capabilities of the X1 including the AI spaghetti detection, flow calibration, vibration compensation, and the connection between the Slicer/App and the printer. The MCU handles the actual movement of the printer after getting the stream of g-code from the CPU. See https://wiki.bambulab.com/en/x1/maintenance/replace-ap-board:
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What is the AP board?

AP Board refers to the Application board, it is a circuit board that controls the interaction of information within the unit. It provides a self-contained operating environment that delivers all system capabilities needed to support the printer's applications, including memory management, system firmware, graphics processing and multimedia decoding.

Connectors on the AP board



NO.	Connect object	NO.	Connect object	NO.	Connect object
1	The chamber camera	4	Button PCBA	7	USB-C cable to Toolhead
2	The chamber LED	5	MC board (Power)		
3	WIFI antenna	6	MC board (Communication)		

See <https://wiki.bambulab.com/en/x1/maintenance/replace-mc-board>:

What it is

MC stands for Machine Controller, Which is the unit that controls all the moving parts of the printer.

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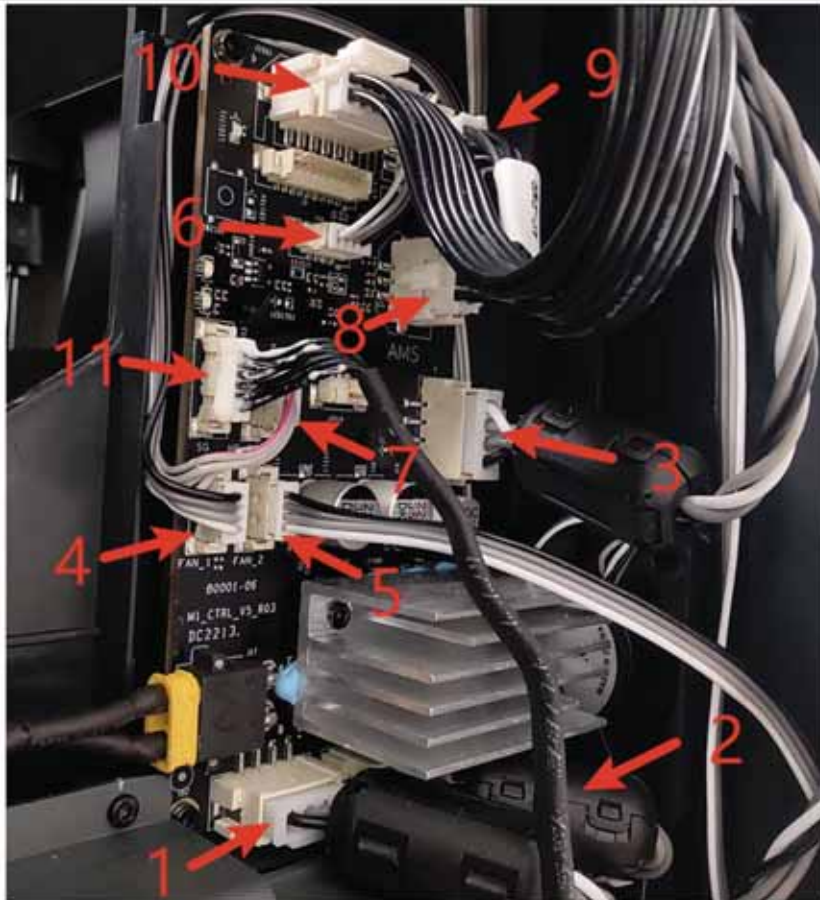


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See <https://wiki.bambulab.com/en/x1/maintenance/x1e-ap-board>:

X1E AP Board

The disassembly and assembly process of the X1E AP board is similar to that of the X1C, but a network card is added.

Please refer to the picture and sheet below to check the connectors on the X1E AP board.



X1E AP board connectors

NO.	Connect object	NO.	Connect object	NO.	Connect object
1	The chamber camera	4	Network Interface Board	7	USB-C cable to Toolhead
2	The chamber LED	5	MC board (Power)		
3	Bottom PCBA	6	MC board(Communication)		

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Similarly, the Bambu Lab A1 series printer includes a dual-core CPU on a system-on-chip that handles “the connection between the slicing software/mobile application and the printer” and that provides its “G-code stream” to the MCU to control the printer’s heating and movement.

See also, <https://wiki.bambulab.com/en/a1/manual/intro-a1>:

Circuit board

The main control board of the A1 printer consists of a low-power SoC (System-on-Chip) with a dual-core processor, Wi-Fi baseband, Bluetooth baseband, RF module, and other peripherals. It also includes a dual-core MCU (Microcontroller Unit) and single-core MCU. Additionally, it incorporates stepper motor drivers and connectors required for connecting various electronic devices to the printer.

The SoC is primarily responsible for handling the user interface of the A1 printer and managing the connection between the slicing software/mobile application and the printer. On the other hand, the MCU controls the printer's heating and movement after receiving the CPU's G-code stream.

<https://wiki.bambulab.com/en/a1/maintenance/mainboard-replacement-guide>

See also, <https://wiki.bambulab.com/en/a1-mini/manual/intro-a1-mini>:

Electrical Components

The A1 mini incorporates various electronic components, and here is a brief overview of some of the most important components and their functions:

Circuit board

The mainboard contains a low-power SoC (System-on-Chip) with a dual-core processor, Wi-Fi baseband, Bluetooth baseband, RF module, and other peripherals. It also includes a dual-core MCU and a single-core MCU. Additionally, it features stepper motor drivers and connectors necessary for connecting different electronic devices to the printer. The SoC handles the user interaction and the communication between the slicing software/mobile application and the printer. The MCU controls the actual heating and movement of the printer after receiving G-code instructions from the CPU.

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See <https://wiki.bambulab.com/en/a1-mini/maintenance/mc-board-replacement-guide>:



Similarly, the Bambu Lab P1 series printer includes an Application Processor (AP) board “that controls the printer and provides the required Wi-Fi connectivity and processing power.”

<https://wiki.bambulab.com/en/p1/manual/intro-p1p>

<https://wiki.bambulab.com/en/p1/maintenance/ap-board>

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AP Board

The AP board is a circuit board that controls the printer and provides the required Wi-Fi connectivity and processing power.

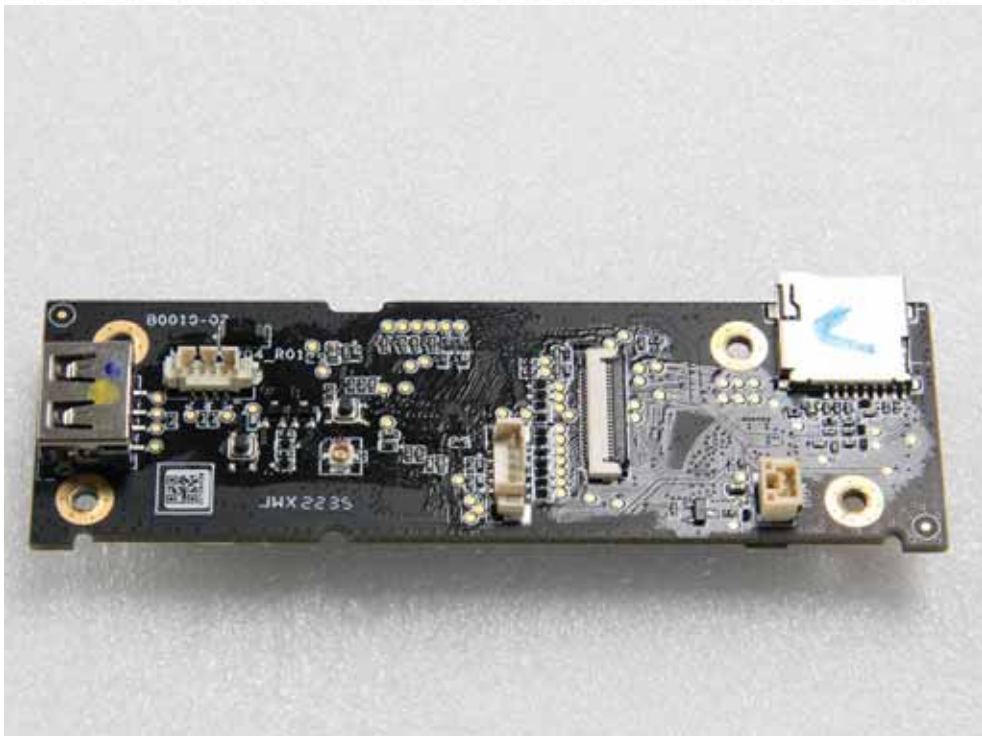
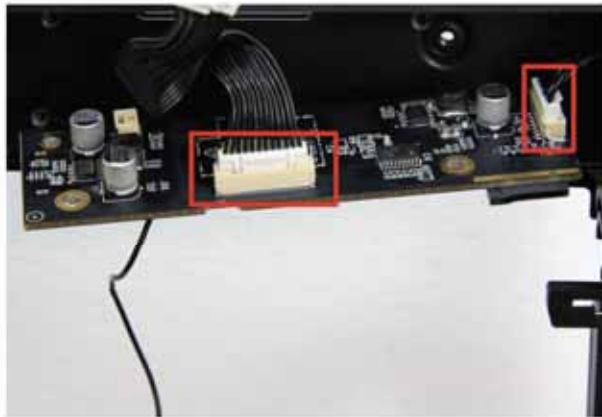


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Step 4 - Remove the AP board

To remove the AP main board from the frame, first, disconnect the screen cable and the MC board cable attached to it. Then carefully lift the AP board off the frame.



<https://wiki.bambulab.com/en/p1/maintenance/mc-board>

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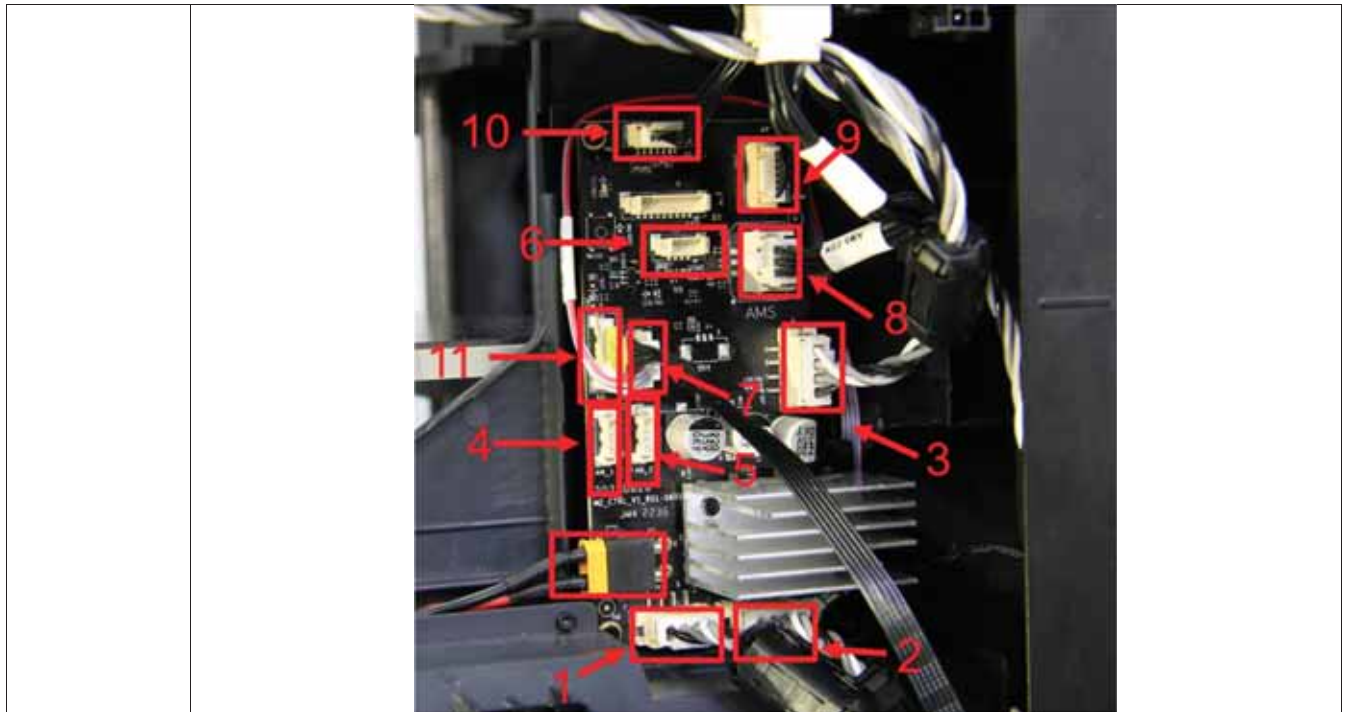


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NO.	Connect object	NO.	Connect object	NO.	Connect object
1	Motor Z	5	Auxiliary part cooling fan	9	AP main board(power and communication cable)
2	The right motor (view from the rear)	6	MC board fan	10	TH board(power and communication cable)
3	The left motor (view from the rear)	7	MC board to AC board connecting cable	11	Heat bed (Communication cable)
4	The chamber temperature regulator fan	8	AMS interface board		

P1P MC Board:



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P1S MC Board:

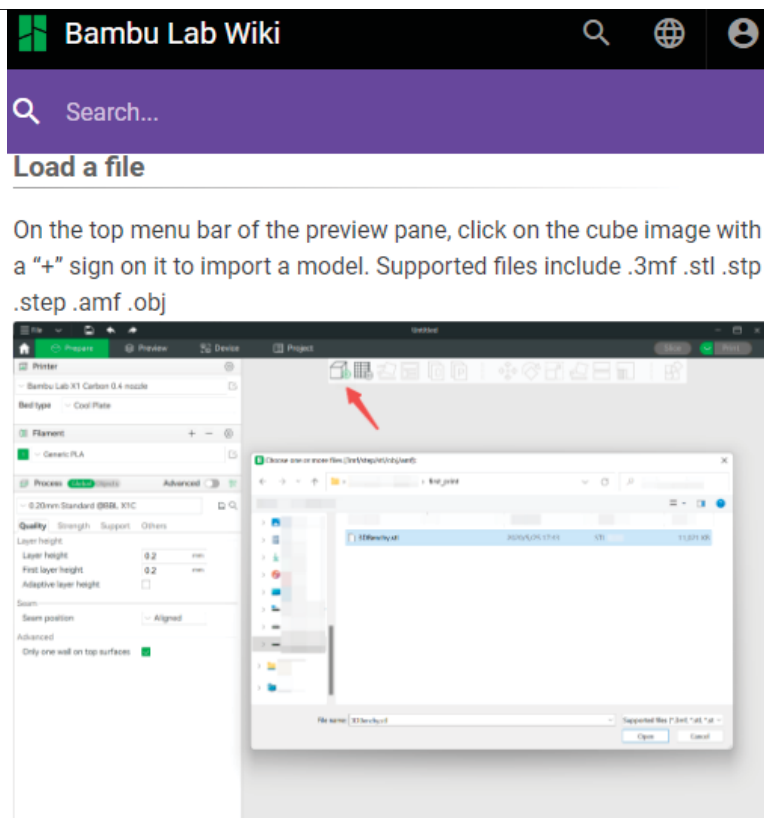


Further, the processor of the printer receives a 3D model and controls operation of the printer to fabricate the 3D model. A request to fabricate an object from a three-dimensional model is received at least via Bambu Studio or Bambu Handy app. See <https://wiki.bambulab.com/en/x1/manual/print-from-bambu-studio>:

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	Printing from Bambu Studio When printing with Bambu Studio, it's possible to send the sliced files directly to the printer via Wi-Fi. Here's how to do it: 1. Import the 3D model you want to slice, and after adjusting the settings, click on the Slice button 2. After the model has been sliced, click on the Print button. A window will show up where the printer can be selected, and the calibration options can be enabled or disabled. 3. When ready to print, simply click the Send button, and the file will be sent to the printer. The printing process will start.  receiving a request Also see https://wiki.bambulab.com/en/software/bambu-studio/studio-quick-start, describing loading a file for a three-dimensional model in Bambu Studio for printing:
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Also see <https://wiki.bambulab.com/en/software/bambu-studio/studio-quick-start>, describing sending a print job to the printer via WLAN:

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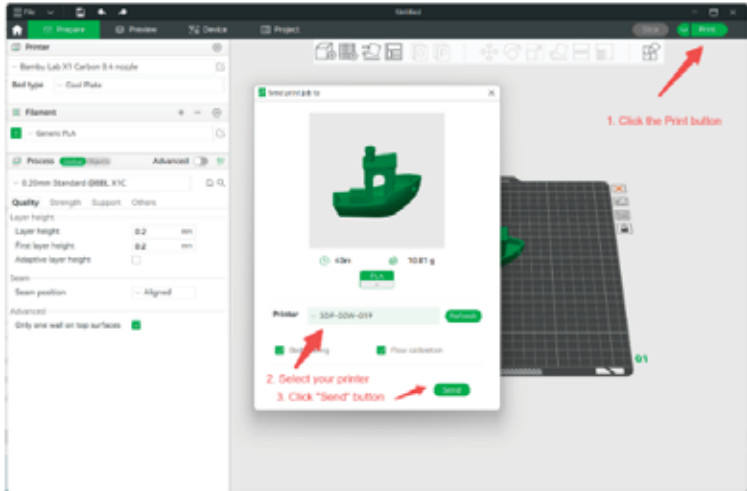
Bambu Lab Wiki

Search...

Send print job via WLAN or SD Card

To send the print job to the printer via WLAN, click "Print" on the top right-hand corner. This will prompt a pop-up window with a quick preview of the model and will also ask you to select the Printer you want to send it to from the drop-down list, and you will also give you the option to choose whether or not you want the printer to perform certain functions like Bed Leveling, flow calibration, etc before the print starts. Once done, click "Send" to send the file to the printer and start printing.

Note: You will need to have Bambu Network plug-in installed to be able to send files via WLAN



The screenshot shows the Bambu Studio software interface. On the left, there's a sidebar with settings for the printer (Bambu Lab X1 Carbon 0.4 nozzle, Cool Plate), filament (Generic PLA), and process (0.20mm Standard @55L 57C). The main area displays a 3D model of a green part on a virtual print bed. A red arrow points to the 'Print' button in the top right corner. A dialog box titled 'Send print job to' is open, showing a preview of the model, its dimensions (43x), and weight (10.81g). Below the preview, there's a dropdown menu for the printer (SD4-004-019) and checkboxes for 'Bed leveling' and 'Flow calibration'. A red arrow points to the 'Send' button at the bottom right of the dialog box. Red text annotations are present: '1. Click the Print button' with an arrow pointing to the 'Print' button, and '2. Select your printer' with an arrow pointing to the printer dropdown menu. Another red arrow points to the 'Send' button with the text '3. Click "Send" button'.

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	Further, Bambu Studio or Bambu Handy run on a processor that interfaces with the 3D printer. https://wiki.bambulab.com/en/software/bambu-studio/remote-control https://wiki.bambulab.com/en/studio-handy/handy/bambu-handy-quick-start
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the processor further configured to provide a user interface to a remote user accessing the device through the network interface, and to present in the user interface an image of the build volume from the video camera and a two-dimensional projection of the three-dimensional model from the point of view of the video camera.	The Accused Instrumentalities each include the processor further configured to provide a user interface to a remote user accessing the device through the network interface, and to present in the user interface an image of the build volume from the video camera and a two-dimensional projection of the three-dimensional model from the point of view of the video camera. For example, the processor of Bambu Lab printers executes software or firmware to collect image content (e.g., from the camera) during execution of the print job and provides for a user interface to a remote user accessing the device through a network interface in which the remote user is shown the status of the print job and to access image content via the Bambu Studio and Bambu Handy apps. See https://wiki.bambulab.com/en/software/bambu-studio/remote-control.
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See also, <https://wiki.bambulab.com/en/a1/manual/intro-a1>:

Circuit board

The main control board of the A1 printer consists of a low-power SoC (System-on-Chip) with a dual-core processor, Wi-Fi baseband, Bluetooth baseband, RF module, and other peripherals. It also includes a dual-core MCU (Microcontroller Unit) and single-core MCU. Additionally, it incorporates stepper motor drivers and connectors required for connecting various electronic devices to the printer.

The SoC is primarily responsible for handling the user interface of the A1 printer and managing the connection between the slicing software/mobile application and the printer. On the other hand, the MCU controls the printer's heating and movement after receiving the CPU's G-code stream.

See also, <https://wiki.bambulab.com/en/a1-mini/manual/intro-a1-mini>:

Electrical Components

The A1 mini incorporates various electronic components, and here is a brief overview of some of the most important components and their functions:

Circuit board

The mainboard contains a low-power SoC (System-on-Chip) with a dual-core processor, Wi-Fi baseband, Bluetooth baseband, RF module, and other peripherals. It also includes a dual-core MCU and a single-core MCU. Additionally, it features stepper motor drivers and connectors necessary for connecting different electronic devices to the printer. The SoC handles the user interaction and the communication between the slicing software/mobile application and the printer. The MCU controls the actual heating and movement of the printer after receiving G-code instructions from the CPU.

See also, <https://wiki.bambulab.com/en/x1/manual/intro-x1>:

Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

Electronics

The X1 has many electronic components inside, but here are the most important:

Logic Board

Every 3D printer comes with a logic board that has the CPU, stepper drivers, and the required connections for different electronics attached to the printer. In the case of the X1, the board has a quad-core CPU and a dual-core MCU.

The CPU handles the smart capabilities of the X1 including the AI spaghetti detection, flow calibration, vibration compensation, and the connection between the Slicer/App and the printer.

The MCU handles the actual movement of the printer after getting the stream of g-code from the CPU.

See also:

<https://wiki.bambulab.com/en/x1/maintenance/x1e-ap-board>

<https://wiki.bambulab.com/en/p1/manual/intro-p1p>

<https://wiki.bambulab.com/en/p1/maintenance/ap-board>

<https://wiki.bambulab.com/en/software/bambu-studio/remote-control>

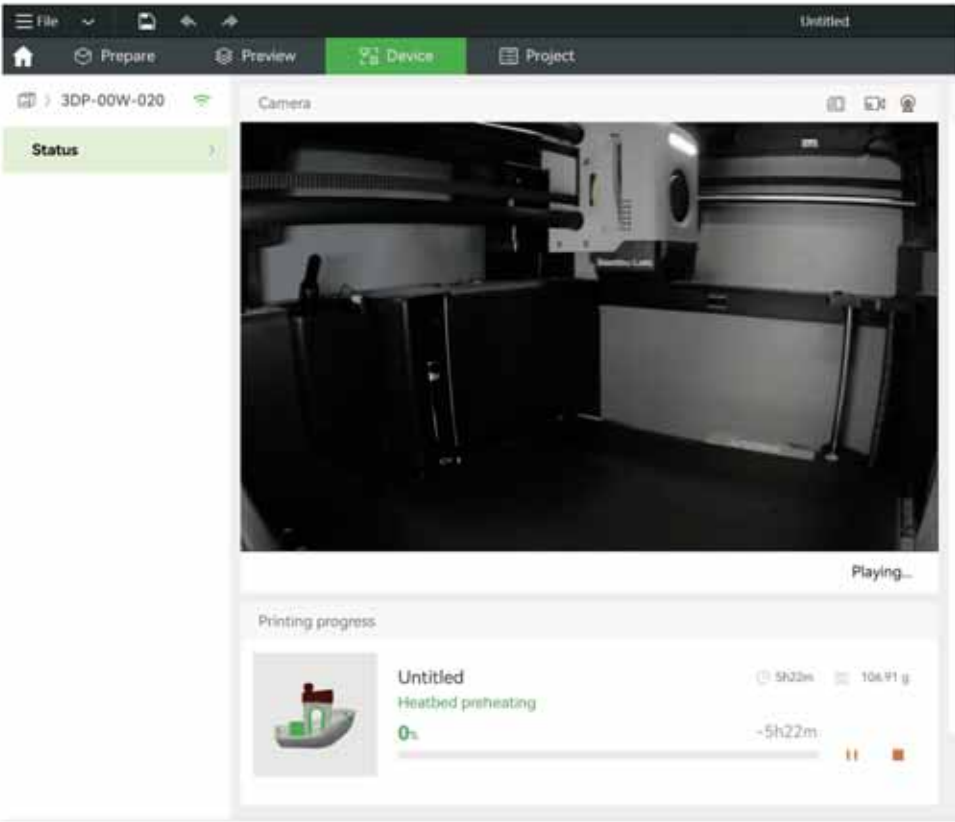
Further, an image of the build volume from the video camera (e.g., camera view) and a two-dimensional projection of the three-dimensional model from the point of view of the video camera (e.g., 2-D projection of 3-D model for cute little dinosaur) is shown in the Bambu Studio or Bambu Handy software running on a processor that alone or in combination with a processor on the printer is also configured to provide a user interface to a remote user. See examples below from Bambu Studio:

<https://wiki.bambulab.com/en/software/bambu-studio/remote-control>

Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

Play webcam LiveView

Whether printing or not, we can monitor the printer from the "Camera" tab.



The screenshot displays a software interface for monitoring a 3D printer. At the top, a dark menu bar contains icons for 'File', 'Prepare', 'Preview', 'Device' (highlighted in green), and 'Project'. Below this, a sidebar on the left shows '3DP-00W-020' and a 'Status' tab. The main area is titled 'Camera' and features a large live video feed of the printer's interior. Below the video feed, a 'Printing progress' section shows a small 3D model of a part, the name 'Untitled', the status 'Heatbed preheating', a progress bar at 0%, a duration of 5h22m, and a weight of 106.91 g. The video feed is labeled 'Playing...' in the bottom right corner.

Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

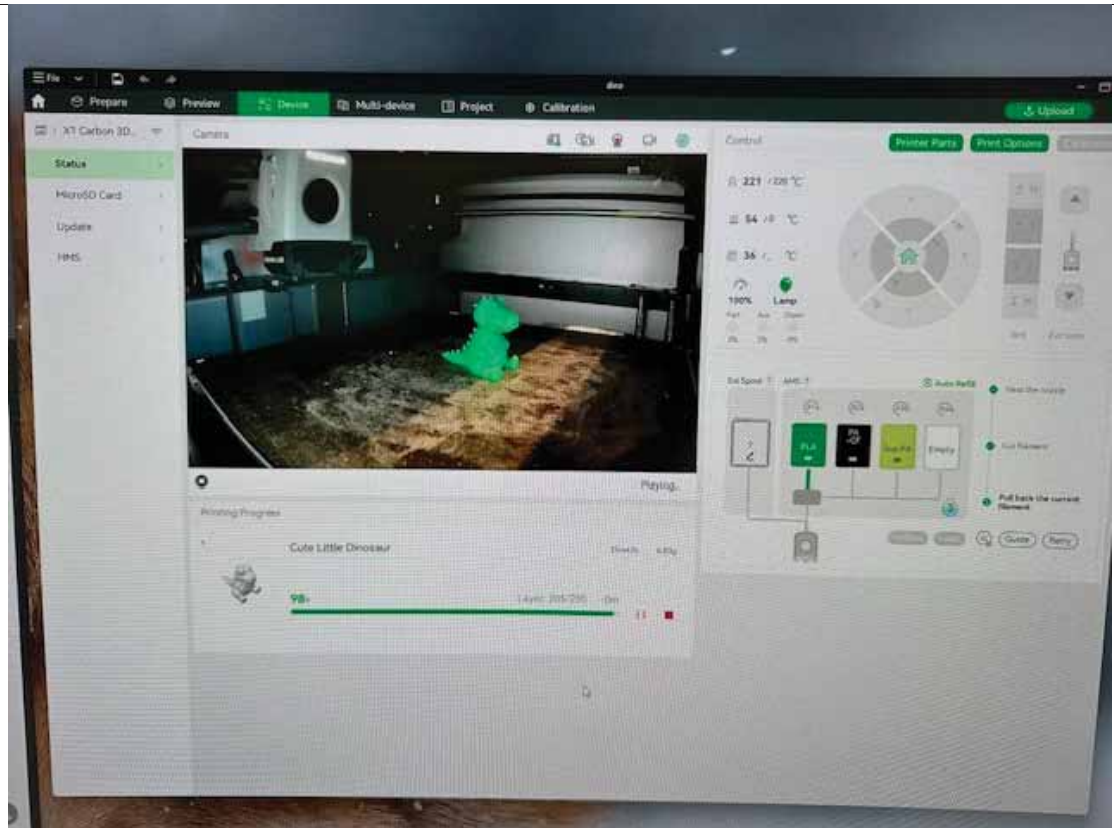
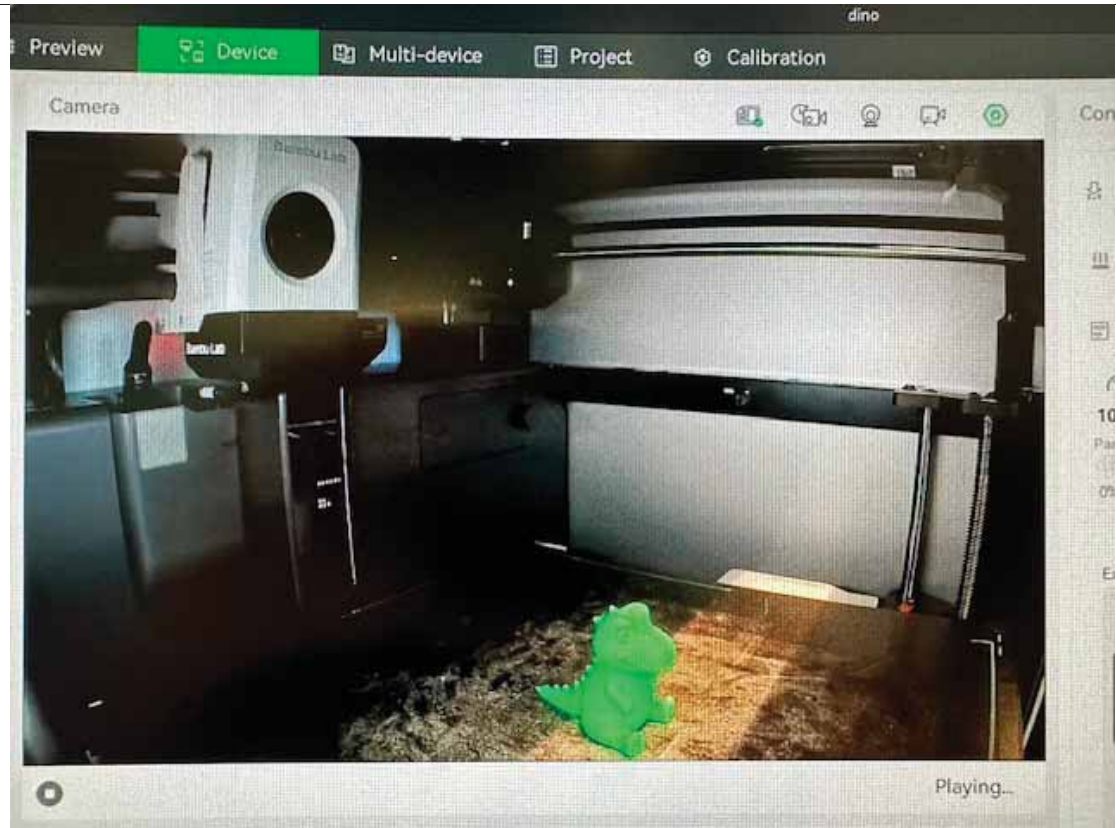
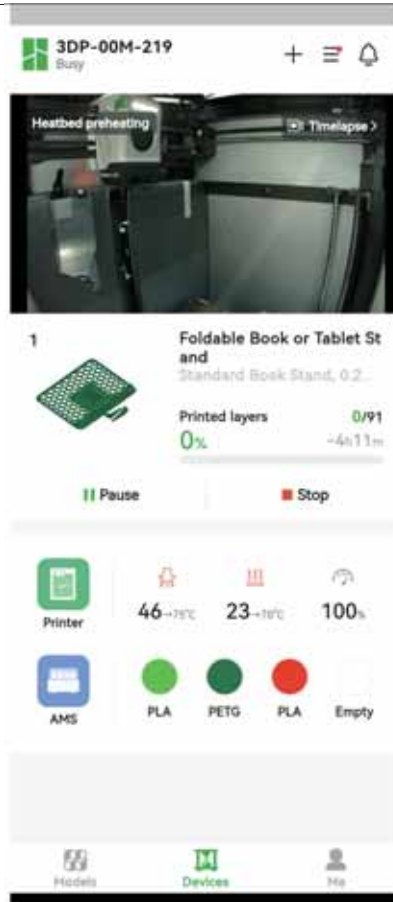


Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324



Further, the following image from Bambu Handy shows the build volume from the video camera (e.g., camera view) and a two-dimensional projection of the three-dimensional model from the camera's point of view (e.g., 2-D projection of 3-D model for foldable book or tablet stand):

Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324



<https://wiki.bambulab.com/en/studio-handy/handy/bambu-handy-quick-start>

Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

	Further, a two-dimensional projection of the three-dimensional model (e.g., time lapse) is shown in the Bambu Studio or Bambu Handy software running on a processor that alone or in combination with a processor on the printer is also configured to provide a user interface to a remote user. Alternatively, a two-dimensional projection of the three-dimensional model is a video image from the video camera, as is shown above in Bambu Studio or Bambu Handy, and an image of the build volume from the video camera is a time lapse, as is shown below. These are shown in the Bambu Studio or Bambu Handy software running on a processor that alone or in combination with a processor on the printer is also configured to provide a user interface to a remote user. Each Bambu Lab 3-D printer supports time-lapse functionality, including but not limited to the Bambu Lab A1, A1 mini, P1S, P1P, X1C, and X1E printers. See https://wiki.bambulab.com/en/software/bambu-studio/Timelapse: 1. Introduction to different modes of time-lapse In the Bambu Studio, if you enable timelapse, a timelapse video will be generated for each print. After each layer is printed, a snapshot is taken by the chamber camera. All of these snapshots are composed into a timelapse video when printing completes. There are two modes of timelapse: smooth mode and traditional mode. For different printers, there will be some differences in the action of shooting time-lapse photography, which is described as follows.
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Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

X1 and P1 series printers

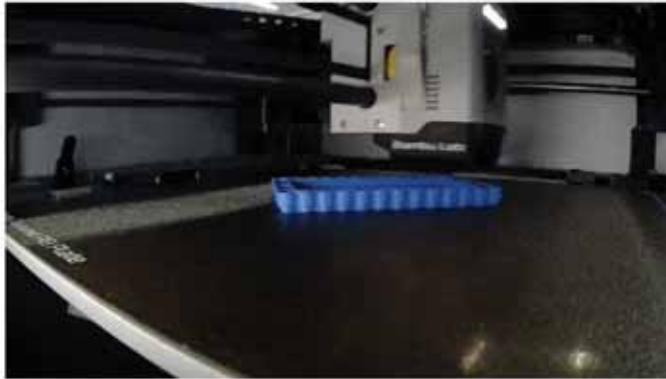
Smooth mode: the tool head will move to the excess chute after each layer is printed and then take a snapshot. Since the melted filament may leak from the nozzle during the process of taking the snapshot, a prime tower is required in this mode. So a prime tower will be automatically generated if there is no prime tower on the build plate. It will reuse the existing prime tower if there is already a prime tower on the plate.

In this mode, the toolhead in the video always stays above the prime tower and does not block the model. Therefore, the timelapse video looks very smooth. However, the overall print time will be longer because this mode adds additional paths and nozzle cleanings to the toolhead.



Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

Traditional mode: It takes a snapshot directly after each layer is printed, so there is no need for a prime tower in this mode. In time-lapse videos, the toolhead is constantly moving.



A1 Series Printer

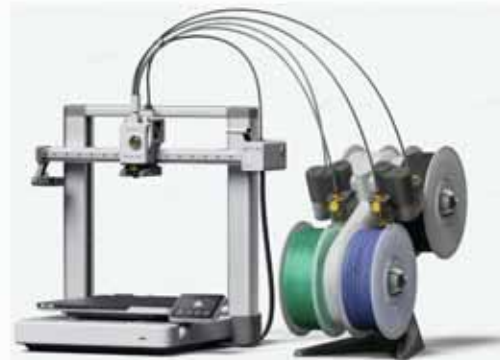
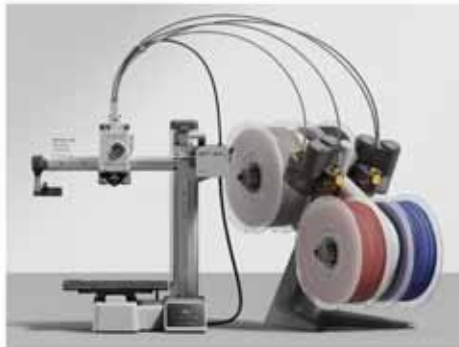


Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

	When shooting the time-lapse video, it is necessary to keep the horizontal position of the heat bed fixed and only change the position in the Z direction. However, the A1 series printer's heat bed was constantly moving during printing, causing the model to move horizontally as well. So, to successfully shoot time-lapse videos, the A1 series printer moves the heat bed to a fixed position and the nozzle to the purge wiper before each shooting then moves them back above the model to continue printing. Whether it is the traditional mode or smooth mode time-lapse photography, it will move the heat bed and tool head to a fixed position before taking the photo. You can see the moving path to the purge wiper in the traveling path previewed after slicing (see below), but if you do not enable the time-lapse feature before sending the print job, these moves will not be executed during the actual print process. Traditional mode: During the printing process, due to the leakage caused by the pause when taking the snapshot, the traditional mode of time-lapse photography does not have a prime tower to absorb this flaw, affecting the printing quality. So our strategy is to print defects into the infill as much as possible to ensure surface quality, but if the model has no infill area in this layer, defects are inevitable. In this case, it is not recommended to enable time-lapse photography in traditional mode but to use smooth mode. You will also receive a prompt before sending the print job.
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Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

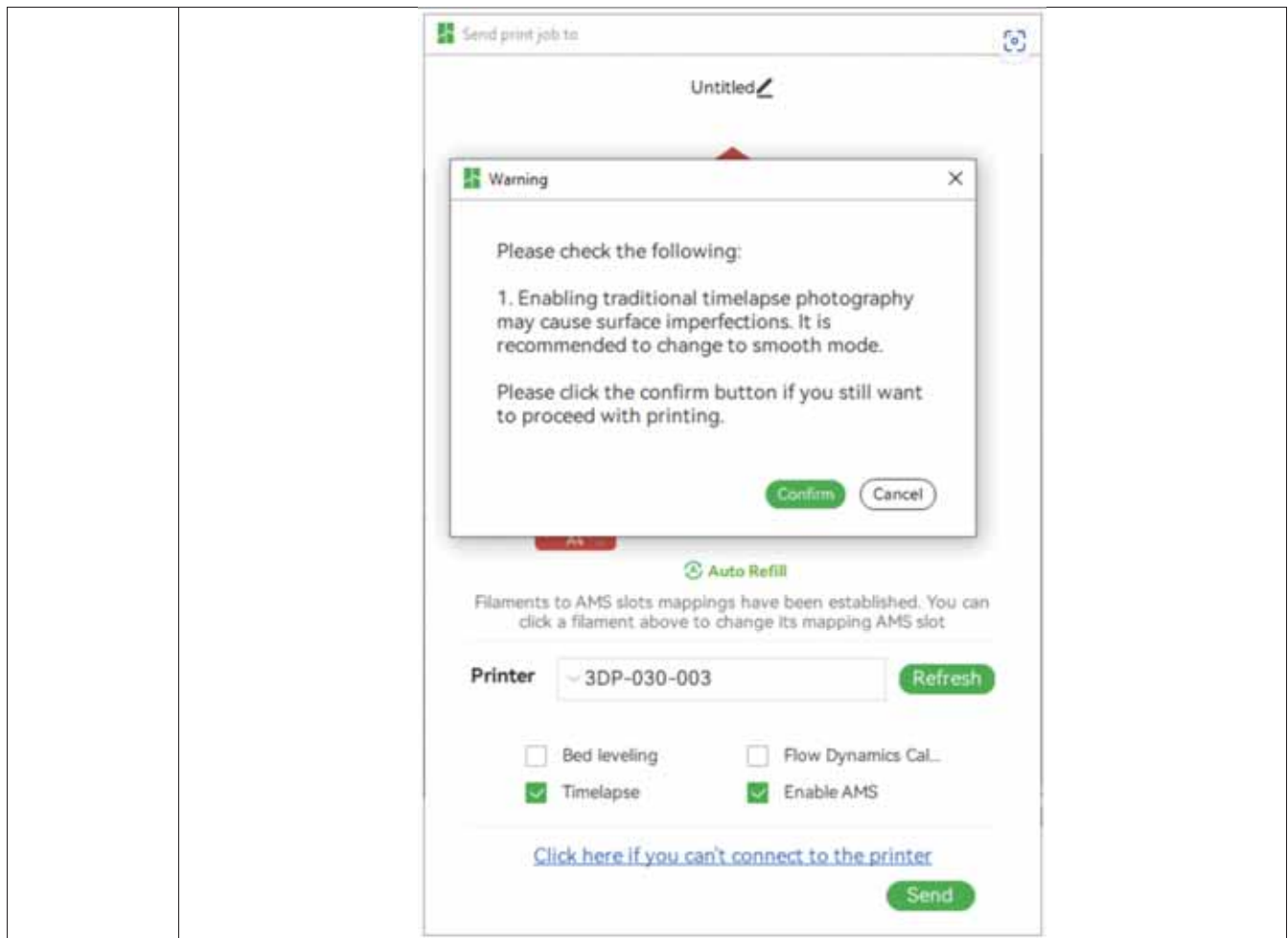


Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

Smooth mode: After selecting smooth mode time-lapse photography, a prime tower will be automatically generated by default. During the printing process, after pausing to take photos, the nozzle will print on the prime tower first, and then continue to print on the model, so that the leakage defects caused by the pause are absorbed by the prime tower.

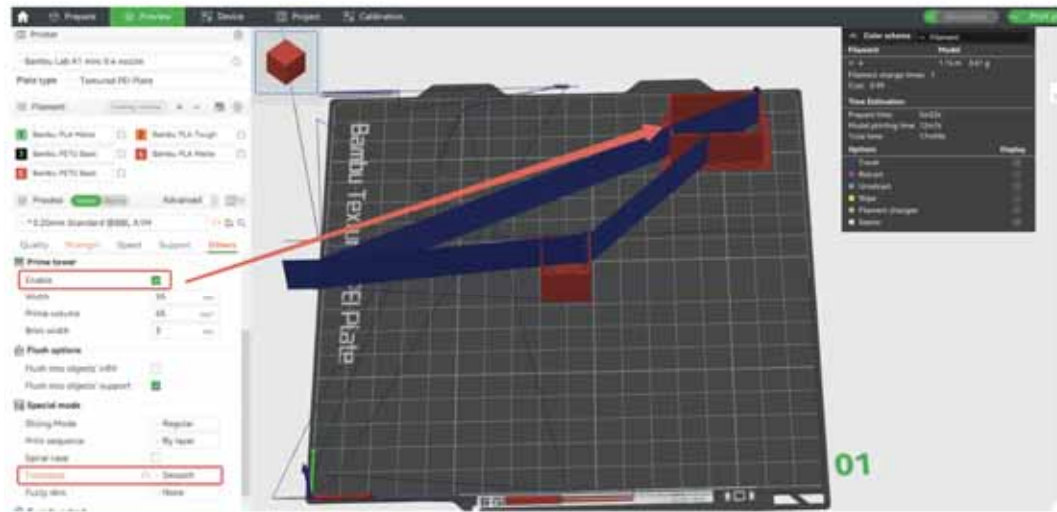


Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

Timelapse Fade-on Mode: When this mode is turned on, a cropping effect will appear when printing the first layer. As the number of layers increases, the image gradually changes from zooming in to zooming out.



Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324



Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

See also, <https://wiki.bambulab.com/en/makerworld/tutorials/printing-tutorial-on-bambu-handy>:

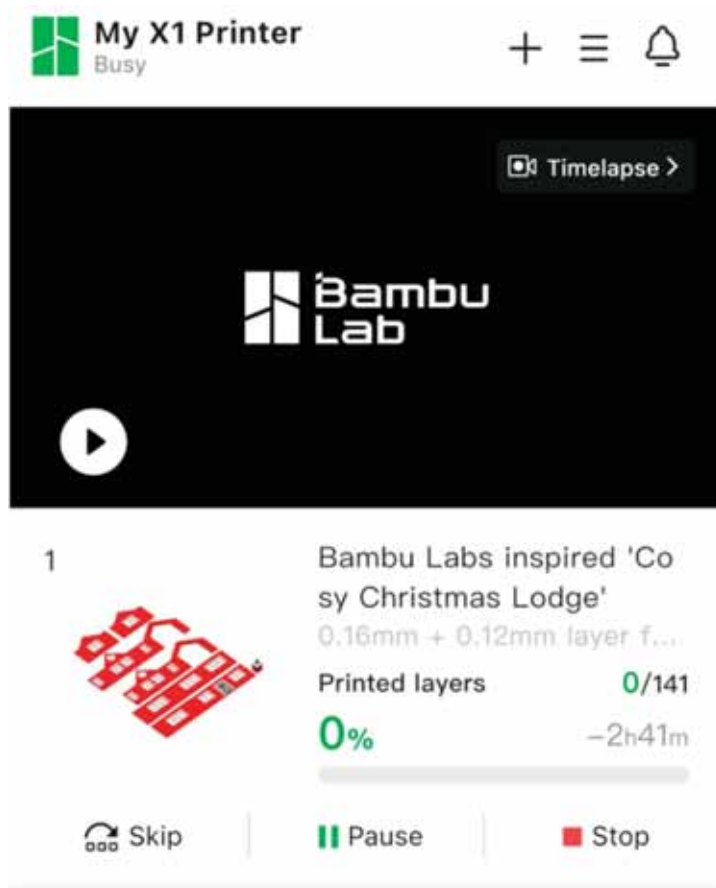


Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

See also, <https://wiki.bambulab.com/en/studio-handy/handy/bambu-handy-quick-start>:



1. Under the TimeLapse tab, you can watch and manage timelapse videos on your SD card. After clicking into an individual video, you can download or share that video.

Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

	Defendants literally infringe this claim, including this claim element. To the extent discovery shows otherwise, Defendants infringe under the doctrine of equivalents by the Accused Instrumentalities (e.g., including Bambu Lab 3D printers) including components (e.g., a processor to run Bambu Studio or Bambu Handy) that are equivalent to this element of the claim. The above component(s) of the Accused Instrumentalities are insubstantially different from what is required by the claim language. In addition, the above component(s) of the Accused Instrumentalities perform the same function (e.g., provide a user interface to a remote user and present an image of the build volume from the video camera and a two-dimensional projection of the three-dimensional model from the point of view of the video camera), in substantially the same way (e.g., provide information via a user interface), to achieve substantially the same result (e.g., provide information to the remote user via the image and two-dimensional projection) as would be achieved by the element.
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Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

3. The device of claim 1 wherein the two-dimensional projection is simulated based upon operation of the three-dimensional printer.	For each of the Accused instrumentalities, the two-dimensional projection is simulated based upon operation of the three-dimensional printer. For example, the two-dimensional projection is simulated as a time lapse based on the operation of the three-dimensional printer printing the object one layer at a time. Each Bambu Lab 3-D printer supports time-lapse functionality, including but not limited to the Bambu Lab A1, A1 mini, P1S, P1P, X1C, and X1E printers. See https://wiki.bambulab.com/en/software/bambu-studio/Timelapse: 1. Introduction to different modes of time-lapse In the Bambu Studio, if you enable timelapse, a timelapse video will be generated for each print. After each layer is printed, a snapshot is taken by the chamber camera. All of these snapshots are composed into a timelapse video when printing completes. There are two modes of timelapse: smooth mode and traditional mode. For different printers, there will be some differences in the action of shooting time-lapse photography, which is described as follows. X1 and P1 series printers Smooth mode: the tool head will move to the excess chute after each layer is printed and then take a snapshot. Since the melted filament may leak from the nozzle during the process of taking the snapshot, a prime tower is required in this mode. So a prime tower will be automatically generated if there is no prime tower on the build plate. It will reuse the existing prime tower if there is already a prime tower on the plate. In this mode, the toolhead in the video always stays above the prime tower and does not block the model. Therefore, the timelapse video looks very smooth. However, the overall print time will be longer because this mode adds additional paths and nozzle cleanings to the toolhead.
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Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

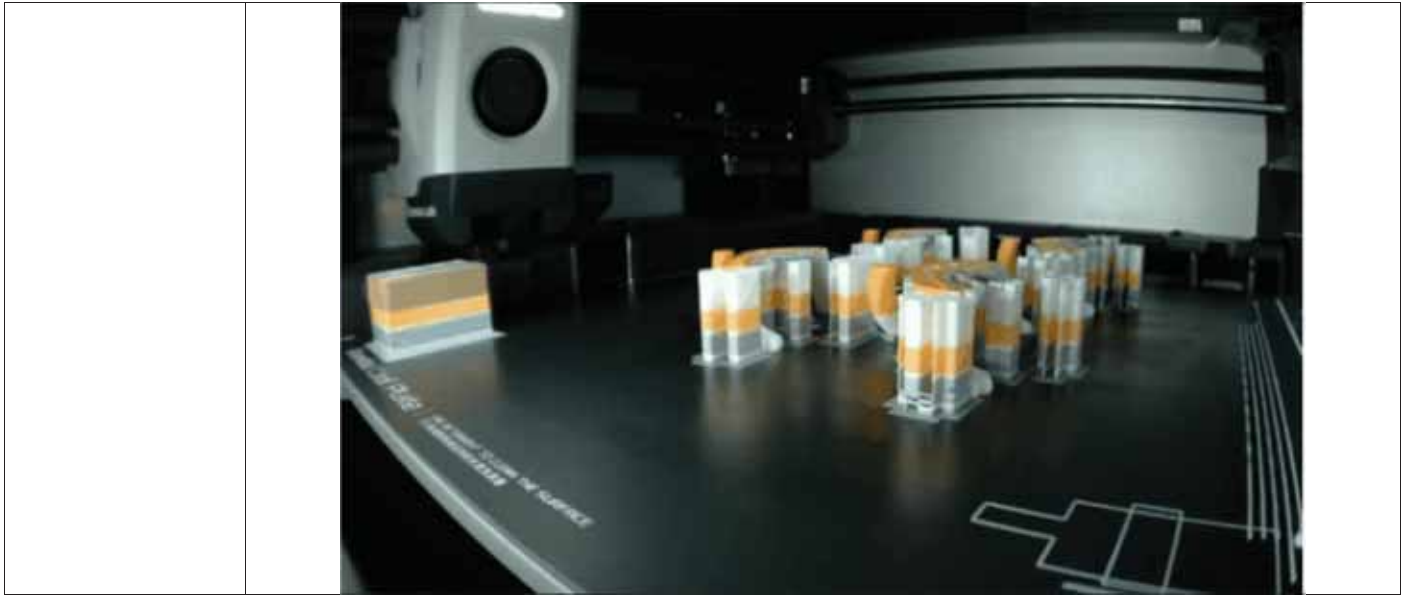
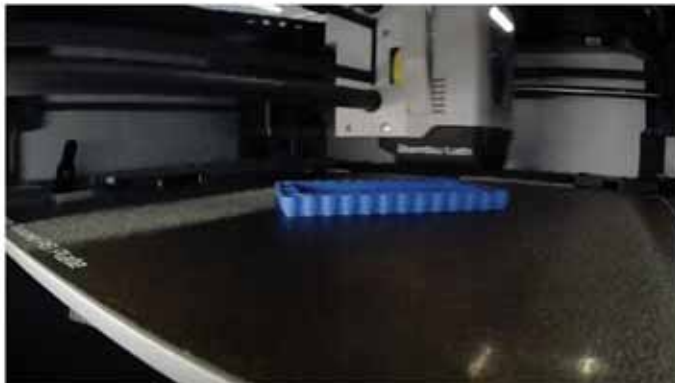


Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

Traditional mode: It takes a snapshot directly after each layer is printed, so there is no need for a prime tower in this mode. In time-lapse videos, the toolhead is constantly moving.



A1 Series Printer

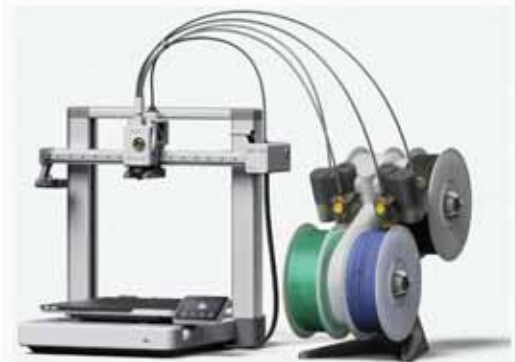
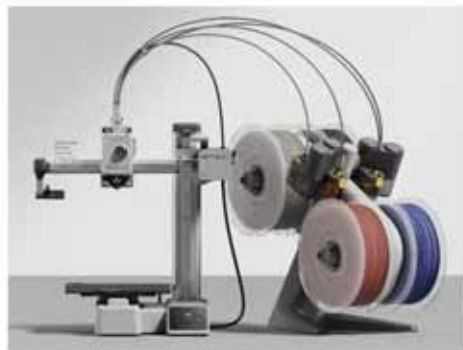


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	When shooting the time-lapse video, it is necessary to keep the horizontal position of the heat bed fixed and only change the position in the Z direction. However, the A1 series printer's heat bed was constantly moving during printing, causing the model to move horizontally as well. So, to successfully shoot time-lapse videos, the A1 series printer moves the heat bed to a fixed position and the nozzle to the purge wiper before each shooting then moves them back above the model to continue printing. Whether it is the traditional mode or smooth mode time-lapse photography, it will move the heat bed and tool head to a fixed position before taking the photo. You can see the moving path to the purge wiper in the traveling path previewed after slicing (see below), but if you do not enable the time-lapse feature before sending the print job, these moves will not be executed during the actual print process. Traditional mode: During the printing process, due to the leakage caused by the pause when taking the snapshot, the traditional mode of time-lapse photography does not have a prime tower to absorb this flaw, affecting the printing quality. So our strategy is to print defects into the infill as much as possible to ensure surface quality, but if the model has no infill area in this layer, defects are inevitable. In this case, it is not recommended to enable time-lapse photography in traditional mode but to use smooth mode. You will also receive a prompt before sending the print job.
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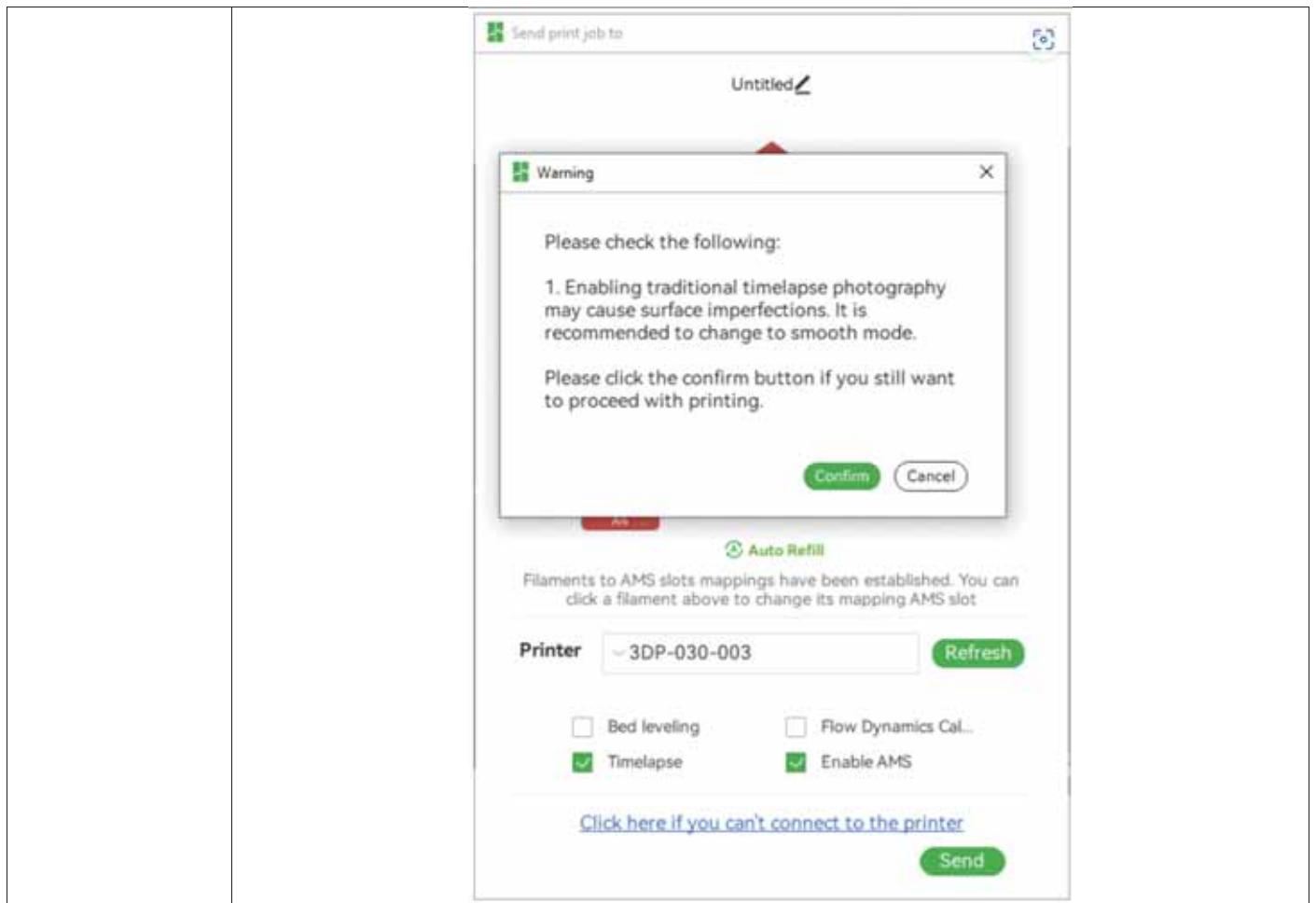


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Smooth mode: After selecting smooth mode time-lapse photography, a prime tower will be automatically generated by default. During the printing process, after pausing to take photos, the nozzle will print on the prime tower first, and then continue to print on the model, so that the leakage defects caused by the pause are absorbed by the prime tower.

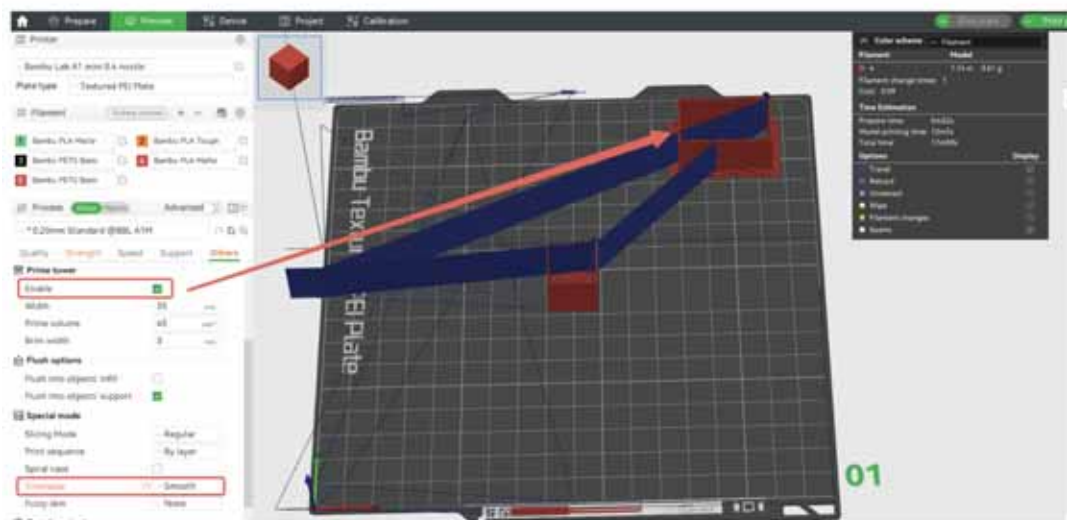


Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

Timelapse Fade-on Mode: When this mode is turned on, a cropping effect will appear when printing the first layer. As the number of layers increases, the image gradually changes from zooming in to zooming out.



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Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

See also, <https://wiki.bambulab.com/en/makerworld/tutorials/printing-tutorial-on-bambu-hand2>:

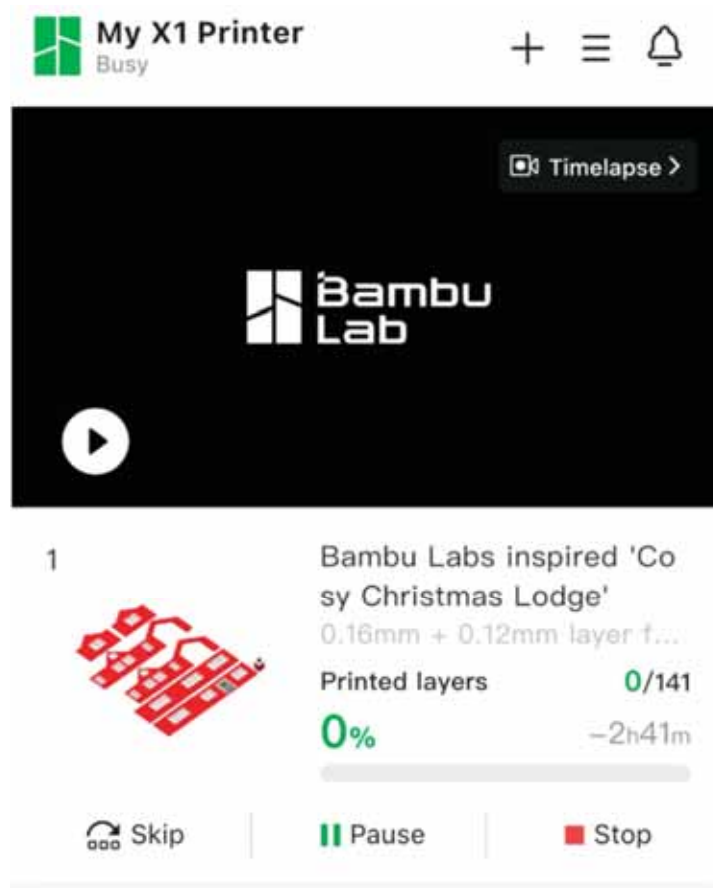


Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

See also, <https://wiki.bambulab.com/en/studio-handy/handy/bambu-handy-quick-start>:



1. Under the TimeLapse tab, you can watch and manage timelapse videos on your SD card. After clicking into an individual video, you can download or share that video.

Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

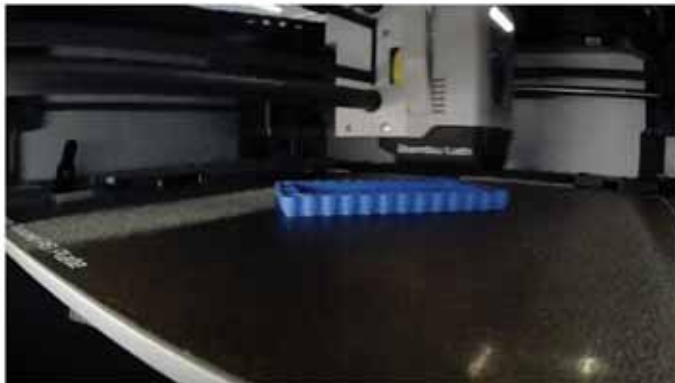
5. The device of claim 1 wherein the two-dimensional projection is dynamically updated to correspond to a state of physical completion of the object.	For each of the Accused Instrumentalities, the two-dimensional projection is dynamically updated to correspond to a state of physical completion of the object. For example, the time lapse includes dynamic updates corresponding to a state of physical completion of the object for each layer of the build. Each Bambu Lab 3-D printer supports time-lapse functionality, including but not limited to the Bambu Lab A1, A1 mini, P1S, P1P, X1C, and X1E printers. See https://wiki.bambulab.com/en/software/bambu-studio/Timelapse: 1. Introduction to different modes of time-lapse In the Bambu Studio, if you enable timelapse, a timelapse video will be generated for each print. After each layer is printed, a snapshot is taken by the chamber camera. All of these snapshots are composed into a timelapse video when printing completes. There are two modes of timelapse: smooth mode and traditional mode. For different printers, there will be some differences in the action of shooting time-lapse photography, which is described as follows. X1 and P1 series printers Smooth mode: the tool head will move to the excess chute after each layer is printed and then take a snapshot. Since the melted filament may leak from the nozzle during the process of taking the snapshot, a prime tower is required in this mode. So a prime tower will be automatically generated if there is no prime tower on the build plate. It will reuse the existing prime tower if there is already a prime tower on the plate. In this mode, the toolhead in the video always stays above the prime tower and does not block the model. Therefore, the timelapse video looks very smooth. However, the overall print time will be longer because this mode adds additional paths and nozzle cleanings to the toolhead.
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Traditional mode: It takes a snapshot directly after each layer is printed, so there is no need for a prime tower in this mode. In time-lapse videos, the toolhead is constantly moving.



A1 Series Printer

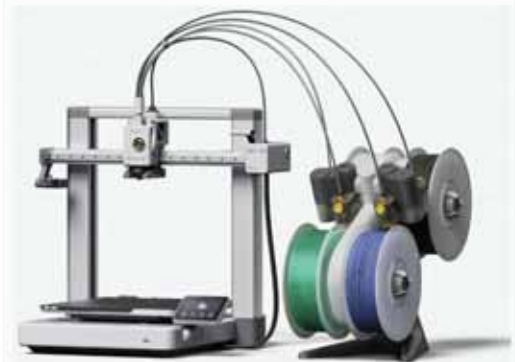
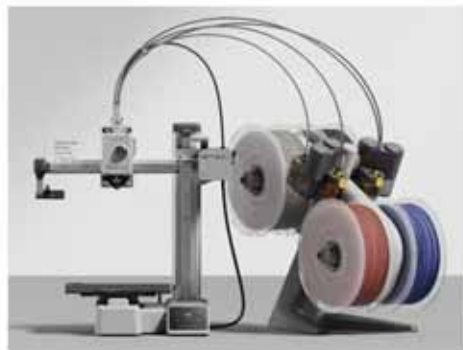


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	When shooting the time-lapse video, it is necessary to keep the horizontal position of the heat bed fixed and only change the position in the Z direction. However, the A1 series printer's heat bed was constantly moving during printing, causing the model to move horizontally as well. So, to successfully shoot time-lapse videos, the A1 series printer moves the heat bed to a fixed position and the nozzle to the purge wiper before each shooting then moves them back above the model to continue printing. Whether it is the traditional mode or smooth mode time-lapse photography, it will move the heat bed and tool head to a fixed position before taking the photo. You can see the moving path to the purge wiper in the traveling path previewed after slicing (see below), but if you do not enable the time-lapse feature before sending the print job, these moves will not be executed during the actual print process. Traditional mode: During the printing process, due to the leakage caused by the pause when taking the snapshot, the traditional mode of time-lapse photography does not have a prime tower to absorb this flaw, affecting the printing quality. So our strategy is to print defects into the infill as much as possible to ensure surface quality, but if the model has no infill area in this layer, defects are inevitable. In this case, it is not recommended to enable time-lapse photography in traditional mode but to use smooth mode. You will also receive a prompt before sending the print job.
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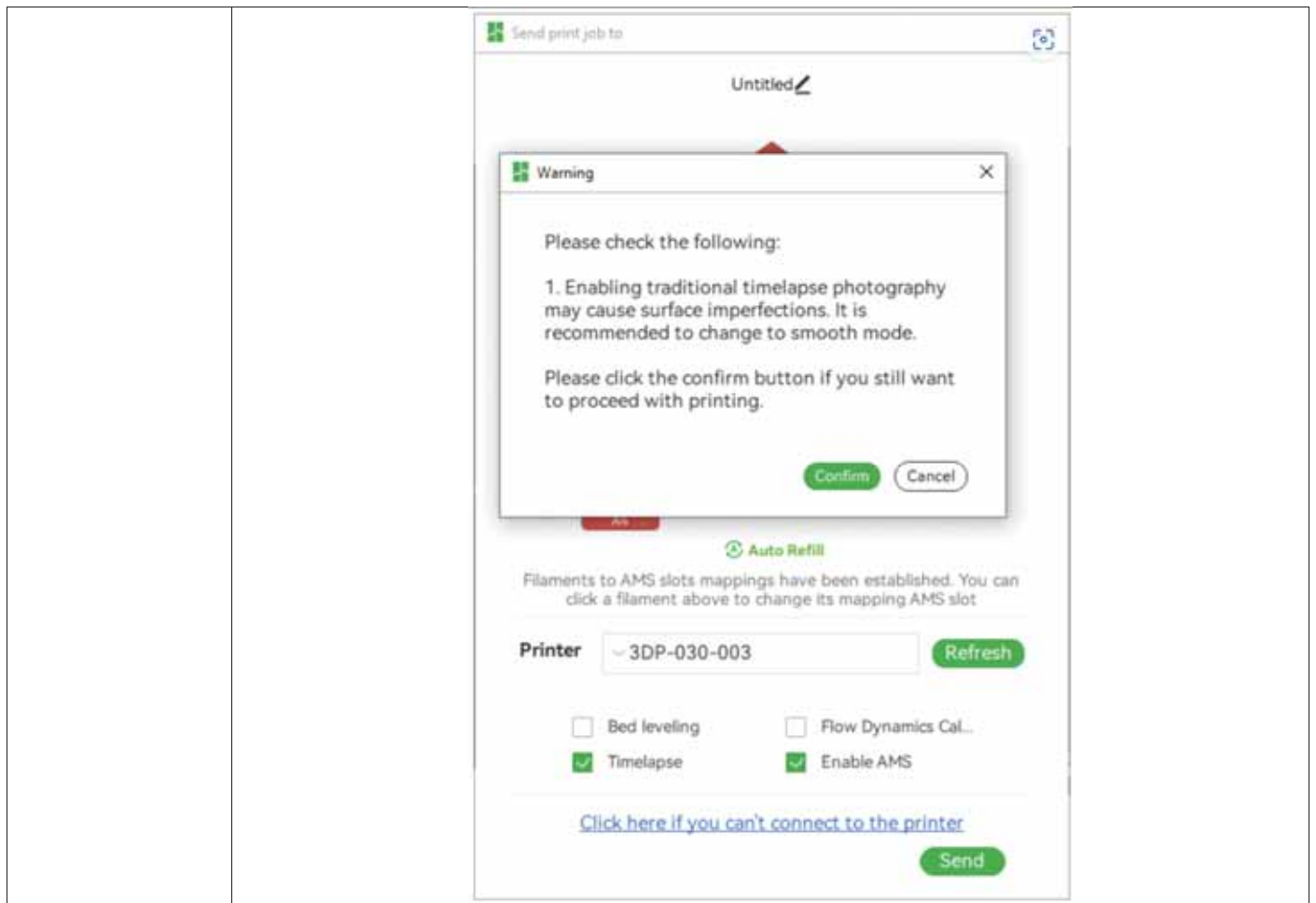


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Smooth mode: After selecting smooth mode time-lapse photography, a prime tower will be automatically generated by default. During the printing process, after pausing to take photos, the nozzle will print on the prime tower first, and then continue to print on the model, so that the leakage defects caused by the pause are absorbed by the prime tower.

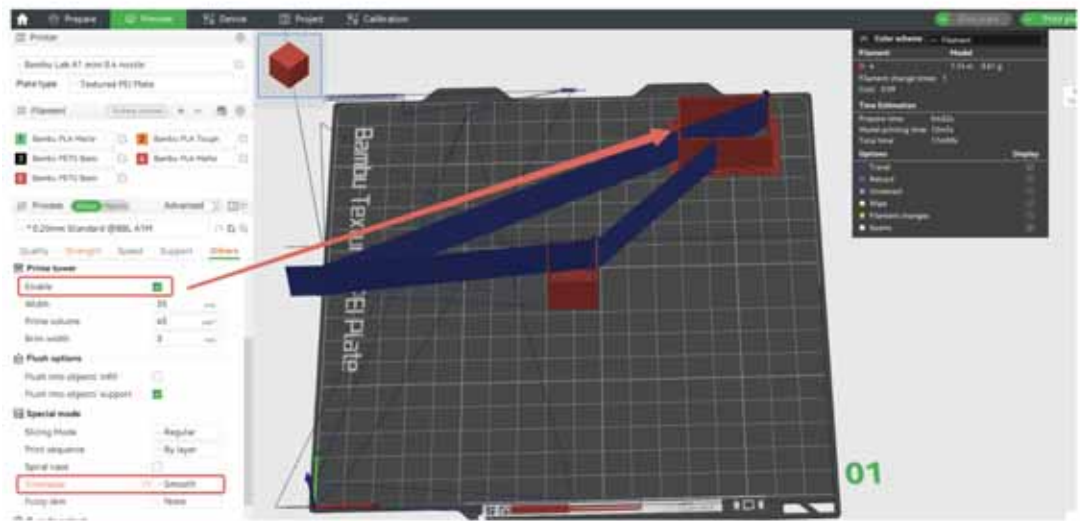


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Timelapse Fade-on Mode: When this mode is turned on, a cropping effect will appear when printing the first layer. As the number of layers increases, the image gradually changes from zooming in to zooming out.



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See also, <https://wiki.bambulab.com/en/makerworld/tutorials/printing-tutorial-on-bambu-handy>:

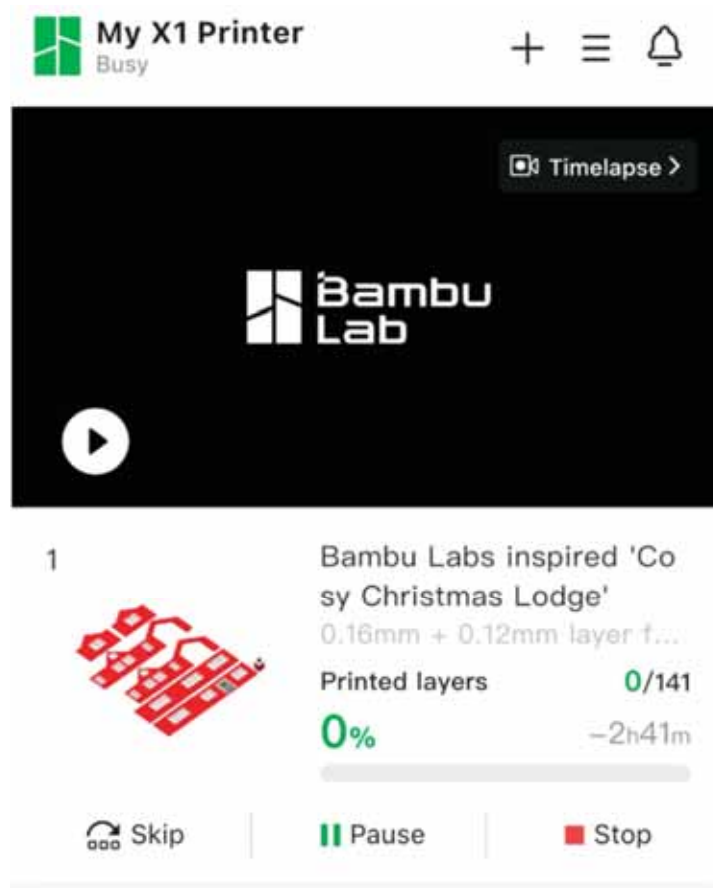


Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

See also, <https://wiki.bambulab.com/en/studio-handy/handy/bambu-handy-quick-start>:



1. Under the TimeLapse tab, you can watch and manage timelapse videos on your SD card. After clicking into an individual video, you can download or share that video.

Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

Alternatively, the two-dimensional projection of the three-dimensional model is a video image from the video camera that includes dynamic updates (corresponding to the state of physical completion of the object. As shown below, the LiveView feature plays a video of the object during the build.

Each Bambu Lab 3-D printer supports LiveView functionality, including but not limited to the Bambu Lab A1, A1 mini, P1S, P1P, X1C, and X1E printers. <https://bambulab.com/en/compare>
See e.g., <https://bambulab.com/en/x1>:



See also the following image from <https://bambulab.com/en/x1>

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Tech specs of the X1 Series

Technology		X1-Carbon	X1
		Fused Deposition Modeling	
Body	Shell	Aluminum & Glass	Plastic & Glass
Tool Head	Extruder Gears	Hardened Steel	Steel
	Nozzle	Hardened Steel	Stainless Steel
Cooling	Auxiliary Part Cooling Fan	Closed Loop Control	Optional
	Air Filter	Activated Carbon Filter	Optional
Supported Filament	PA, PC	Ideal	Capable
	Carbon / Glass Fiber Reinforced Polymer	Ideal	Not Recommended
Sensors	Chamber Monitoring Camera	1920 x 1080 Included	Optional
Physical Dimensions	Net Weight	14.13kg	13.18kg

Also see, <https://us.store.bambulab.com/products/chamber-camera>:

Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324



Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

Also see, <https://bambulab.com/en/x1e>:

Sensors	Sensors
Bambu Micro Lidar: Yes Chamber Monitoring Camera: 1920*1080 Included	Bambu Micro Lidar: Yes Chamber Monitoring Camera: 1920*1080 Included

See also <https://bambulab.com/en/p1>:

Liveview &Time-lapse	The built-in chamber camera enables easy print monitoring on Bambu Studio and Handy, and timelapse video creation.
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Also see, <https://us.store.bambulab.com/products/p1p-chamber-camera-led>:

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Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

	https://wiki.bambulab.com/en/p1/manual/unboxing-p1s: <table><tr><td>Chamber Monitoring Camera</td><td>Low Rate Camera 1280 x 720 / 0.5fps Timelapse Supported</td></tr></table>	Chamber Monitoring Camera	Low Rate Camera 1280 x 720 / 0.5fps Timelapse Supported
Chamber Monitoring Camera	Low Rate Camera 1280 x 720 / 0.5fps Timelapse Supported		

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<https://wiki.bambulab.com/en/p1/manual/glossary:>

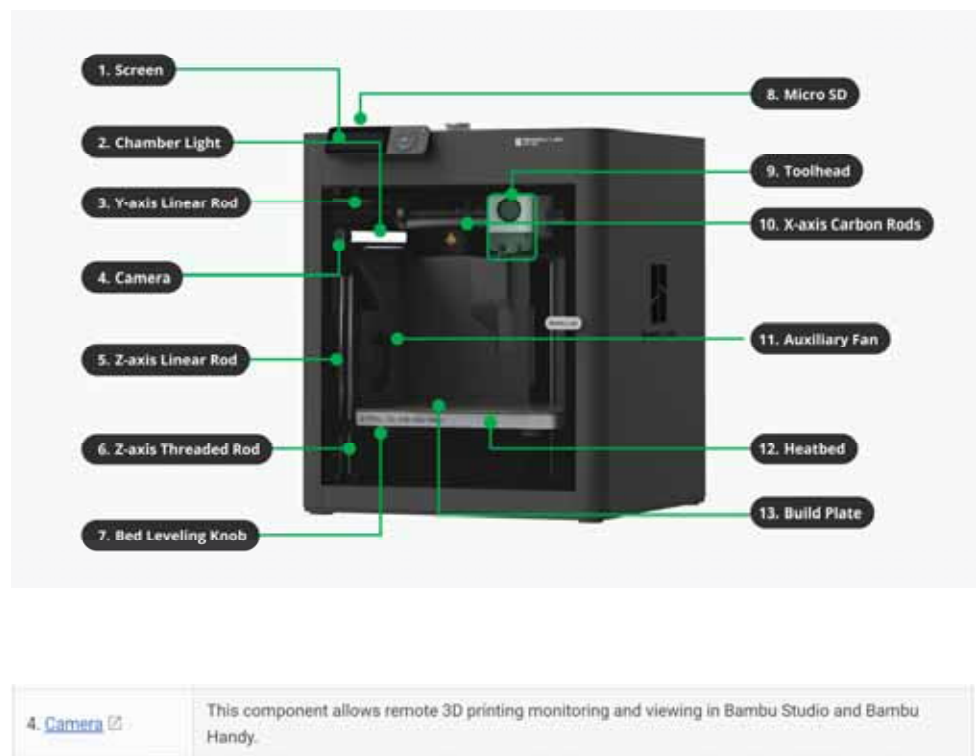


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<https://wiki.bambulab.com/en/p1:>

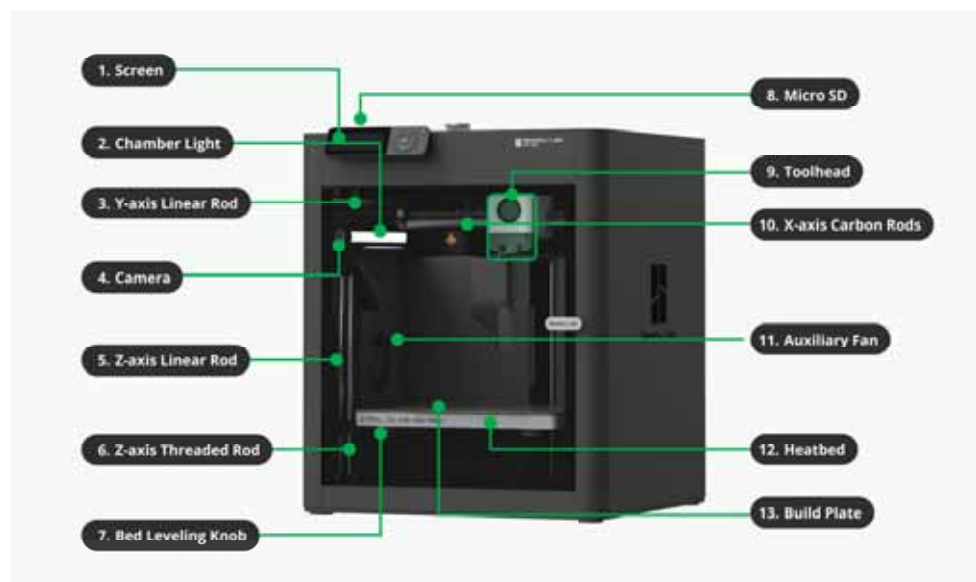
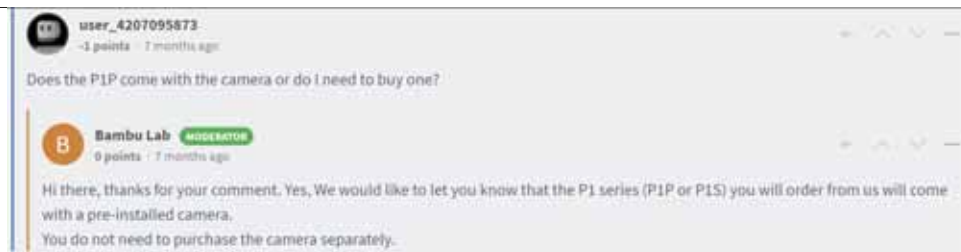
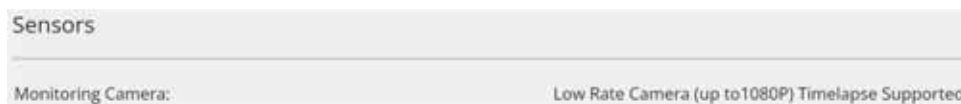


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See also <https://bambulab.com/en/a1/tech-specs>:



See also, <https://wiki.bambulab.com/en/a1/manual/intro-a1>:

Camera

The printer integrates a camera that can be used for real-time monitoring of prints using the Bambu Slicer or Bambu Handy applications. It can also be utilized for print defect detection (supported after firmware updates).

In addition to its monitoring capabilities, the camera can record printed videos and create time-lapse videos. While the machine does not have night vision, the camera module has an LED that can illuminate the printed object.

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See also, <https://wiki.bambulab.com/en/a1-mini>:

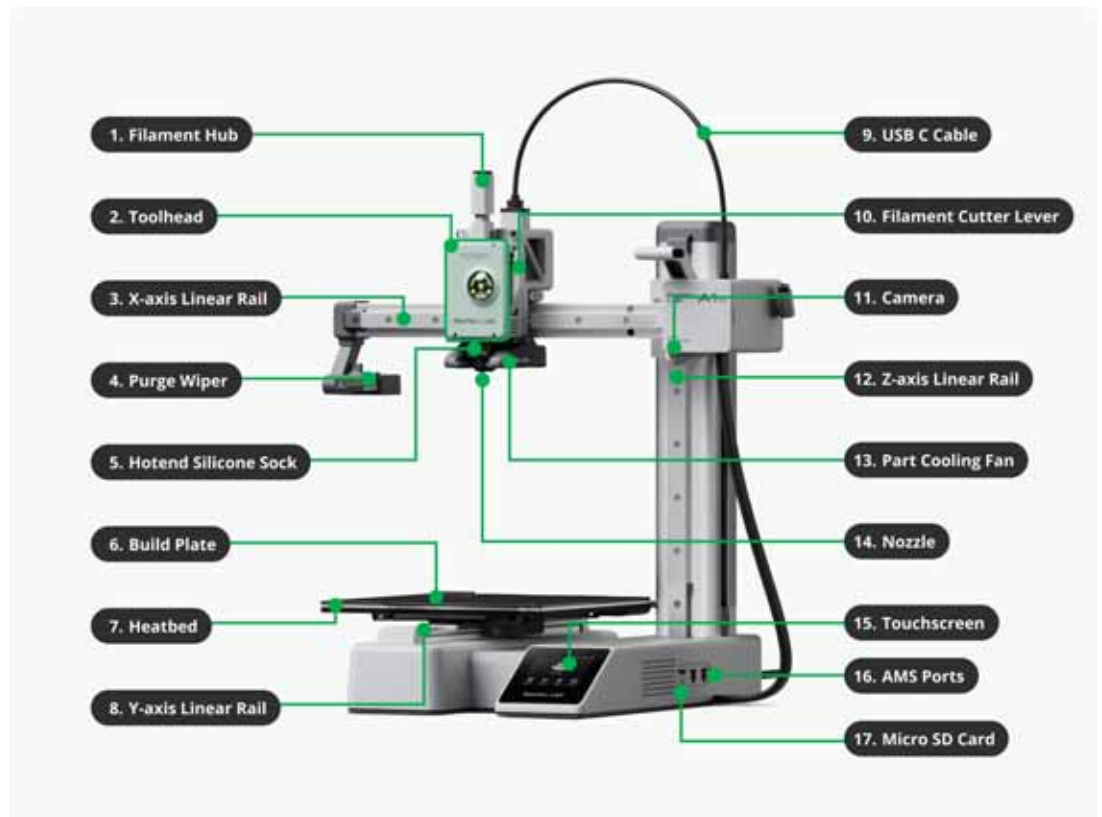


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See also, <https://wiki.bambulab.com/en/a1-mini/camera-replacement-guide>:



<https://wiki.bambulab.com/en/software/bambu-studio/remote-control>

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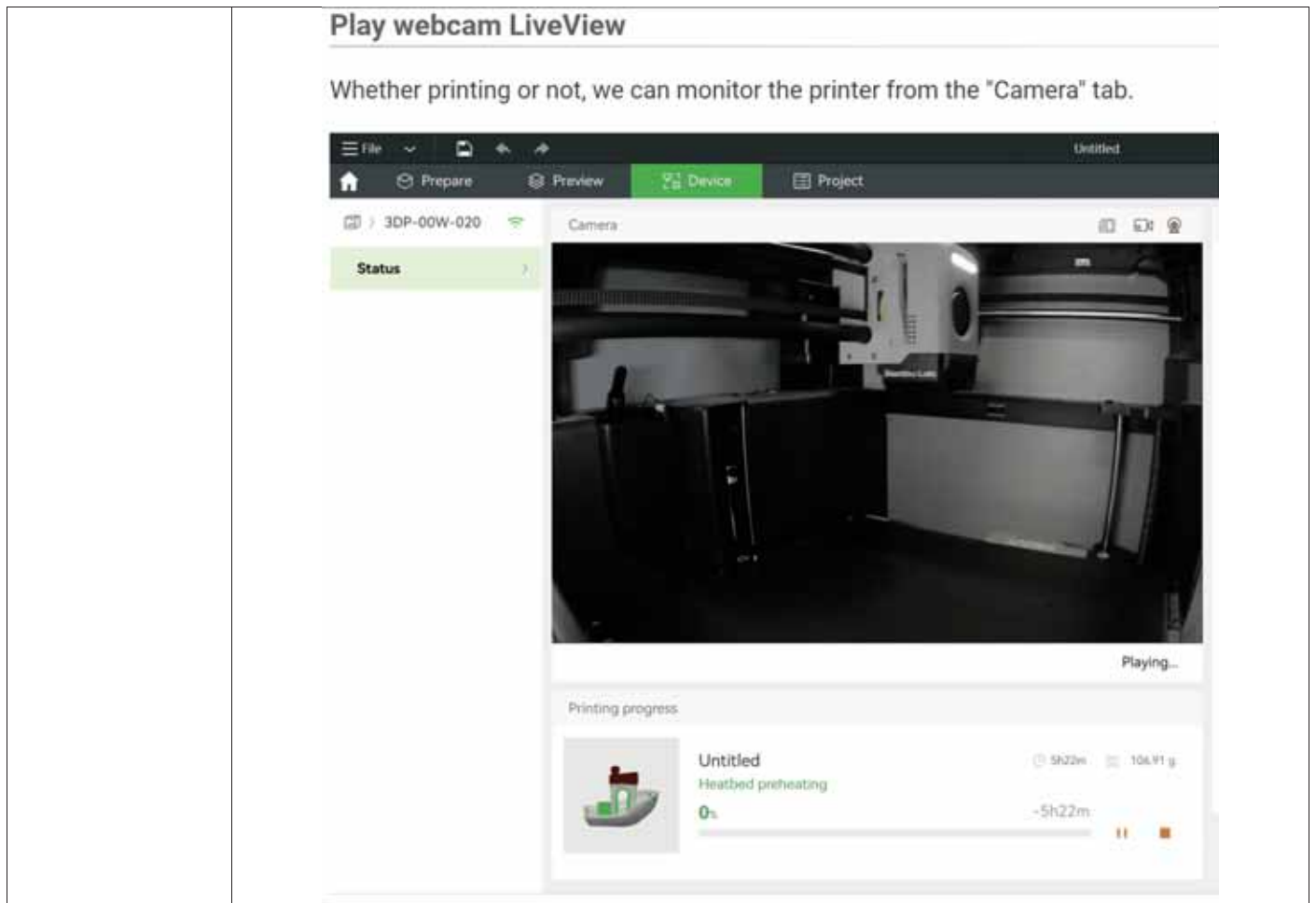


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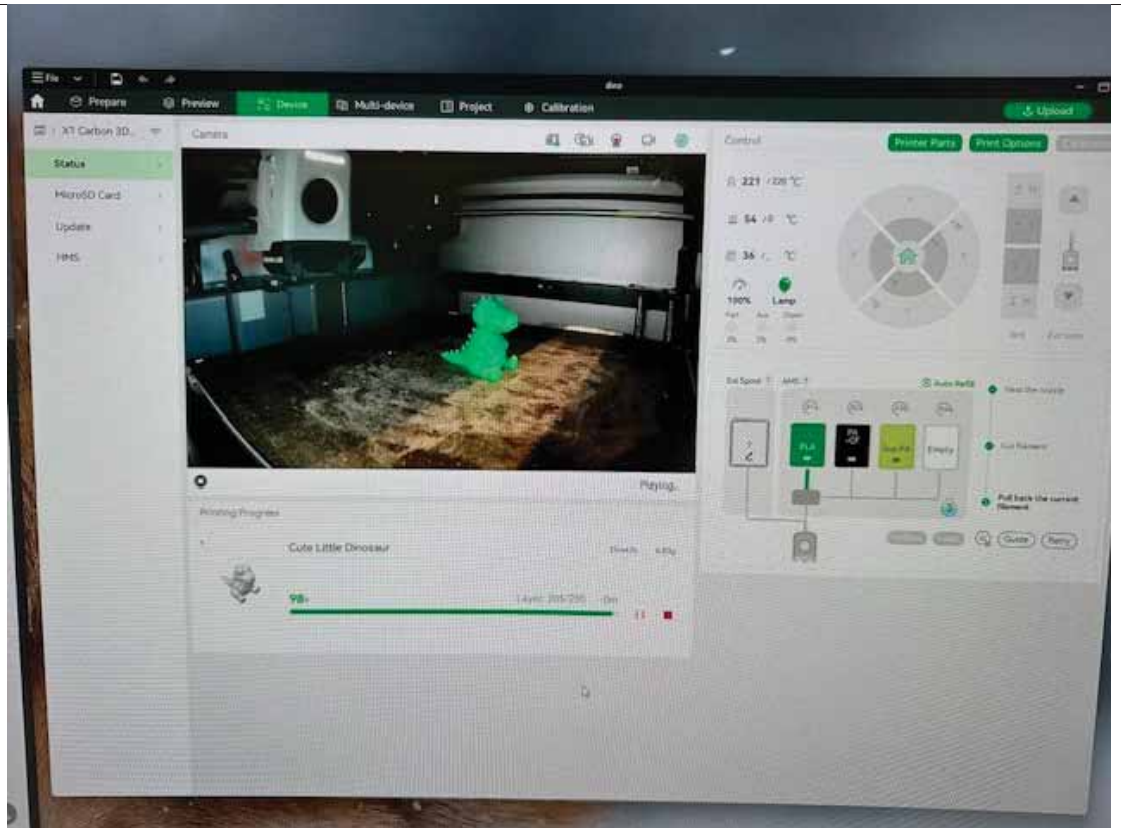


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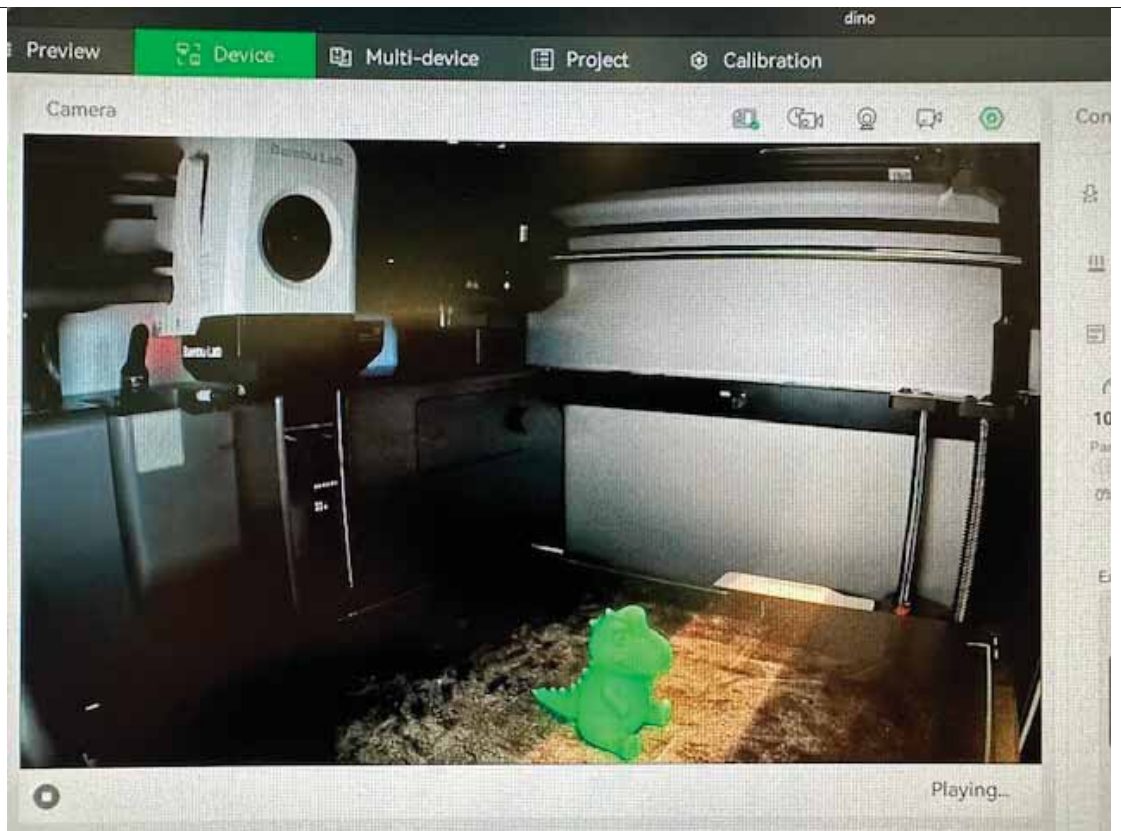


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6. The device of claim 1 wherein the two-dimensional projection is a video image from the video camera.	For each of the Accused Instrumentalities, the two-dimensional projection is a video image from the video camera. For example, a two-dimensional projection of the three-dimensional model is a video image from the video camera, such as the LiveView feature in Bambu Studio or Bambu Handy. Each Bambu Lab 3-D printer supports LiveView functionality, including but not limited to the Bambu Lab A1, A1 mini, P1S, P1P, X1C, and X1E printers. https://bambulab.com/en/compare See e.g., https://bambulab.com/en/x1:  Health management system Door Sensor (Under development) A smart door sensor enables the X1 to pause prints if the door is opened, keeping your prints and your environment safe. Chamber Camera Chamber Camera provides you with a remote livestream, shoots time lapses, and records the process for possible troubleshooting.
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See also the following image from <https://bambulab.com/en/x1>

Tech specs of the X1 Series

Technology		X1-Carbon	X1
		Fused Deposition Modeling	
Body	Shell	Aluminum & Glass	Plastic & Glass
Tool Head	Extruder Gears	Hardened Steel	Steel
	Nozzle	Hardened Steel	Stainless Steel
Cooling	Auxiliary Part Cooling Fan	Closed Loop Control	Optional
	Air Filter	Activated Carbon Filter	Optional
Supported Filament	PA, PC	Ideal	Capable
	Carbon / Glass Fiber Reinforced Polymer	Ideal	Not Recommended
Sensors	Chamber Monitoring Camera	1920 x 1080 Included	Optional
Physical Dimensions	Net Weight	14.13kg	13.18kg

Also see, <https://us.store.bambulab.com/products/chamber-camera>:

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Also see, <https://bambulab.com/en/x1e>:

Sensors	Sensors
Bambu Micro Lidar: Yes Chamber Monitoring Camera: 1920*1080 Included	Bambu Micro Lidar: Yes Chamber Monitoring Camera: 1920*1080 Included

See also <https://bambulab.com/en/p1>:

Liveview &Time-lapse	The built-in chamber camera enables easy print monitoring on Bambu Studio and Handy, and timelapse video creation.
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Also see, <https://us.store.bambulab.com/products/p1p-chamber-camera-led>:

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	https://wiki.bambulab.com/en/p1/manual/unboxing-p1s: <table><tr><td>Chamber Monitoring Camera</td><td>Low Rate Camera 1280 x 720 / 0.5fps Timelapse Supported</td></tr></table>	Chamber Monitoring Camera	Low Rate Camera 1280 x 720 / 0.5fps Timelapse Supported
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<https://wiki.bambulab.com/en/p1/manual/glossary:>

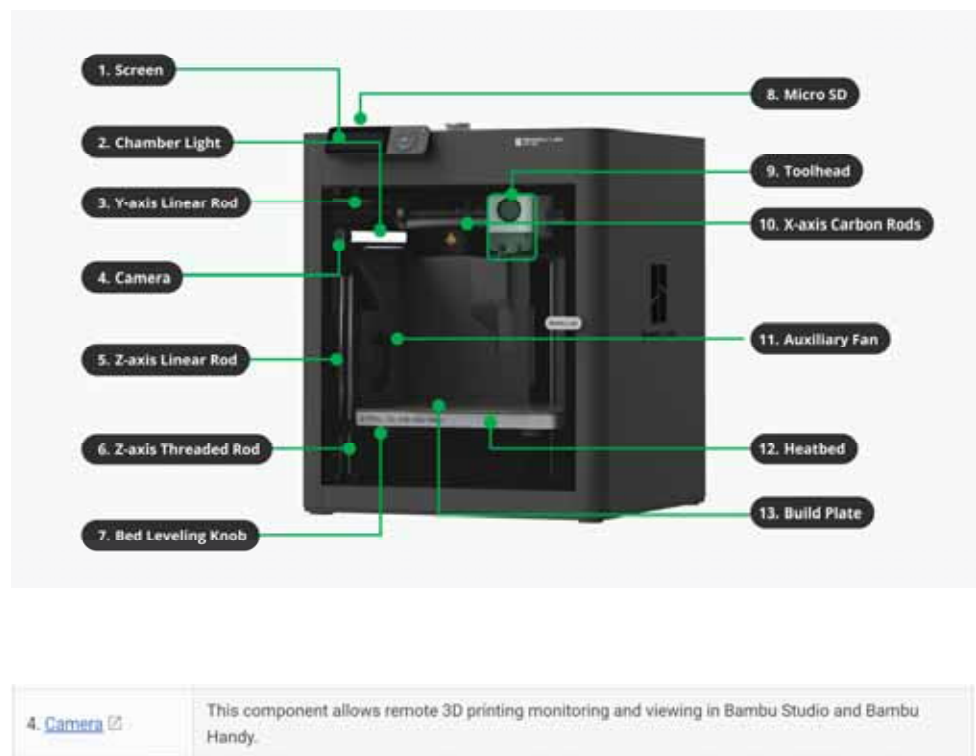


Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

<https://wiki.bambulab.com/en/p1:>

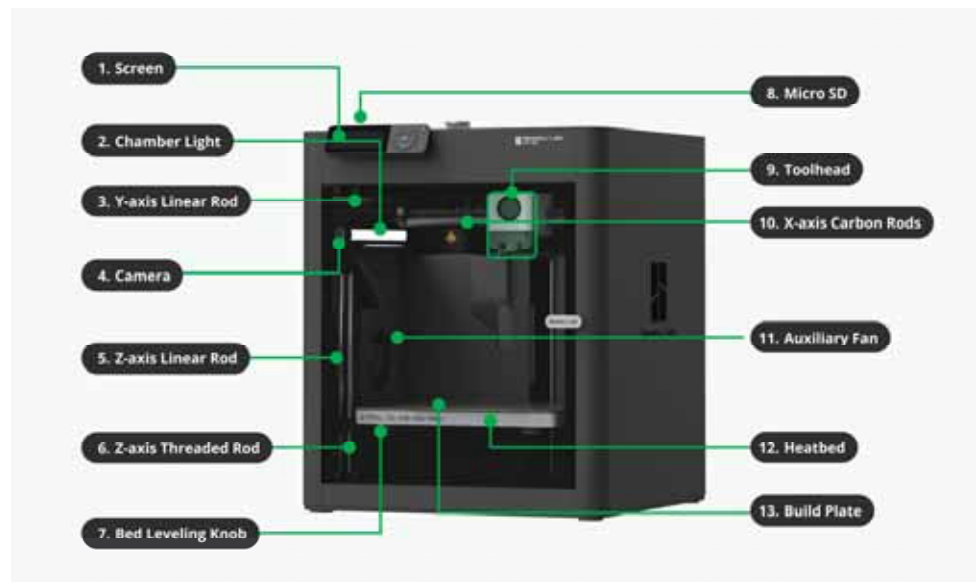
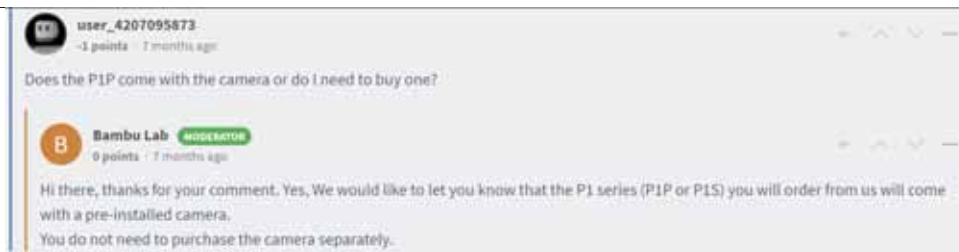
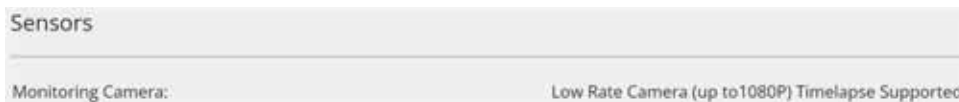


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See also <https://bambulab.com/en/a1/tech-specs>:



See also, <https://wiki.bambulab.com/en/a1/manual/intro-a1>:

Camera

The printer integrates a camera that can be used for real-time monitoring of prints using the Bambu Slicer or Bambu Handy applications. It can also be utilized for print defect detection (supported after firmware updates).

In addition to its monitoring capabilities, the camera can record printed videos and create time-lapse videos. While the machine does not have night vision, the camera module has an LED that can illuminate the printed object.

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See also, <https://wiki.bambulab.com/en/a1-mini>:

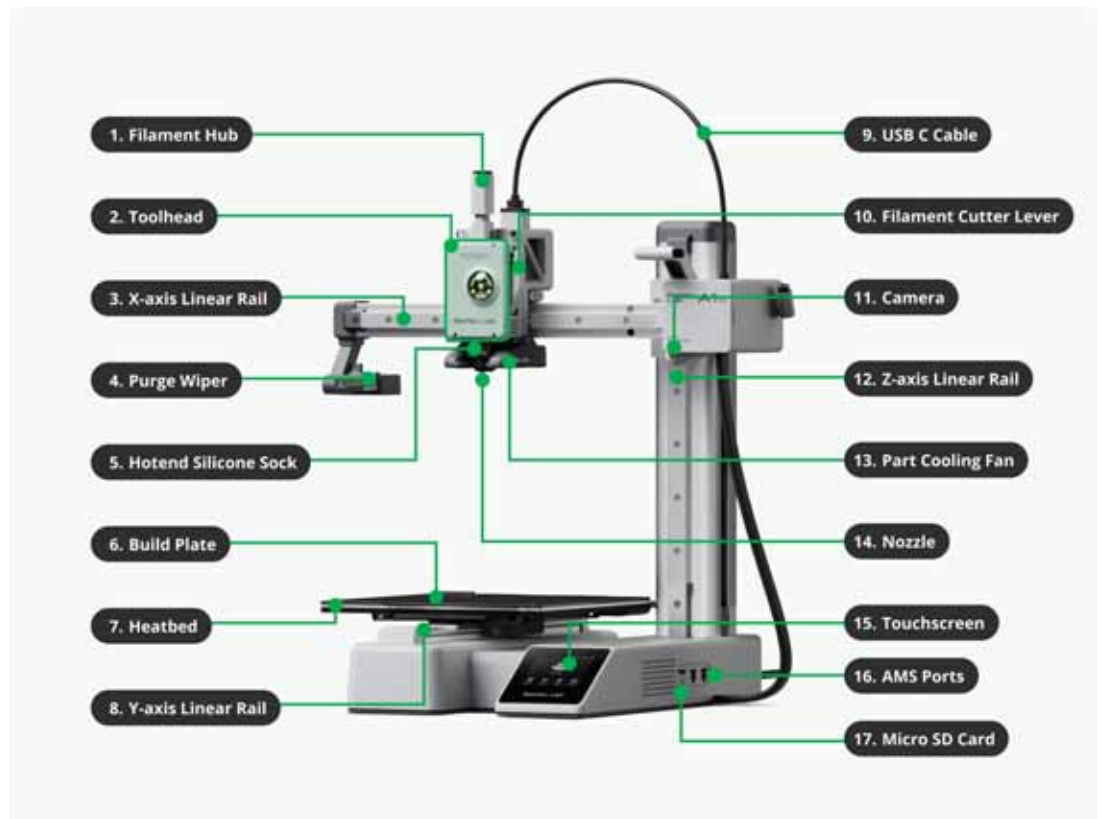


Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

See also, <https://wiki.bambulab.com/en/a1-mini/camera-replacement-guide>:



See <https://wiki.bambulab.com/en/software/bambu-studio/remote-control>:

Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

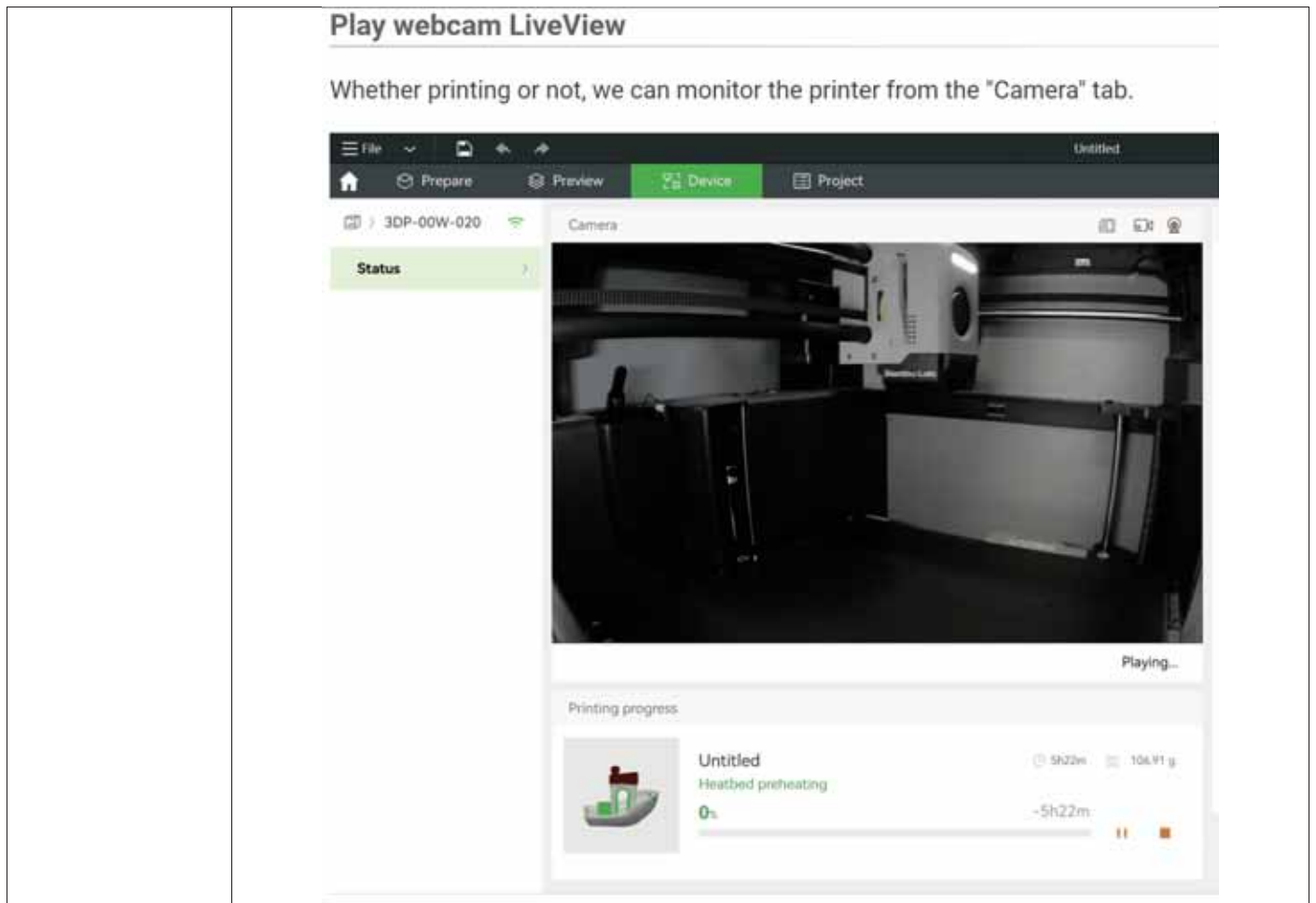


Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

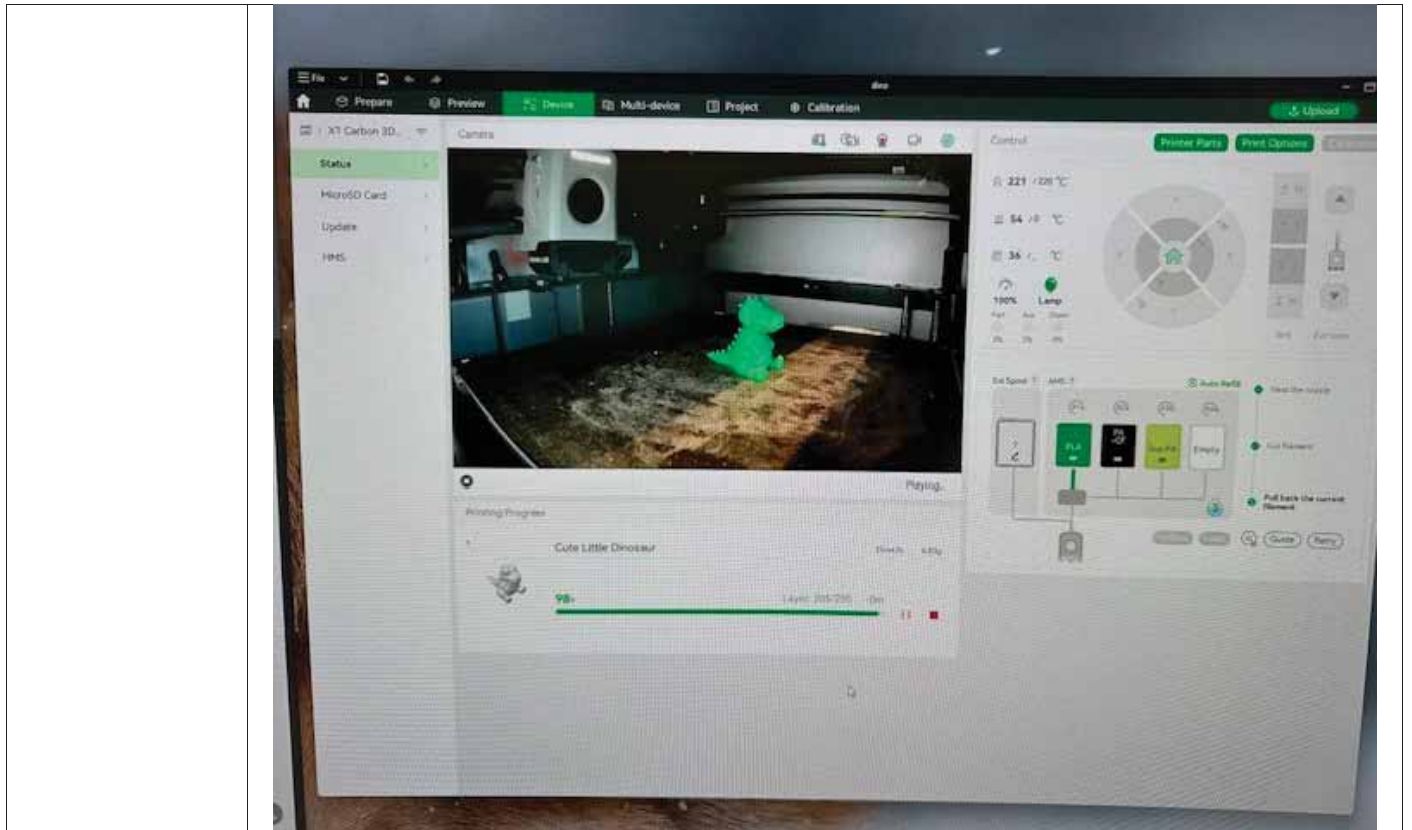
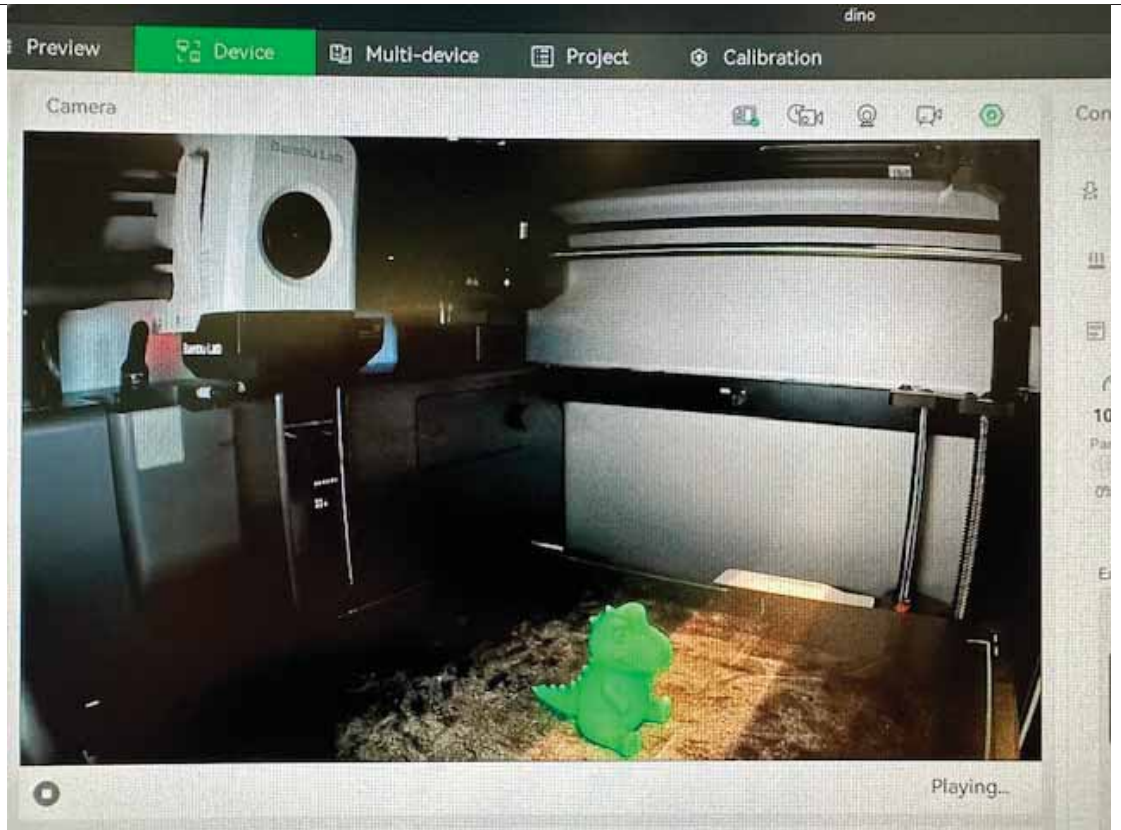


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<https://wiki.bambulab.com/en/studio-handy/handy/bambu-handy-quick-start>

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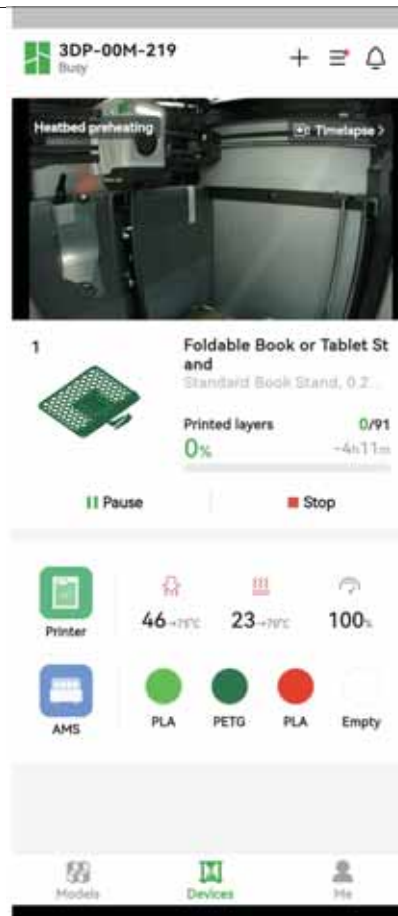
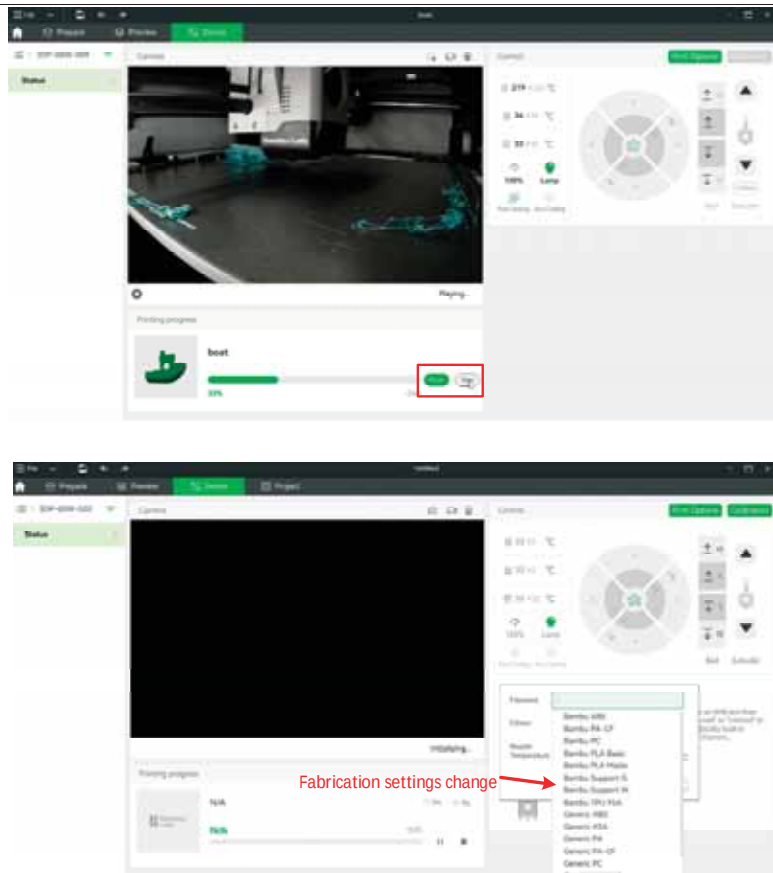


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7. The device of claim 1 wherein the user interface provides at least one control for manual operation of the three-dimensional printer by the remote user.	For each of the Accused Instrumentalities, the user interface provides at least one control for manual operation of the three-dimensional printer by the remote user. For example, the user interface for Bambu Studio for each Bambu Lab 3-D printer, including but not limited to the Bambu Lab A1, A1 mini, P1S, P1P, X1C, and X1E printers, provides control for manual operation of the printer. Remote Control Going to the Device surface on the Studio will allow you to control and monitor the print remotely in real time (Please check this wiki: remote-control). If you have a camera installed in your machine (Standard on the X1C), you can also watch a live feed of the print remotely https://wiki.bambulab.com/en/software/bambu-studio/remote-control The images below from Bambu Studio show examples of manual operations, such as pausing fabrication, stopping fabrication, restart fabrication (un-pause), and changing fabrication settings: After the printing starts, we can find the 'Printing progress' of the current print job. We can stop or pause/resume your current print job.
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<https://wiki.bambulab.com/en/software/bambu-studio/remote-control>

Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

Similarly, user interface for Bambu Handy provides control for manual operation of the printer (see <https://wiki.bambulab.com/en/studio-handy/handy/bambu-handy-quick-start>):

Printer Control

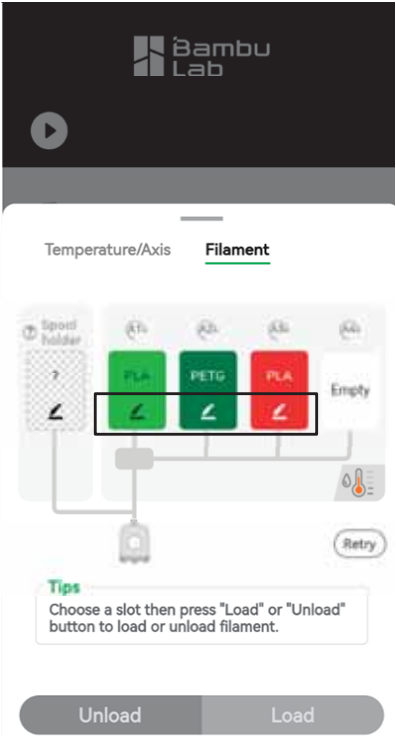
Printer Control contains control options for both the printer and AMS sections. On the main screen, you can directly control the nozzle temperature, heat bed temperature and speed, or click on the color block corresponding to each filament to view material information. Clicking on Printer or AMS on the left side of the module takes you to the detail page, where you can move the printer axes in addition to what you can do on the main screen, control some parts (such as the light and cooling fan), and control the AMS to perform load/unload actions.

The images below from Bambu Handy show examples of manual operations, such as pausing fabrication, stopping fabrication, restart fabrication (un-pause), and changing fabrication settings:

Print Project

The Print Items module displays only the last item printed by the binded device if no item is currently printing. If the device is printing, the module displays the currently printing item and the print control options. If printing was initiated through the printer, the module only displays the Pause and Stop options, but if the print item was sent to the printer from Bambu Studio, the module displays the Skip Part option in addition to Pause and Stop. This option will be covered in the advanced features part of this article.

Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324



<https://wiki.bambulab.com/en/studio-handy/handy/bambu-handy-quick-start>

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8. The device of claim 1 wherein the processor is configured to provide credential-based access to the user interface.	For each of the Accused Instrumentalities, the processor is configured to provide credential-based access to the user interface. For example, the Bambu Handy software running on a processor that alone or in combination with a processor on the printer is configured to provide sign in/sign up to complete account registration or login before gaining access to the user interface for the printer. Bambu Handy supports such access for each Bambu Lab 3-D printer, including but not limited to the Bambu Lab A1, A1 mini, P1S, P1P, X1C, and X1E printers. See https://wiki.bambulab.com/en/studio-handy/handy/bambu-handy-quick-start: Sign In/Sign Up Upon entering the main interface, tap the Me button located on the right side of the bottom navigation bar to access the "Me" page. Next, click on Login/Register at the top of the screen to complete account registration or login. Bambu Handy provides login options using an email address, Google account, or Facebook account.
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Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

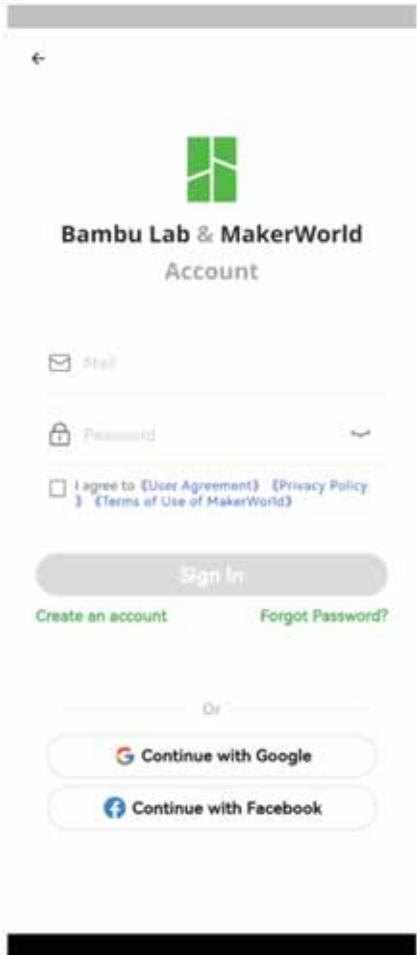
	
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Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

	Add Printer After successfully logging in to your account, click the Devices button in the bottom navigation bar to enter the "Devices" page, and then click Bind Printer to add a printer. [Device] Interface Functions After completing the printer binding, the application will automatically return to the device screen. The Device interface contains the top bar, printer monitoring image, item currently being printed (or the last previously printed item), and the printer controls.
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Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

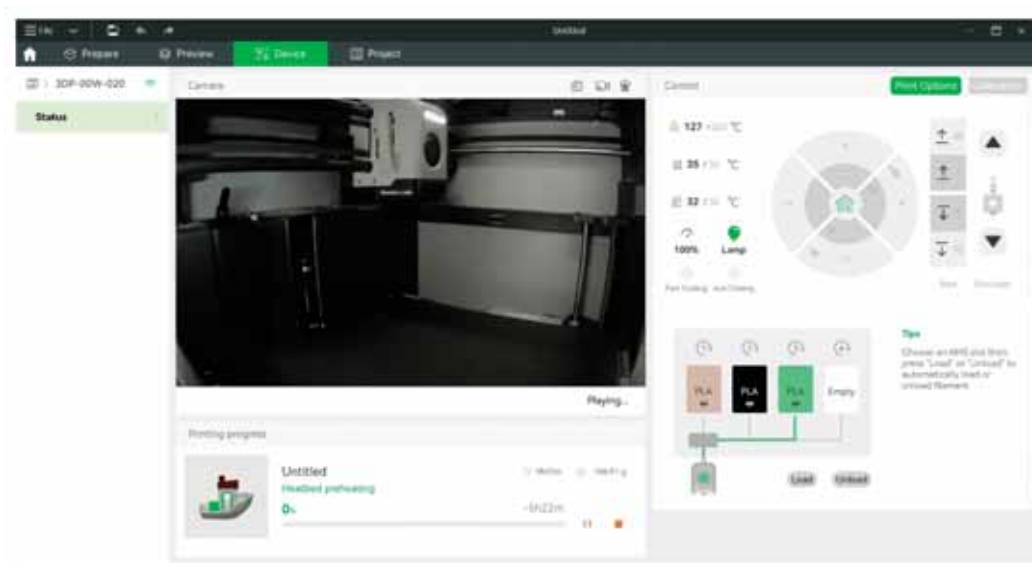
9. The device of claim 1 wherein the user interface provides status information for the three-dimensional printer.

For each of the Accused Instrumentalities, the user interface provides status information for the three-dimensional printer.

For example, the user interface for Bambu Studio provides status information of the printer, including but not limited to the Bambu Lab A1, A1 mini, P1S, P1P, X1C, and X1E printers, as indicated below (such as temperatures of printer).

Control printer

Control bed temperature, nozzle temperature, speed level, fan on/off, move the tool head along XYZ, calibrate the printer, and adjust AMS settings.



<https://wiki.bambulab.com/en/software/bambu-studio/remote-control>

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Bambu Handy offers a similar experience, as shown below:

Printer Control

Printer Control contains control options for both the printer and AMS sections. On the main screen, you can directly control the nozzle temperature, heat bed temperature and speed, or click on the color block corresponding to each filament to view material information. Clicking on Printer or AMS on the left side of the module takes you to the detail page, where you can move the printer axes in addition to what you can do on the main screen, control some parts (such as the light and cooling fan), and control the AMS to perform load/unload actions.



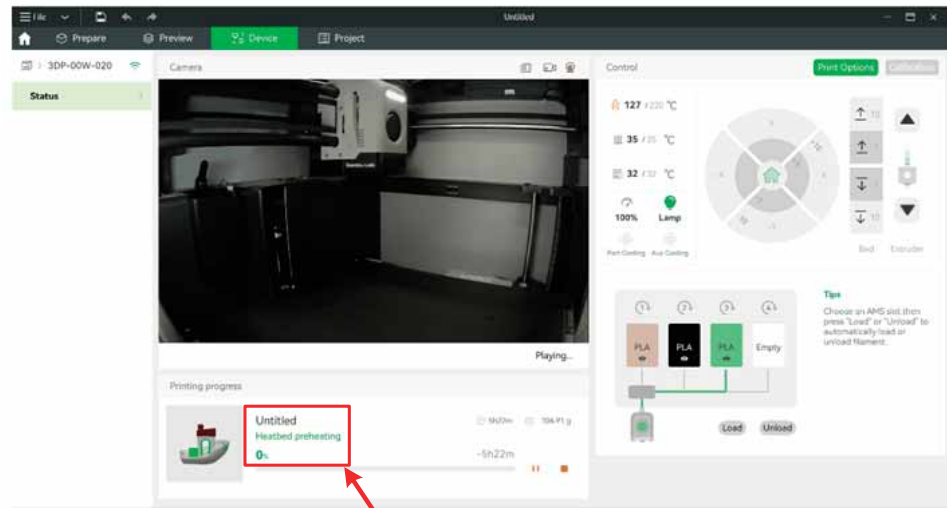
<https://wiki.bambulab.com/en/studio-handy/handy/bambu-handy-quick-start>

Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

10. The device of claim 1 wherein the user interface provides status information for a build process executing on the three-dimensional printer.

For each of the Accused Instrumentalities, the user interface provides status information for a build process executing on the three-dimensional printer.

For example, the user interface of Bambu Studio provides status information of the build, such as completion percentage, shown below. Each Bambu Lab 3-D printer, including but not limited to the Bambu Lab A1, A1 mini, P1S, P1P, X1C, and X1E printers, alone or in combination with Bambu Studio supports such status information.



Status Information

<https://wiki.bambulab.com/en/software/bambu-studio/remote-control>

Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

Further, the user interface of Bambu Handy provides status information of the build, such as completion percentage. Each Bambu Lab 3-D printer, including but not limited to the Bambu Lab A1, A1 mini, P1S, P1P, X1C, and X1E printers, alone or in combination with Bambu Handy supports such status information.



<https://wiki.bambulab.com/en/studio-handy/handy/bambu-handy-quick-start>

Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

11. The device of claim 1 wherein the user interface displays a two-dimensional tool path for the three-dimensional printer, the two-dimensional tool path corresponding to a current layer of the object during a fabrication of the object by the three-dimensional printer.	For each of the Accused Instrumentalities, the user interface displays a two-dimensional tool path for the three-dimensional printer, the two-dimensional tool path corresponding to a current layer of the object during a fabrication of the object by the three-dimensional printer. For example, the user interface in Bambu Studio displays slicing information for the 3-D printer that corresponds to a current layer (e.g., layer 230 in the image below) of the object during fabrication of the object by the 3-D printer. Each Bambu Lab 3-D printer, including but not limited to the Bambu Lab A1, A1 mini, P1S, P1P, X1C, and X1E printers, alone or in combination with Bambu Studio supports the display of such information.
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Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324

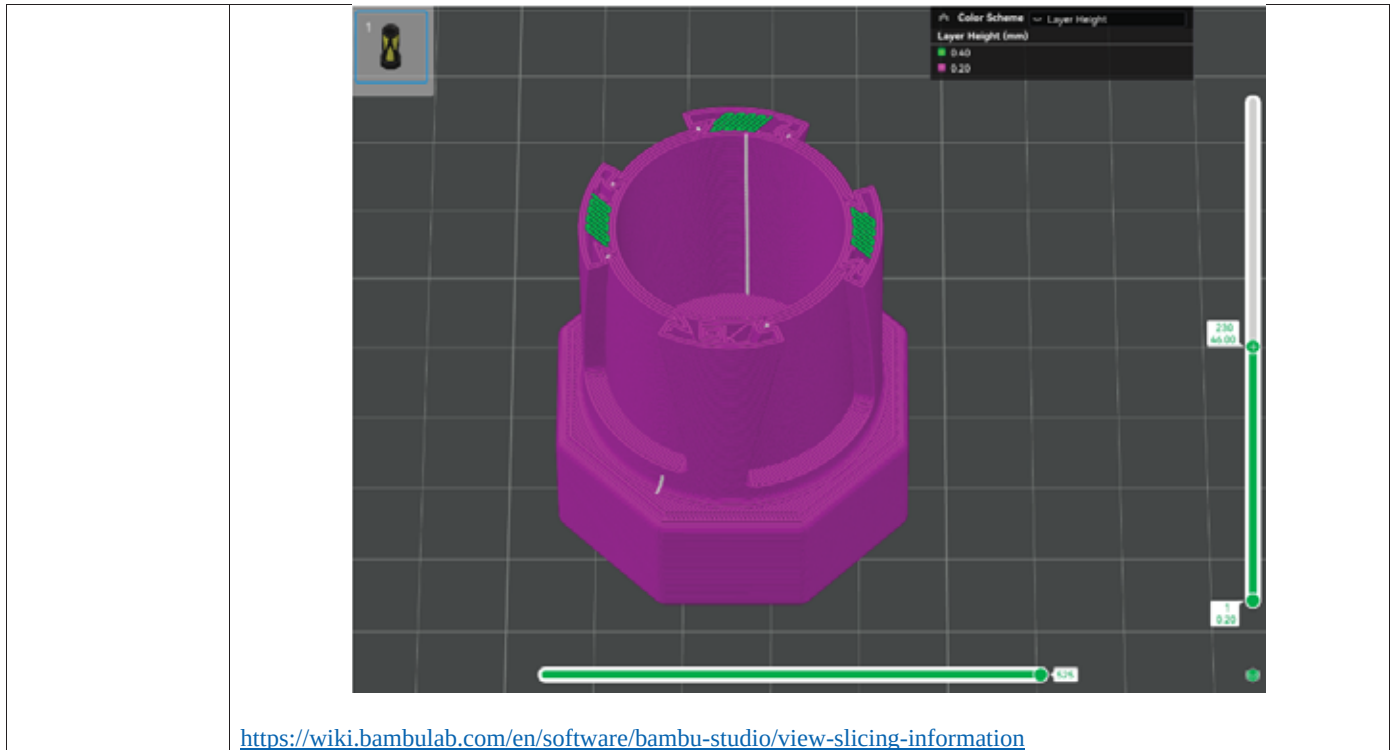


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17. The device of claim 1 wherein the user interface includes at least one control to capture a stop-motion animation of a fabrication of the object using the video camera.	For each of the Accused Instrumentalities, the user interface includes at least one control to capture a stop-motion animation of a fabrication of the object using the video camera. For example, the user interface of Bambu Studio includes a control to capture a time lapse of the fabrication of the object using the video camera. Each Bambu Lab 3-D printer, including but not limited to the Bambu Lab A1, A1 mini, P1S, P1P, X1C, and X1E printers, alone or in combination with Bambu Studio supports such control. See https://wiki.bambulab.com/en/software/bambu-studio/Timelapse: 1. Introduction to different modes of time-lapse In the Bambu Studio, if you enable timelapse, a timelapse video will be generated for each print. After each layer is printed, a snapshot is taken by the chamber camera. All of these snapshots are composed into a timelapse video when printing completes. There are two modes of timelapse: smooth mode and traditional mode. For different printers, there will be some differences in the action of shooting time-lapse photography, which is described as follows. X1 and P1 series printers Smooth mode: the tool head will move to the excess chute after each layer is printed and then take a snapshot. Since the melted filament may leak from the nozzle during the process of taking the snapshot, a prime tower is required in this mode. So a prime tower will be automatically generated if there is no prime tower on the build plate. It will reuse the existing prime tower if there is already a prime tower on the plate. In this mode, the toolhead in the video always stays above the prime tower and does not block the model. Therefore, the timelapse video looks very smooth. However, the overall print time will be longer because this mode adds additional paths and nozzle cleanings to the toolhead.
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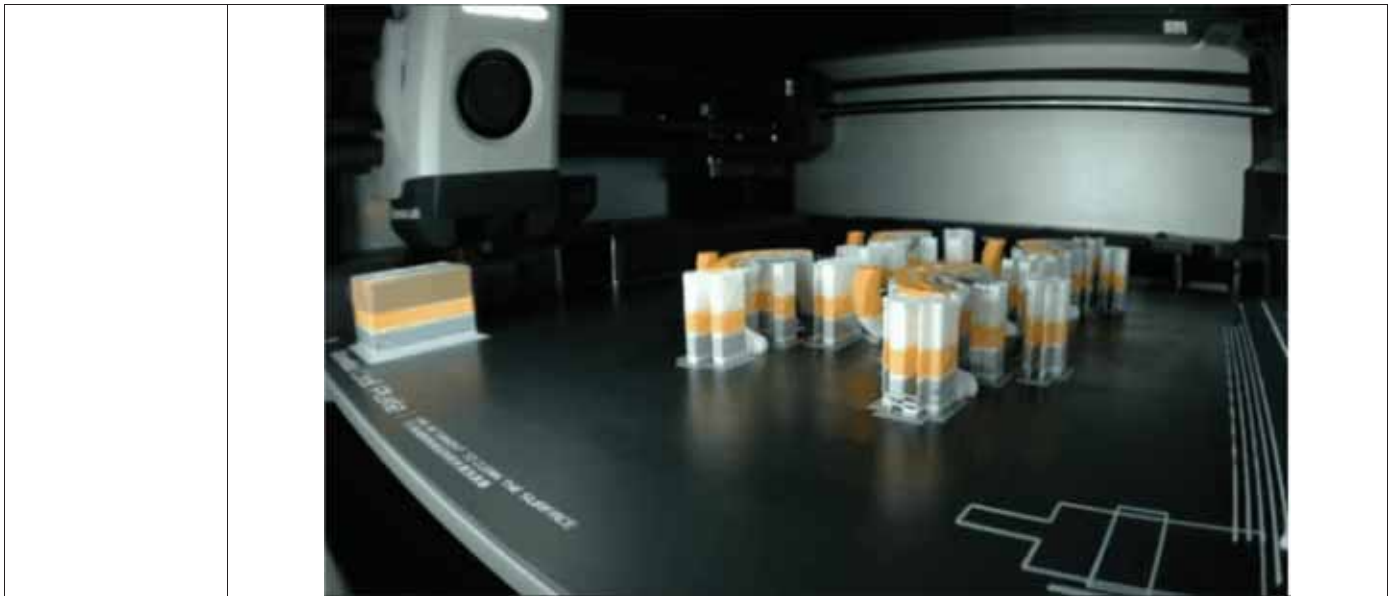
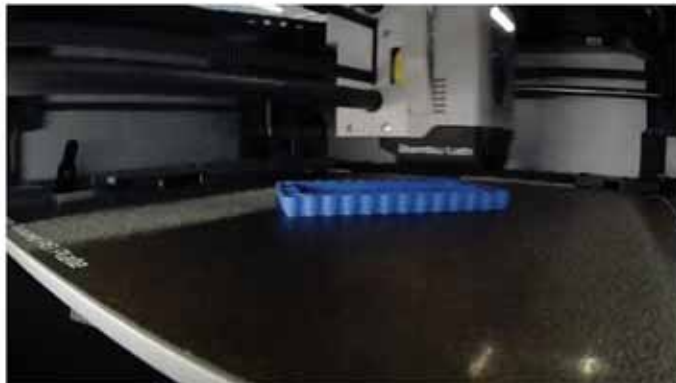


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Traditional mode: It takes a snapshot directly after each layer is printed, so there is no need for a prime tower in this mode. In time-lapse videos, the toolhead is constantly moving.



A1 Series Printer

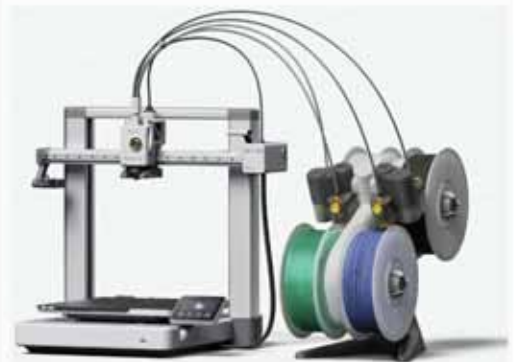
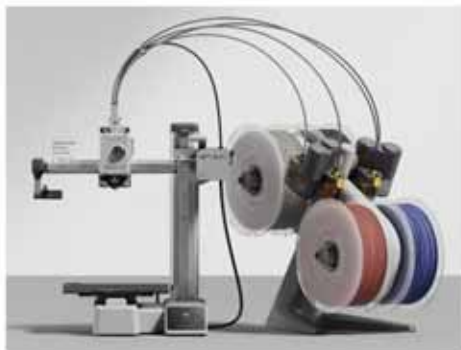


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	When shooting the time-lapse video, it is necessary to keep the horizontal position of the heat bed fixed and only change the position in the Z direction. However, the A1 series printer's heat bed was constantly moving during printing, causing the model to move horizontally as well. So, to successfully shoot time-lapse videos, the A1 series printer moves the heat bed to a fixed position and the nozzle to the purge wiper before each shooting then moves them back above the model to continue printing. Whether it is the traditional mode or smooth mode time-lapse photography, it will move the heat bed and tool head to a fixed position before taking the photo. You can see the moving path to the purge wiper in the traveling path previewed after slicing (see below), but if you do not enable the time-lapse feature before sending the print job, these moves will not be executed during the actual print process. Traditional mode: During the printing process, due to the leakage caused by the pause when taking the snapshot, the traditional mode of time-lapse photography does not have a prime tower to absorb this flaw, affecting the printing quality. So our strategy is to print defects into the infill as much as possible to ensure surface quality, but if the model has no infill area in this layer, defects are inevitable. In this case, it is not recommended to enable time-lapse photography in traditional mode but to use smooth mode. You will also receive a prompt before sending the print job.
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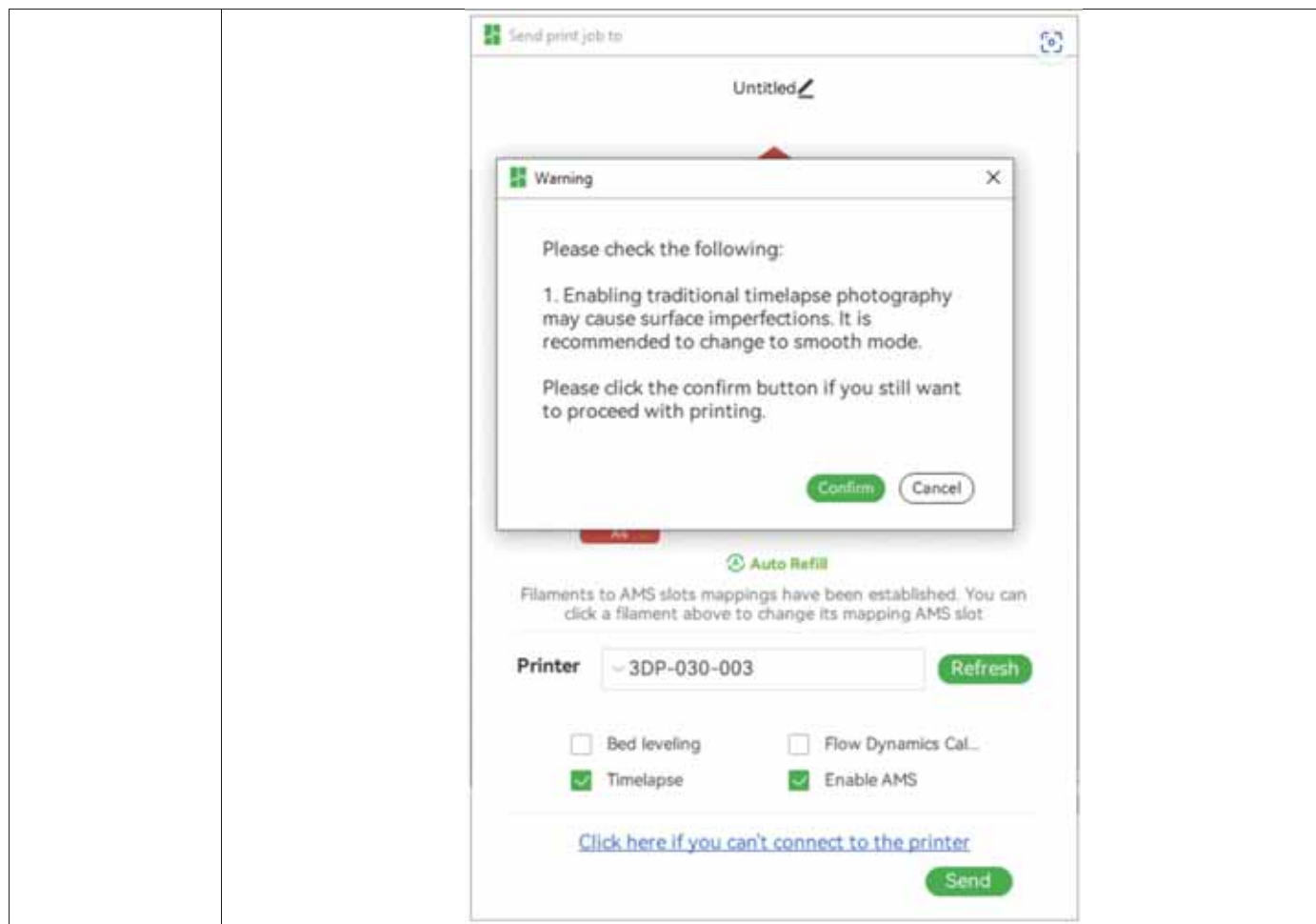


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Smooth mode: After selecting smooth mode time-lapse photography, a prime tower will be automatically generated by default. During the printing process, after pausing to take photos, the nozzle will print on the prime tower first, and then continue to print on the model, so that the leakage defects caused by the pause are absorbed by the prime tower.

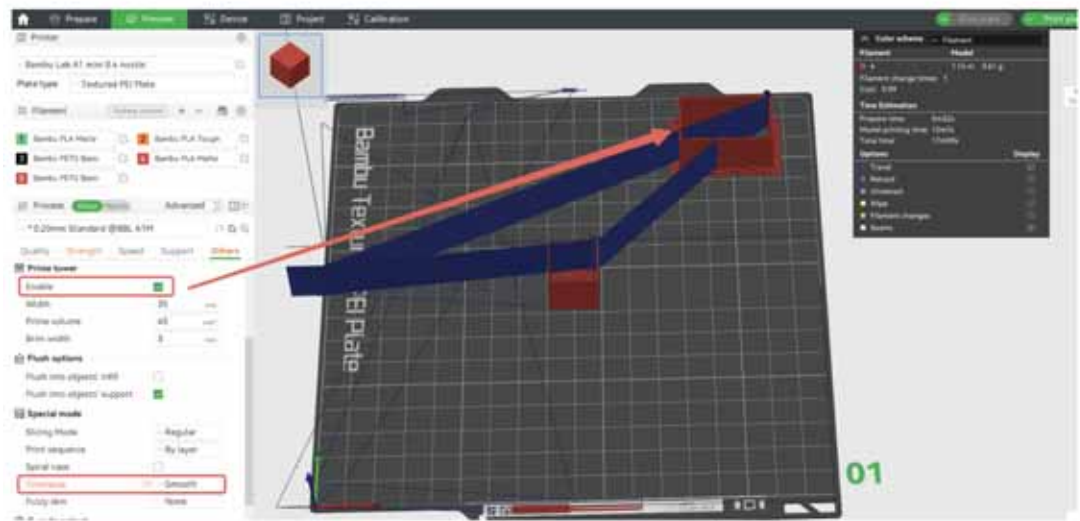


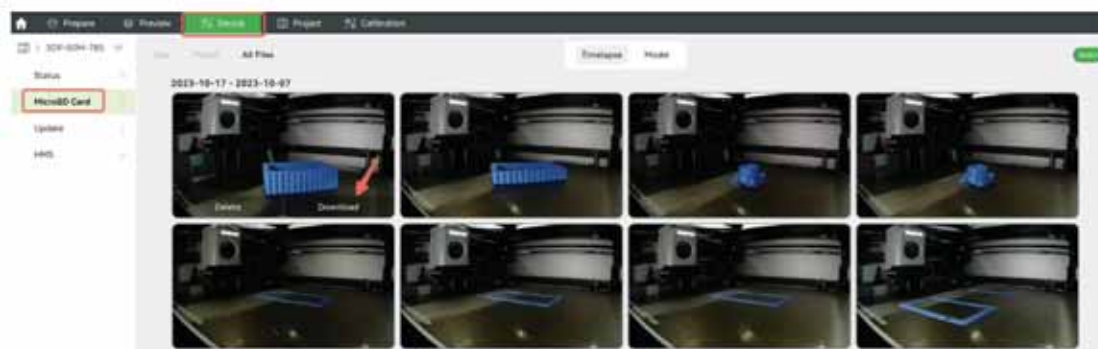
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Timelapse Fade-on Mode: When this mode is turned on, a cropping effect will appear when printing the first layer. As the number of layers increases, the image gradually changes from zooming in to zooming out.



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In Bambu Studio, you can also download time-lapse video files from the "Device" - "MicroSD Card" page:



Further, the user interface of Bambu Handy includes a control to capture a time lapse of the fabrication of the object using the video camera.

<https://wiki.bambulab.com/en/software/bambu-handy/bambu-handy-release-note>

- Added support for choosing whether to record timelapse when sending a print job. Note that P1P firmware needs to be updated to V01.02.01.00

See <https://wiki.bambulab.com/en/studio-handy/handy/bambu-handy-quick-start>

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See also, <https://wiki.bambulab.com/en/makerworld/tutorials/printing-tutorial-on-bambu-handy>:

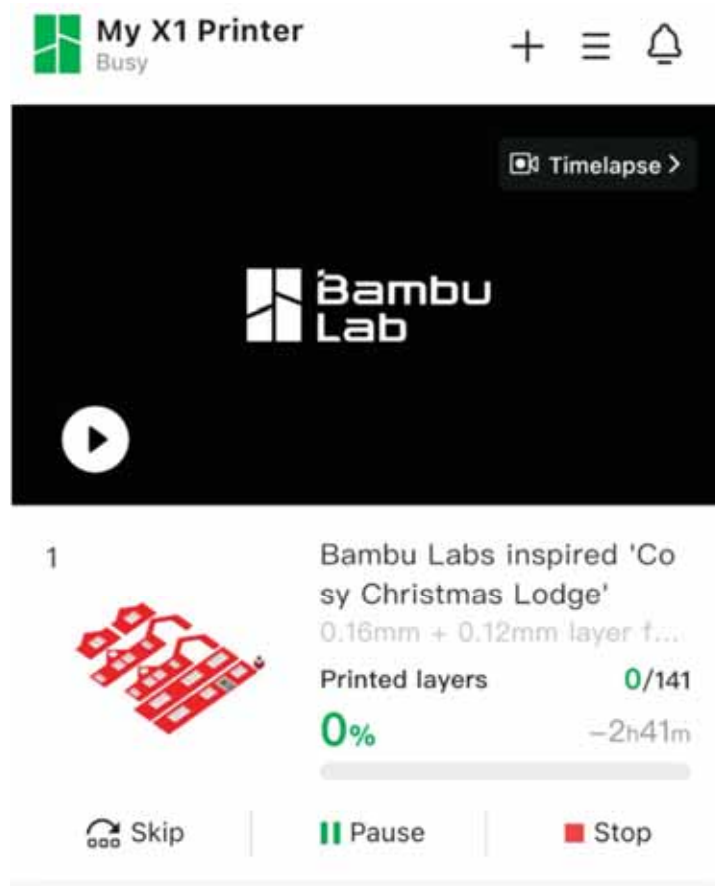


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See also, <https://wiki.bambulab.com/en/studio-handy/handy/bambu-handy-quick-start>:



1. Under the TimeLapse tab, you can watch and manage timelapse videos on your SD card. After clicking into an individual video, you can download or share that video.

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18. The device of claim 1 wherein the processor is configured to couple the three-dimensional printer in a communicating relationship with a remote print server through the data network.	For each of the Accused Instrumentalities, the processor is configured to couple the three-dimensional printer in a communicating relationship with a remote print server through the data network. For example, the X1E printer includes a network connection such that the printer can communicate with a cloud server through the network connection. X1E now supports both Wi-Fi and Wired connection. It supports simultaneous connections to both wired and wireless networks, with a prioritized wired network. Additionally, the printer has two separate physical switches that allow you to control the wired and wireless networks individually. If you are connected to both wired and wireless networks but want to use the wireless network, you can unplug the Ethernet cable or disable the physical switch for the wired connection. https://wiki.bambulab.com/en/x1/manual/x1e-network-connection-guide Auto mode: it communicates with the printer via internet and local area network accordingly. The print file will be transferred to the cloud server to make the printer download from the remote. And it also helps to support printing again from the print history list in Bambu Handy. All the information and file is visible only to the user who sent the print task. By default the print files will be removed automatically after 90 days from the first printing. User can remove print files from cloud one by one from the Bambu Handy App's print history menu, or auto remove all new print files by enabling the "Incognito Printing" option in App settings. https://wiki.bambulab.com/en/software/bambu-studio/remote-control Similarly, the X1C, P1S, P1P, A1 and A1 Mini printers include a network interface (e.g., Ethernet, Wi-Fi, LAN, etc.) in which a processor for network communications is configured to couple the printer to communication with a remote print server through the data network. https://wiki.bambulab.com/en/general/bbl-security
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IoT Security

To provide the remote control features of the printers, Bambu Lab uses IoT services including device login, device information synchronization, firmware/software updates, user device binding, remote printing, slicing parameter management, cloud slicing, failure detection, and other functions.

Every device has a unique built-in 128-bit ID and password, which are randomly generated at the factory. When the device performs a binding action, the communication is done via HTTPS API, to get validation from the server.

Printers can be connected to a user account in the following 3 ways:

- Scanning a QR code shown on the printer
- Connecting to the printer via LAN through an SSDP message.
- Connecting through a Bluetooth connection

All three connection methods use secure authentication methods like HTTPS and TLS.

3D models can be sent to the printer using a LAN network connection or through our cloud services if a stable Internet connection is available.

When the files are sent to the printer through our cloud services, the .3mf files are sent to a temporary private storage location through an HTTPS secure channel. The uploaded file contains the validity period and the relevant authentication signature, and can only be used for uploading to maximize data security.

After the file is uploaded to the cloud, the printer obtains the print file address from the MQTT print command, downloads it locally, and parses it before starting the print process.

When it comes to the Video streaming service, the cloud connection acts as a security broker to validate the request and offer the stream to Bambu Handy and Studio. Both the video stream and the file transfers are protected with TLS encryption.



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<https://wiki.bambulab.com/en/general/printer-network-ports>

This document lists all the applications and ports required for the printer. Please check the setting of the router or your PC to make sure these ports are not blocked.

Application	Port	Type	Comments
http API	80/443/8080	TCP	Cloud mode
mqtt	8883	TCP	Cloud mode
Remote video	8000/21047/10001	TCP	Cloud mode
Remote video	10001-10512	UDP	Cloud mode
Device binding	3000	TCP	Cloud mode
Device discovering	1990/2021	SSDP, multicast/broadcast	Cloud/LAN mode
LAN mode MQTT	8883	TCP	LAN mode.
LAN mode FTP	990/50000~50100	TCP	LAN mode
LAN mode video	322/6000	TCP	LAN mode
NTP	123	TCP/UDP	Cloud/LAN mode

Domain name/IP

To make printers able to communicate with Cloud servers, the following domain names/IP addresses are used.

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		Application	Domain name/IP	Related Features
		NTP	pool.ntp.org 0.pool.ntp.org 1.pool.ntp.org 2.pool.ntp.org 3.pool.ntp.org	
		http API	Global users: - *.bambulab.com: Given the changes in cloud services, listing all domain names here is not feasible. Examples include: api.bambulab.com, e.bambulab.com - *.amazonaws.com: This is the AWS S3 service, domain reference: https://docs.aws.amazon.com/general/latest/gr/s3.html China mainland users: - *.bambulab.cn: Given the changes in cloud services, listing all domain names here is not feasible. Examples include: api.bambulab.cn e.bambulab.cn - *.aliyuncs.com: This is aliyun oss service, domain reference: https://help.aliyun.com/zh/oss/user-guide/regions-and-endpoints	Primary Cloud functions including user login, remote print, remote video, firmware OTA, etc.
		mqtt	Global users: - us.mqtt.bambulab.com China mainland users: - cn.mqtt.bambulab.com	Remote printer control/print

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			Global users: Given the changes in video servers, listing all domain names here is not feasible. - all-master-tutk.iotcplatform.com - all-c-master-71spctnsfa8p5xvgkssa.iotcplatform.com - all-c-master-tutk.iotcplatform.com - m1.iotcplatform.com - m2.iotcplatform.com - m3.iotcplatform.com - m4.iotcplatform.com - m5.iotcplatform.com - m6.iotcplatform.com - - m7.iotcplatform.com - m8.iotcplatform.com - m9.iotcplatform.com - m10.iotcplatform.com - m11.iotcplatform.com - m12.iotcplatform.com - m13.iotcplatform.com - mdk-im.kalay.net.cn		
		Remote video		Remote video monitoring/video file download	

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<https://wiki.bambulab.com/en/software/bambu-studio/remote-control>

Two network modes

Bambu Studio Supports two network modes:

- Auto mode: it communicates with the printer via internet and local area network accordingly. The print file will be transferred to the cloud server to make the printer download from the remote. And it also helps to support printing again from the print history list in Bambu Handy. All the information and file is visible only to the user who sent the print task. By default the print files will be removed automatically after 90 days from the first printing. User can remove print files from cloud one by one from the Bambu Handy App's print history menu, or auto remove all new print files by enabling the "Incognito Printing" option in App settings.
- LAN mode: it communicates with the printer via the local area network. No print information and files will be transferred to cloud server in this mode. It's safe for cases when the printed content needs to be kept highly secret. (Please know more about it: [How to enable LAN Mode on X1 / P1 series printers](#))

The printer is under Auto mode by default. We can turn on the "LAN Only" option on the printer from the "Network settings."

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19. A method comprising:
providing a three-dimensional printer including a build volume,

To the extent the preamble of the claim is limiting, each of the Accused Instrumentalities are used for providing a three-dimensional printer including a build volume.

For example, Bambu Lab's X1C, X1E, P1S, P1P, A1 and A1 mini printers are 3D printers that include a build volume. For example, the following image shows the X1 printer including a three-dimensional printer with a build volume. See e.g., <https://bambulab.com/en/x1>:



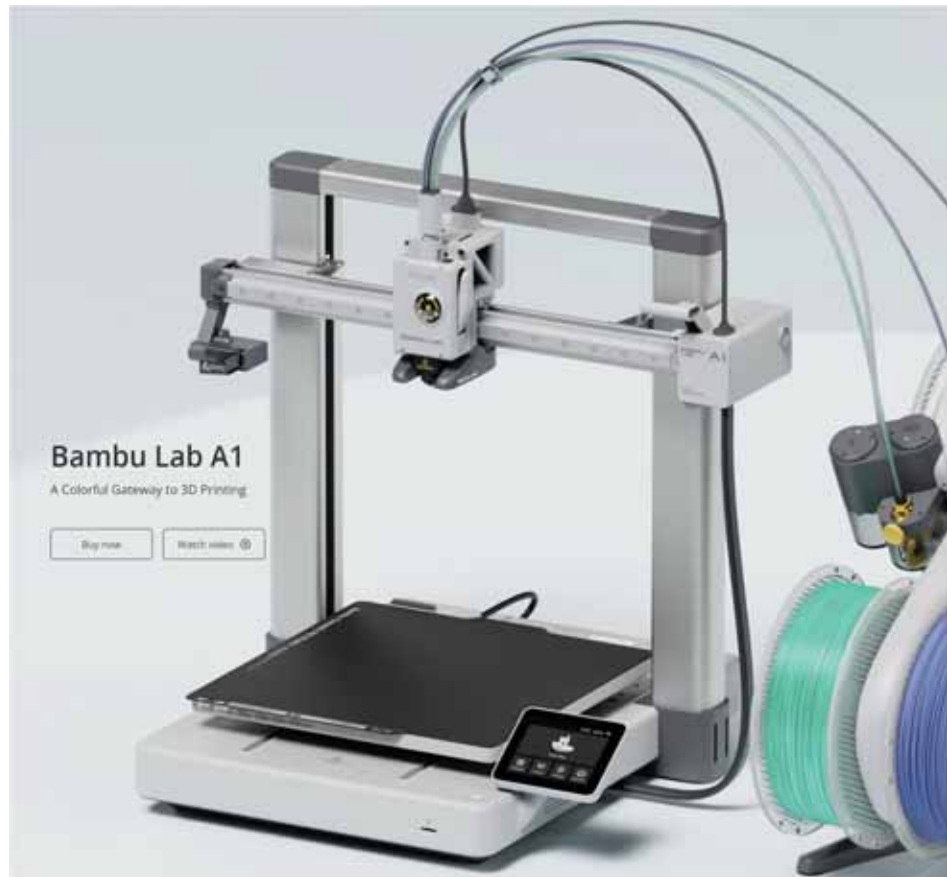
See also, <https://bambulab.com/en/p1>:

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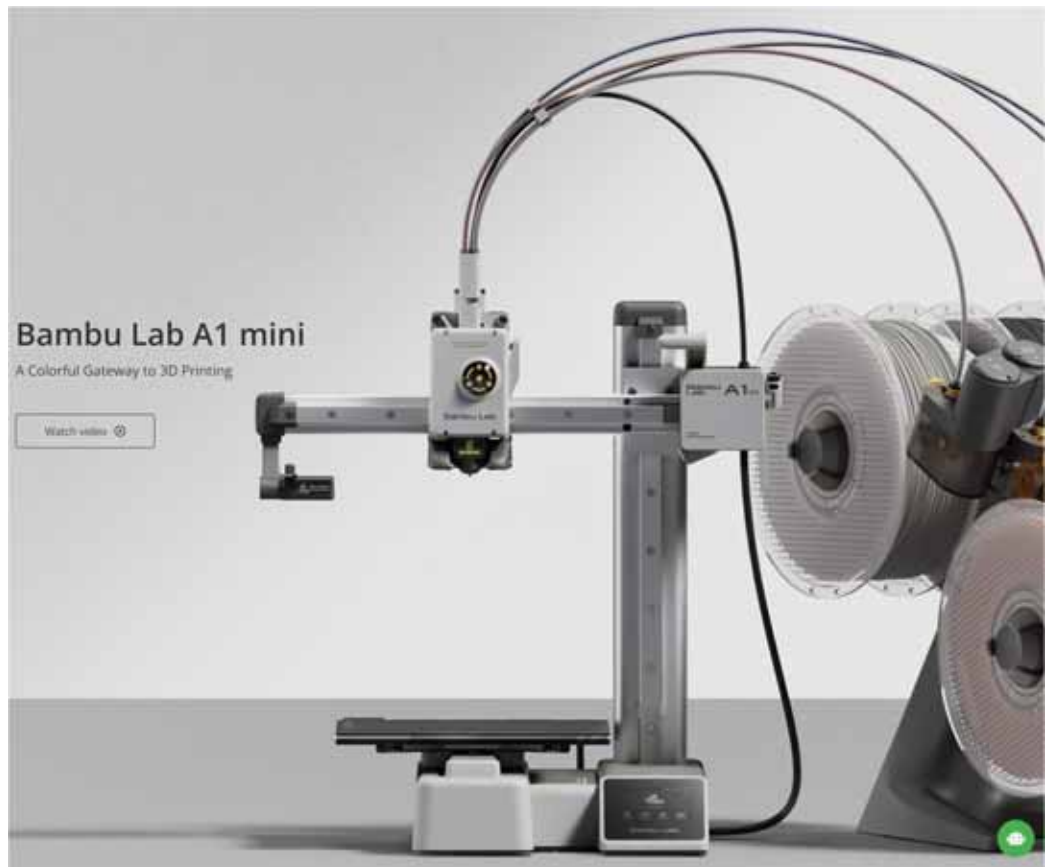
See also, <https://bambulab.com/en/a1>:

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See also, <https://bambulab.com/en/a1-mini>:

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See also, <https://bambulab.com/en/x1e>:

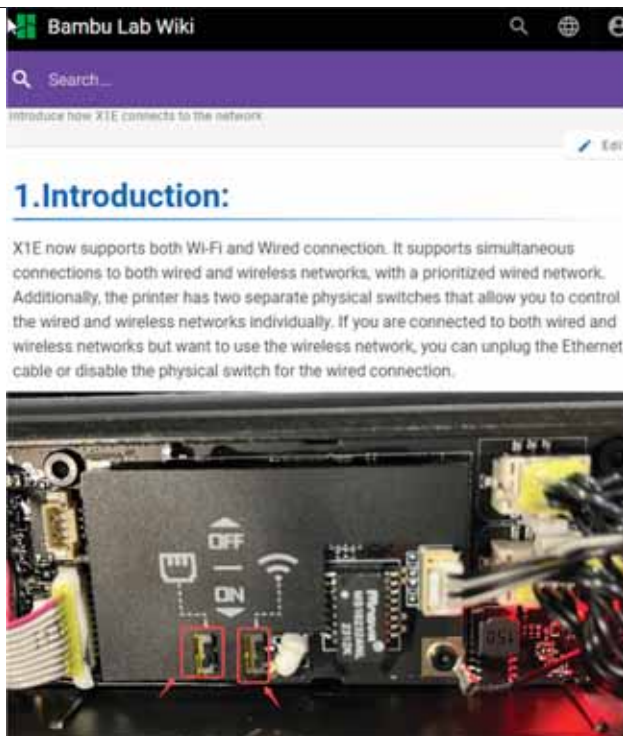
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a network interface coupled to a data network,	Each of the Accused Instrumentalities are used for providing a three-dimensional printer including a network interface. For example, Bambu Lab's X1C, X1E, P1S, P1P, A1 and A1 Mini printers include a network interface (e.g., Ethernet, Wi-Fi, LAN, etc.). For example, see the following screen shot image from https://wiki.bambulab.com/en/x1/manual/x1e-network-connection-guide that describes both a Wi-Fi and Wired connection for the X1E.
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As another example, the P-Series (and X and A series) of Bambu printers also includes a Wi-Fi network connection. See e.g., <https://wiki.bambulab.com/en/p1/maintenance/wifi-antenna>:

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WIFI antenna

The WIFI antenna is an electronic accessory used for wireless network connection. The WIFI antenna of the P series printers is installed on the inside of the front cover and is connected to the AP main board.



See also, <https://wiki.bambulab.com/en/x1/maintenance/replace-wifi-antenna>:

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What it is

The WIFI antenna is an electronic accessory used to enhance wireless network signals. The WIFI antenna of the X1 series printers is installed on the inside of the front cover and is connected to the AP main board.



See also, <https://wiki.bambulab.com/en/a1/manual/intro-a1>:

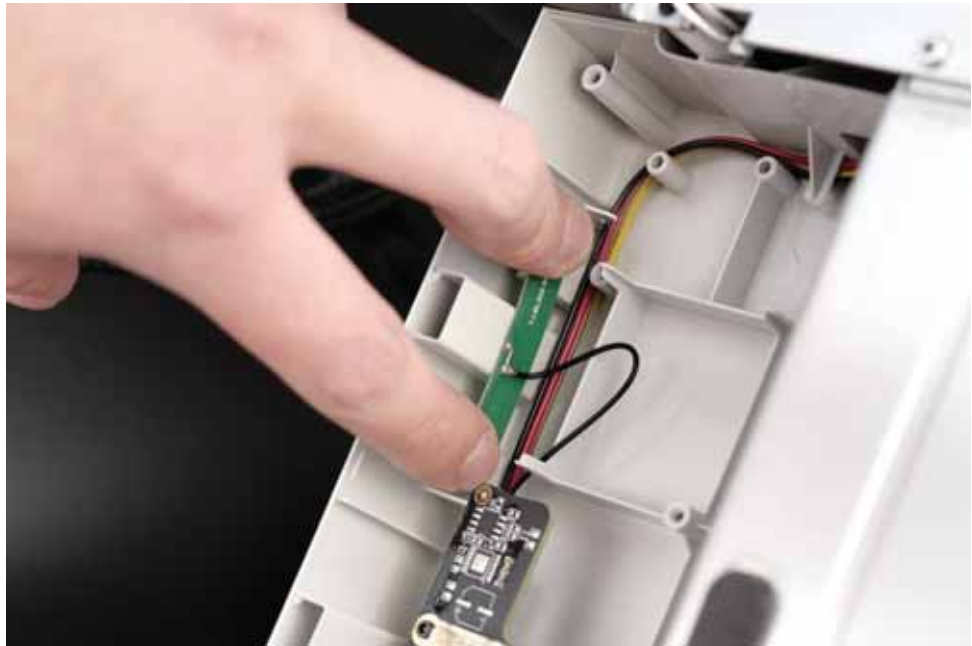
Circuit board

The main control board of the A1 printer consists of a low-power SoC (System-on-Chip) with a dual-core processor, Wi-Fi baseband, Bluetooth baseband, RF module, and other peripherals. It also includes a dual-core MCU (Microcontroller Unit) and a single-core MCU. Additionally, it incorporates stepper motor drivers and connectors required for connecting various electronic devices to the printer.

The SoC is primarily responsible for handling the user interface of the A1 printer and managing the connection between the slicing software/mobile application and the printer. On the other hand, the MCU controls the printer's heating and movement after receiving the CPU's G-code stream.

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See also, <https://wiki.bambulab.com/en/a1/maintenance/wi-fi-antenna-replacement-guide>:



See also, <https://wiki.bambulab.com/en/a1-mini/maintenance/wi-fi-antenna-replacement-guide>:

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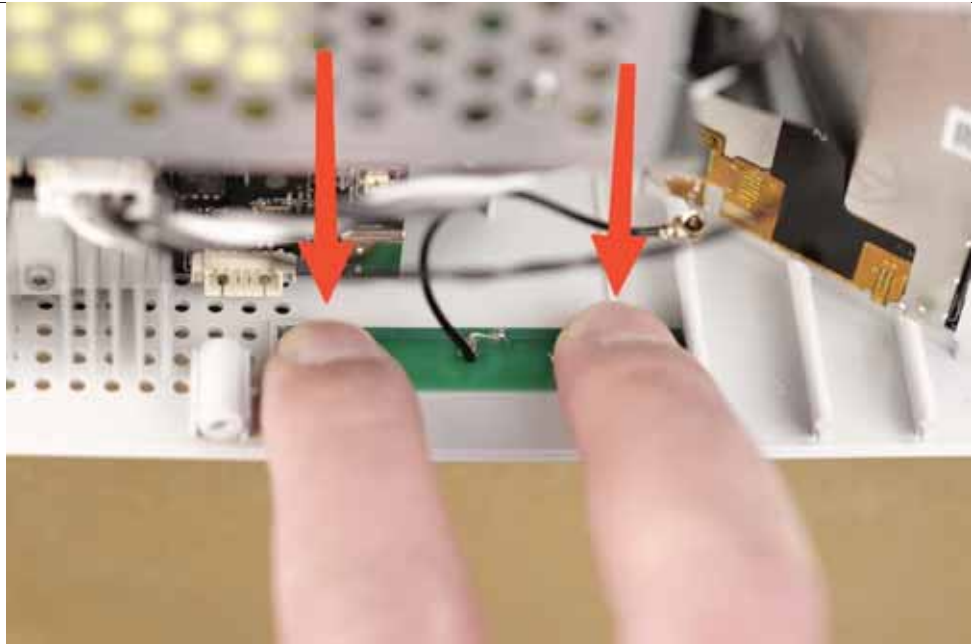


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and a video camera positioned to capture video of the build volume from a point of view	Each of the Accused Instrumentalities are used for providing a video camera positioned to capture video of the build volume from a point of view. For example, Bambu Lab's X1C, X1E, P1S, P1P, A1 and A1 Mini printers include a camera mounted to the printer. The following image of a Bambu Labs X1 printer shows where a "chamber camera" (e.g., video camera) is mounted within the build chamber and is positioned to capture video of the build volume. See e.g., https://bambulab.com/en/x1:  Health management system Door Sensor (Under development) A smart door sensor enables the X1 to pause prints if the door is opened, keeping your print and your environment safe. Chamber Camera Chamber Camera provides you with a remote livestream, shoots time lapses, and records the process for possible troubleshooting.
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See also the following image from <https://bambulab.com/en/x1>

Tech specs of the X1 Series

Technology		X1-Carbon	X1
		Fused Deposition Modeling	
Body	Shell	Aluminum & Glass	Plastic & Glass
Tool Head	Extruder Gears	Hardened Steel	Steel
	Nozzle	Hardened Steel	Stainless Steel
Cooling	Auxiliary Part Cooling Fan	Closed Loop Control	Optional
	Air Filter	Activated Carbon Filter	Optional
Supported Filament	PA, PC	Ideal	Capable
	Carbon / Glass Fiber Reinforced Polymer	Ideal	Not Recommended
Sensors	Chamber Monitoring Camera	1920 x 1080 Included	Optional
Physical Dimensions	Net Weight	14.18kg	13.18kg

See also, <https://us.store.bambulab.com/products/chamber-camera>:

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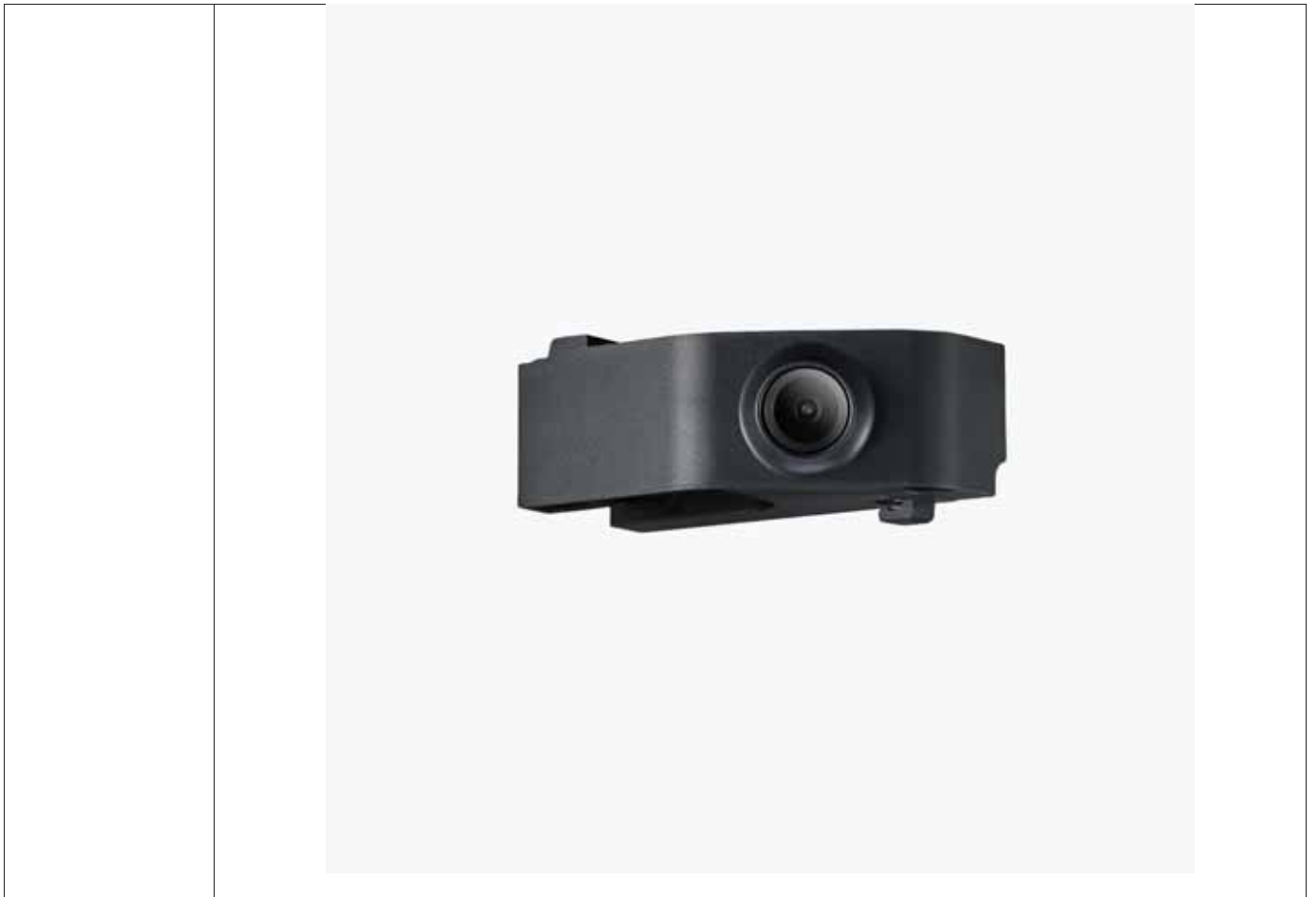
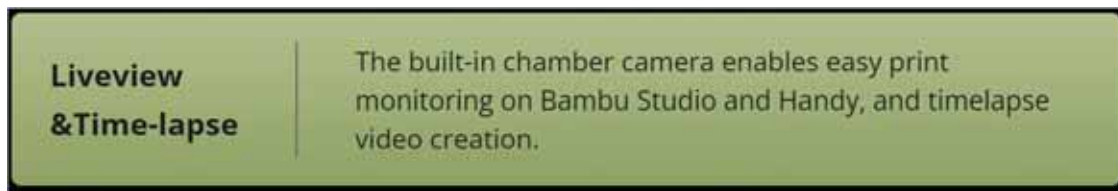


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See also, <https://bambulab.com/en/x1e>:

Sensors	Sensors
Bambu Micro Lidar: Yes Chamber Monitoring Camera: 1920*1080 Included	Bambu Micro Lidar: Yes Chamber Monitoring Camera: 1920*1080 Included

See also <https://bambulab.com/en/p1>:



See also, <https://us.store.bambulab.com/products/p1p-chamber-camera-led>:

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See also, <https://wiki.bambulab.com/en/p1/manual/unboxing-p1s>:

Chamber Monitoring Camera	Low Rate Camera 1280 x 720 / 0.5fps Timelapse Supported
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See also, <https://wiki.bambulab.com/en/p1/manual/glossary>:

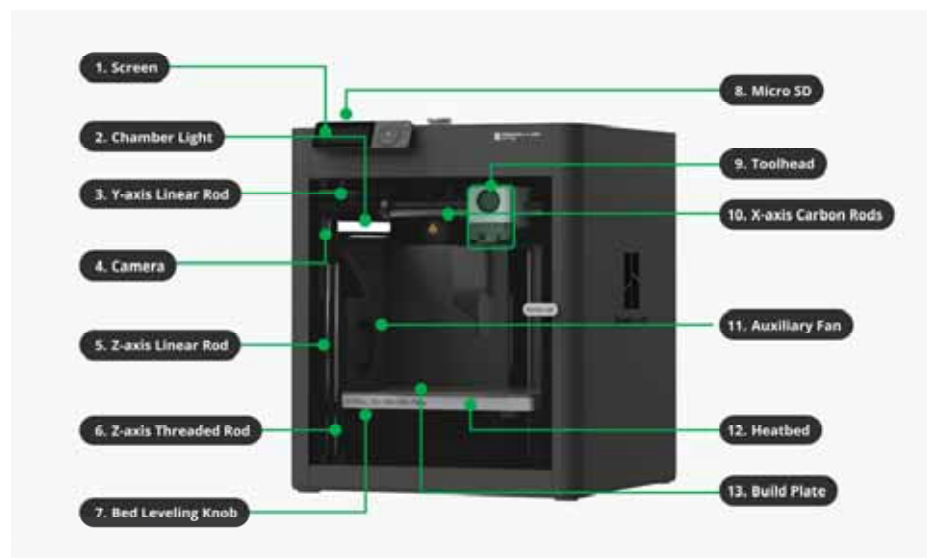


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4. Camera

This component allows remote 3D printing monitoring and viewing in Bambu Studio and Bambu Handy.

See also, <https://wiki.bambulab.com/en/p1:>

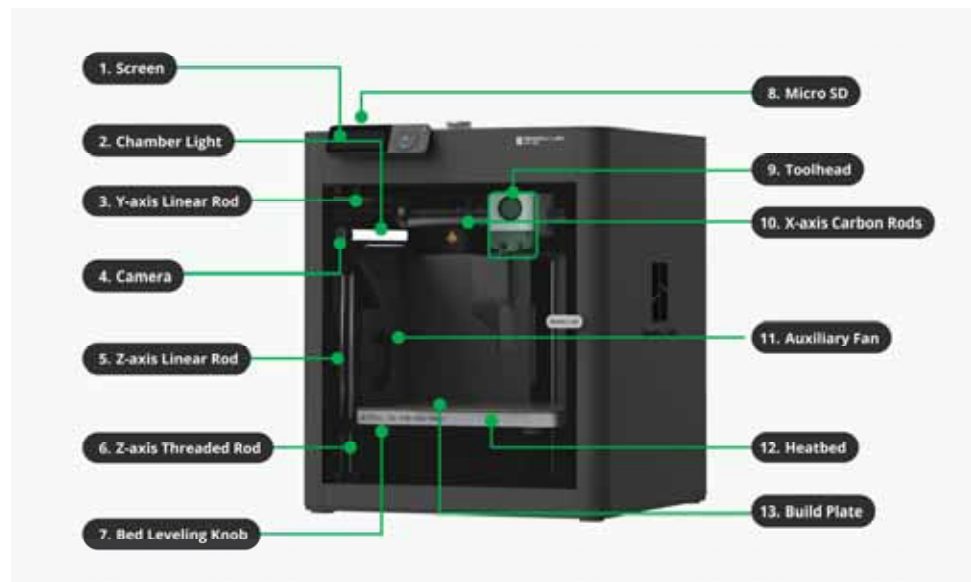
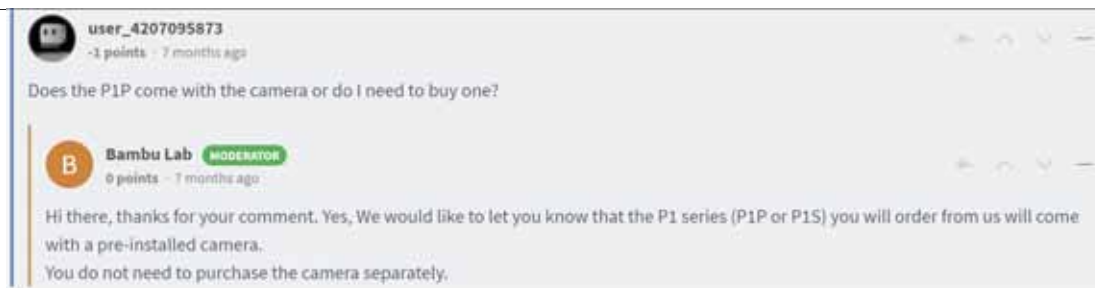


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See also <https://bambulab.com/en/a1/tech-specs:>

Sensors	
Monitoring Camera:	Low Rate Camera (up to 1080P) Timelapse Supported

See also, <https://wiki.bambulab.com/en/a1/manual/intro-a1:>

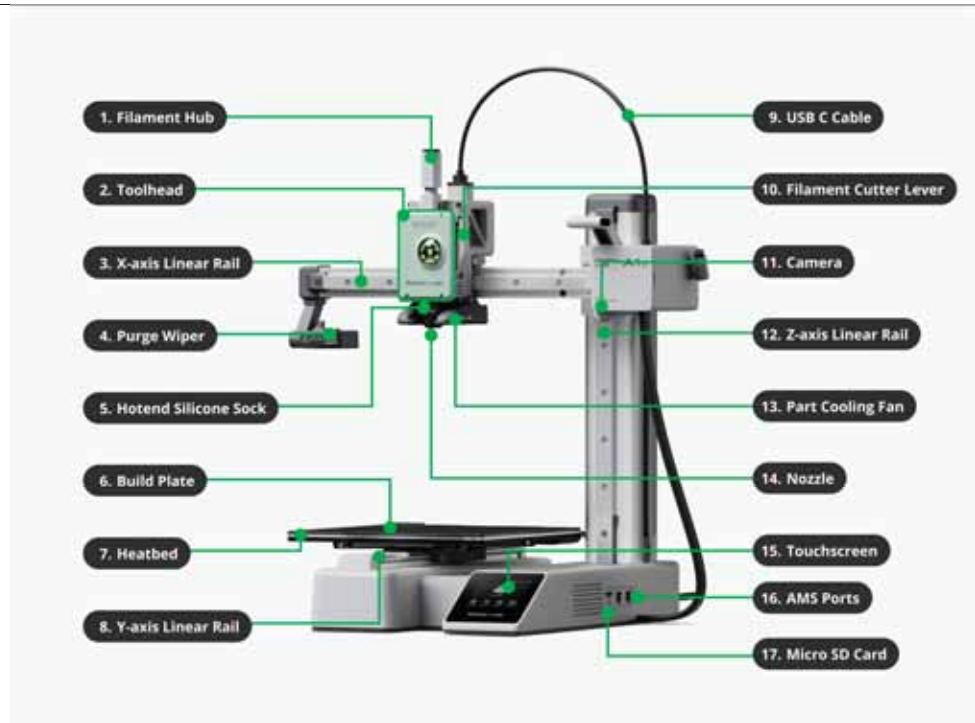
Camera

The printer integrates a camera that can be used for real-time monitoring of prints using the Bambu Slicer or Bambu Handy applications. It can also be utilized for print defect detection (supported after firmware updates).

In addition to its monitoring capabilities, the camera can record printed videos and create time-lapse videos. While the machine does not have night vision, the camera module has an LED that can illuminate the printed object.

See also, <https://wiki.bambulab.com/en/a1-mini:>

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See also, <https://wiki.bambulab.com/en/a1-mini/camera-replacement-guide>

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receiving a three-dimensional model through the network interface;	Each of the Accused Instrumentalities are used for receiving a three-dimensional model through the network interface. For example, the printer receives a 3D model and controls operation of the printer to fabricate the 3D model. A request to fabricate an object from a three-dimensional model is received at least via the Bambu Studio or Bambu Handy app. Each Bambu Lab 3-D printer, including but not limited to the Bambu Lab A1, A1 mini, P1S, P1P, X1C, and X1E printers, alone or in combination with Bambu Studio supports receiving a three-dimensional model through the network interface. Printing from Bambu Studio When printing with Bambu Studio, it's possible to send the sliced files directly to the printer via Wi-Fi. Here's how to do it: 1. Import the 3D model you want to slice, and after adjusting the settings, click on the Slice button 2. After the model has been sliced, click on the Print button. A window will show up where the printer can be selected, and the calibration options can be enabled or disabled. 3. When ready to print, simply click the Send button, and the file will be sent to the printer. The printing process will start. receiving a request https://wiki.bambulab.com/en/x1/manual/print-from-bambu-studio
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In the following screenshot, the Bambu Labs Wiki web site (<https://wiki.bambulab.com/en/software/bambu-studio/studio-quick-start>) shows an example of importing a three-dimensional model to print by the printer receiving a request to fabricate an object from the model.

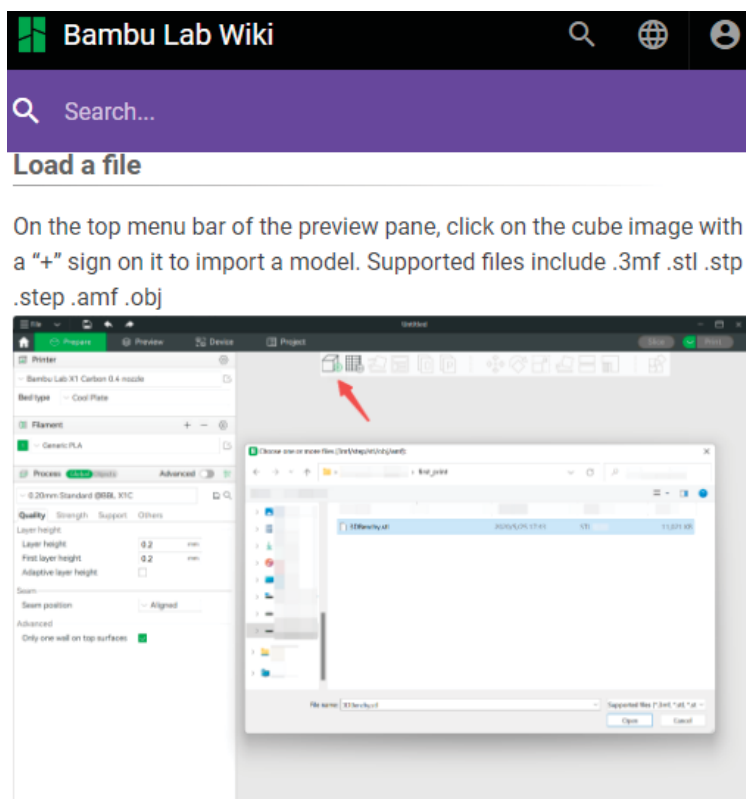


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In the following screenshot, the Bambu Labs Wiki web site (<https://wiki.bambulab.com/en/software/bambu-studio/studio-quick-start>) explains how the 3D model (e.g., the .3mf file) is sent to the target printer for fabrication on the printer:

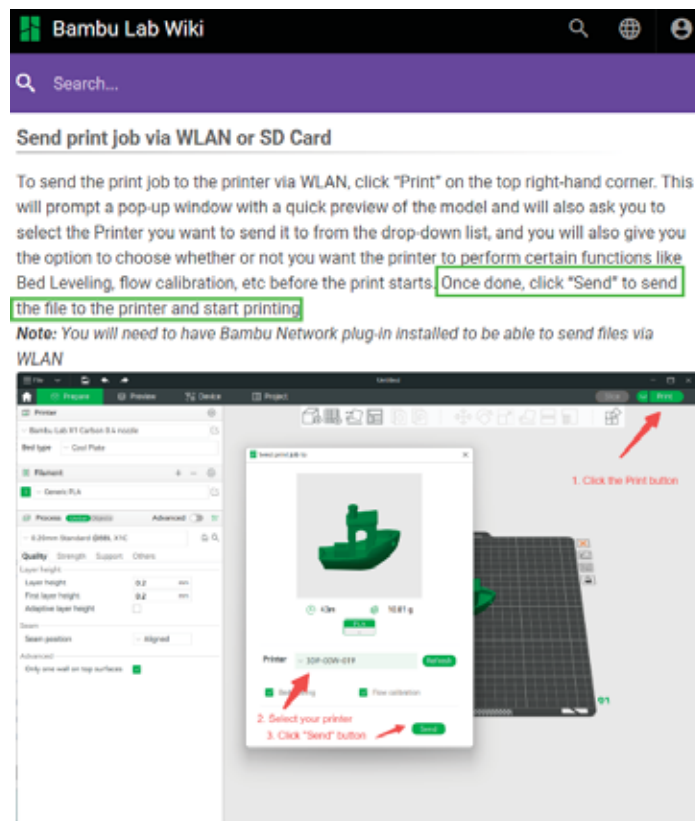


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See also, <https://wiki.bambulab.com/en/makerworld/tutorials/printing-tutorial-on-bambu-handy>:

Step 3. Print the 1st plate



Here, several settings need to be checked/configured:

1. check/select the printer you want to set the print job to
2. check/select the plate type you are using
3. set filament(s)
 - if AMS installed: Bambu Handy will auto-assign the AMS slot (A1~A4) for target filament used in current print job according to the filament type and color. You may also change it according to your requirement.
 - if no AMS: choose the filament type mounted on the printer.
4. Click the "Print Now" button to send the print job to the designated printer.

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fabricating the three-dimensional model as an object within the build volume of the three-dimensional printer; and	The Accused Instrumentalities are each used for fabricating the three-dimensional model as an object within the build volume of the three-dimensional printer. For example, the Bambu Labs Wiki web site (https://wiki.bambulab.com/en/software/bambu-studio/studio-quick-start) explains how the 3D model (e.g., the .3mf file) is sent to the target printer for fabrication on the printer, which includes but is not limited to the Bambu Lab A1, A1 mini, P1S, P1P, X1C, and X1E printers.
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Bambu Lab Wiki

Search...

Send print job via WLAN or SD Card

To send the print job to the printer via WLAN, click "Print" on the top right-hand corner. This will prompt a pop-up window with a quick preview of the model and will also ask you to select the Printer you want to send it to from the drop-down list, and you will also give you the option to choose whether or not you want the printer to perform certain functions like Bed Leveling, flow calibration, etc before the print starts. Once done, click "Send" to send the file to the printer and start printing

Note: You will need to have Bambu Network plug-in installed to be able to send files via WLAN

File

Printer

Process

Preview

Device

Project

Send

More

Bambu Lab X1 Carbon 3.4 nozzle

Bed type: Cool Plate

Filament: Generic PLA

Process: 0.20mm Standard (BBBL X1C)

Quality: Strength Support Others

Layer height: 0.2 mm

First layer height: 0.2 mm

Adaptive layer height: ☐

Seam: Seam position: Aligned

Advanced: Only one wall on top surfaces ☒

Send print job to



43% 10.61 g

Printer: 3DP-200K-019

☒ Bed leveling ☒ Flow calibration

2. Select your printer

3. Click "Send" button

Send

1. Click the Print button

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162

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See also <https://wiki.bambulab.com/en/makerworld/tutorials/printing-tutorial-on-bambu-handy>:

Step 3. Print the 1st plate



Here, several settings need to be checked/configured:

1. check/select the printer you want to set the print job to
2. check/select the plate type you are using
3. set filament(s)
 - if AMS installed: Bambu Handy will auto-assign the AMS slot (A1~A4) for target filament used in current print job according to the filament type and color. You may also change it according to your requirement.
 - if no AMS: choose the filament type mounted on the printer.
4. Click the "Print Now" button to send the print job to the designated printer.

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providing a user interface to a remote user accessing the device through the network interface, wherein the user interface presents an image of the build volume from the video camera and a two-dimensional projection of the three-dimensional model from the point of view of the video camera.	The Accused Instrumentalities are each used for providing a user interface to a remote user accessing the device through the network interface, wherein the user interface presents an image of the build volume from the video camera and a two-dimensional projection of the three-dimensional model from the point of view of the video camera. For example, Bambu Lab printers, including but not limited to the Bambu Lab A1, A1 mini, P1S, P1P, X1C, and X1E printers, execute software or firmware to collect image content (e.g., from the camera) during execution of the print job and provides for a user interface to a remote user accessing the device through a network interface in which the remote user is shown the status of the print job and accesses image content via the Bambu Studio and Bambu Handy apps. See https://wiki.bambulab.com/en/software/bambu-studio/remote-control. Further, an image of the build volume from the video camera (e.g., camera view) and a two-dimensional projection of the three-dimensional model from the point of view of the video camera (e.g., 2-D projection of 3-D model for cute little dinosaur) is shown in the Bambu Studio or Bambu Handy software also configured to provide a user interface to a remote user. See the following examples from Bambu Studio:
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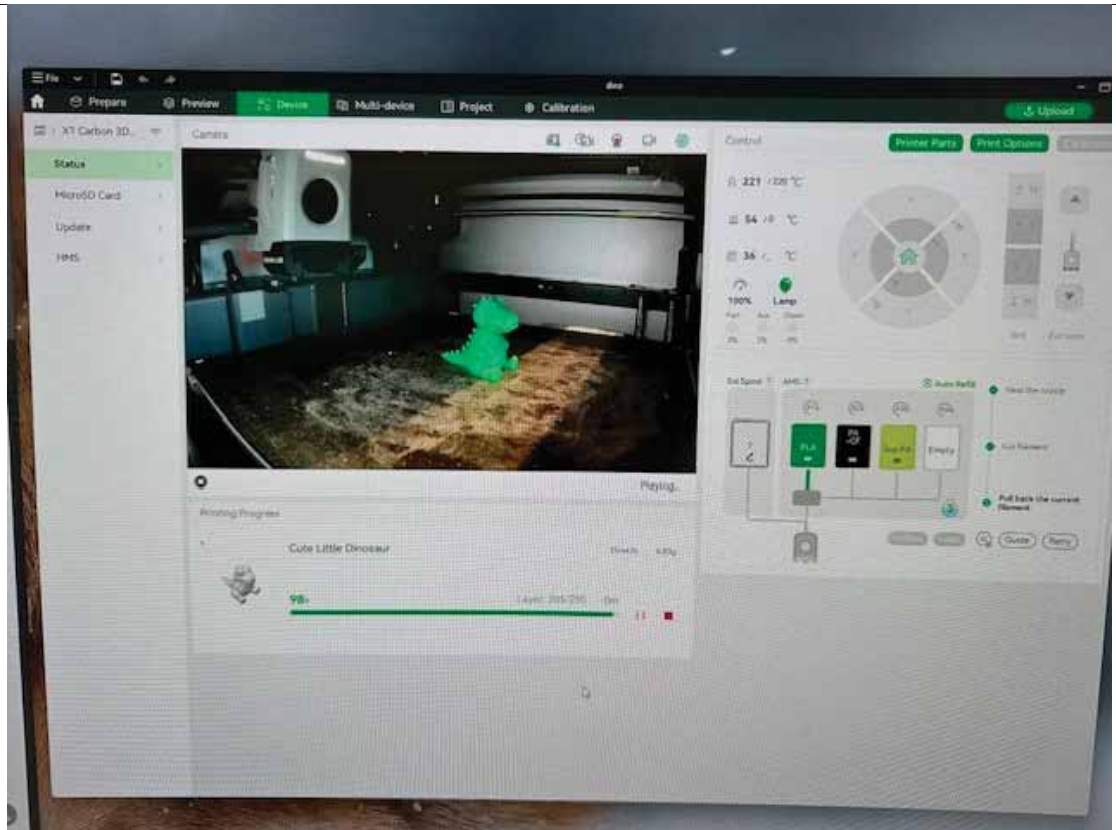


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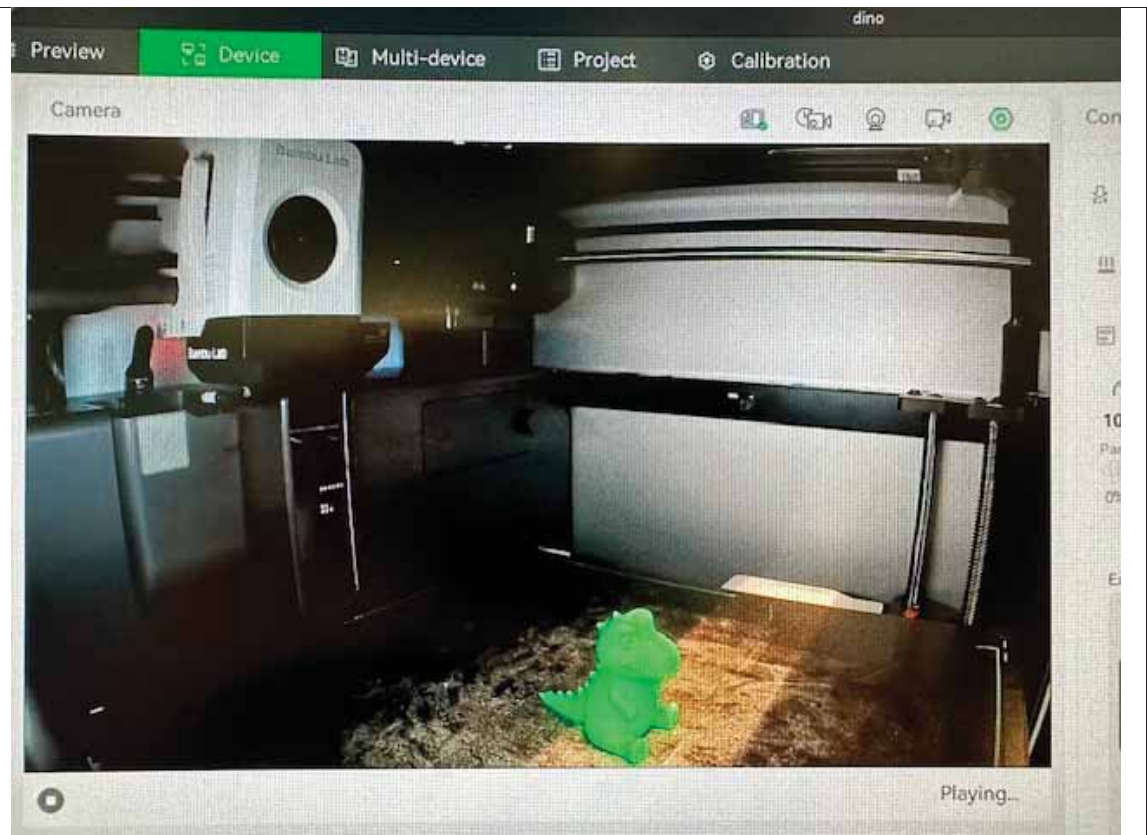


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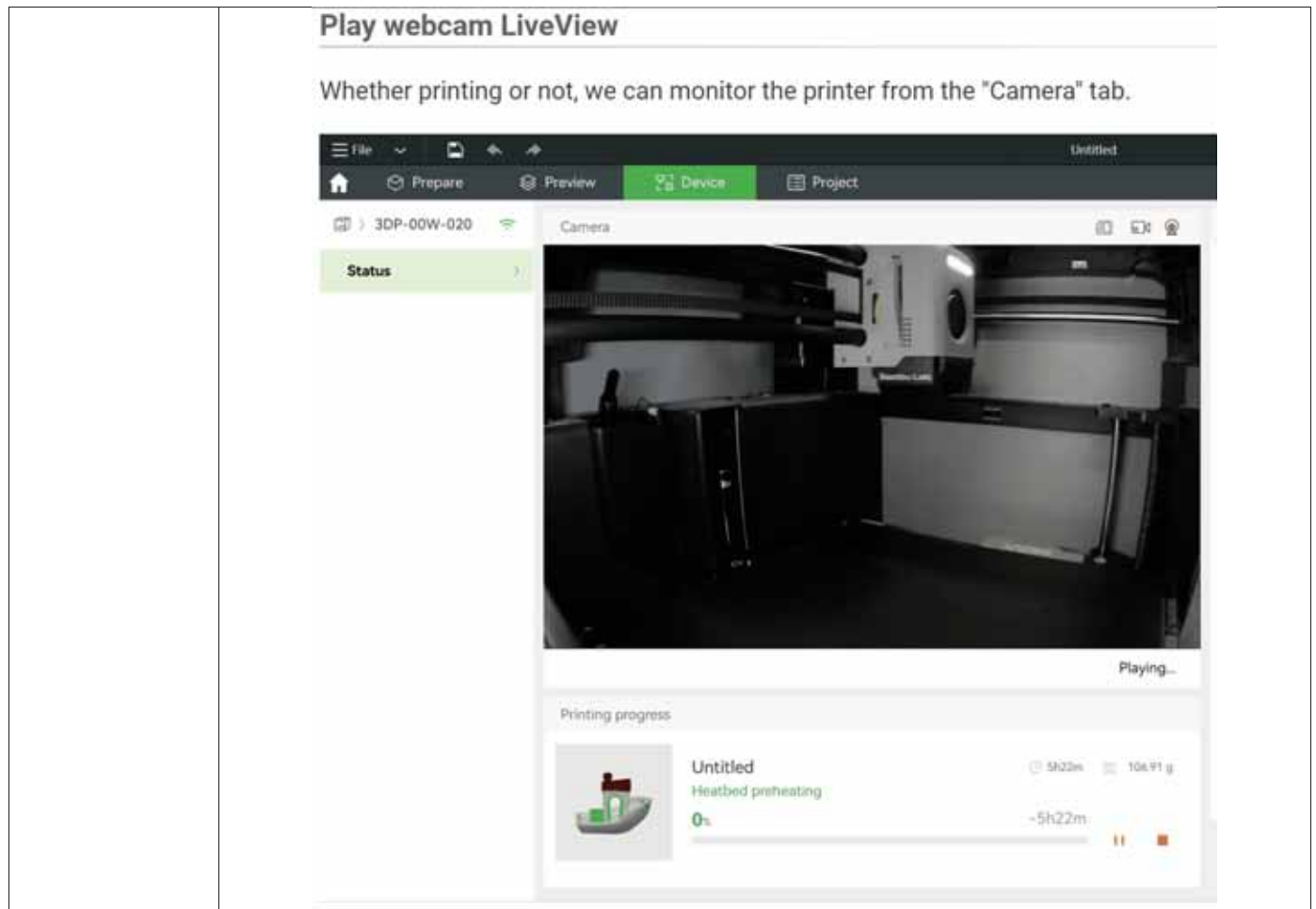


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<https://wiki.bambulab.com/en/software/bambu-studio/remote-control>

Further, the following image from Bambu Handy shows the build volume from the video camera (e.g., camera view) and a two-dimensional projection of the three-dimensional model from the camera's point of view (e.g., 2-D projection of 3-D model for foldable book or tablet stand):

Exhibit J - Exemplary Infringement Evidence for U.S. Patent No. 8,562,324



<https://wiki.bambulab.com/en/studio-handy/handy/bambu-handy-quick-start>

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Further, a two-dimensional projection of the three-dimensional model (e.g., time lapse) is shown in the Bambu Studio or Bambu Handy software running on a processor that alone or in combination with a processor on the printer is also configured to provide a user interface to a remote user.

Alternatively, a two-dimensional projection of the three-dimensional model is a video image from the video camera, as is shown above in Bambu Studio or Bambu Handy, and an image of the build volume from the video camera is a time lapse, as is shown below. These are shown in the Bambu Studio or Bambu Handy software running on a processor that alone or in combination with a processor on the printer is also configured to provide a user interface to a remote user.

Each Bambu Lab 3-D printer supports time-lapse functionality, including but not limited to the Bambu Lab A1, A1 mini, P1S, P1P, X1C, and X1E printers.

See <https://wiki.bambulab.com/en/software/bambu-studio/Timelapse>:

1. Introduction to different modes of time-lapse

In the Bambu Studio, if you enable timelapse, a timelapse video will be generated for each print. After each layer is printed, a snapshot is taken by the chamber camera. All of these snapshots are composed into a timelapse video when printing completes.

There are two modes of timelapse: smooth mode and traditional mode. For different printers, there will be some differences in the action of shooting time-lapse photography, which is described as follows.

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X1 and P1 series printers

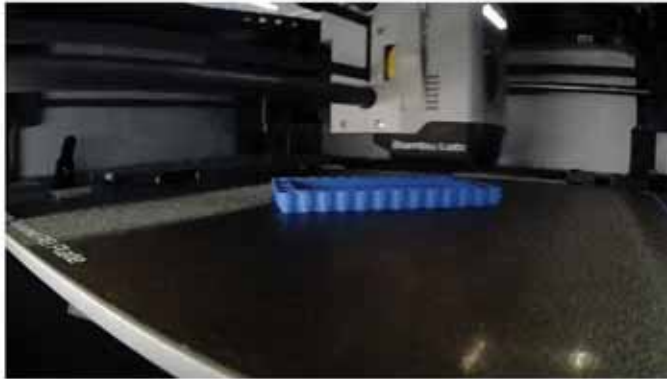
Smooth mode: the tool head will move to the excess chute after each layer is printed and then take a snapshot. Since the melted filament may leak from the nozzle during the process of taking the snapshot, a prime tower is required in this mode. So a prime tower will be automatically generated if there is no prime tower on the build plate. It will reuse the existing prime tower if there is already a prime tower on the plate.

In this mode, the toolhead in the video always stays above the prime tower and does not block the model. Therefore, the timelapse video looks very smooth. However, the overall print time will be longer because this mode adds additional paths and nozzle cleanings to the toolhead.



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Traditional mode: It takes a snapshot directly after each layer is printed, so there is no need for a prime tower in this mode. In time-lapse videos, the toolhead is constantly moving.



A1 Series Printer

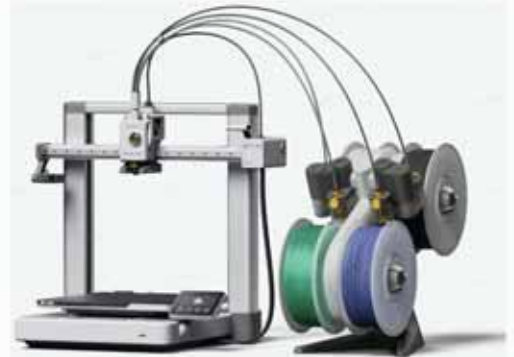
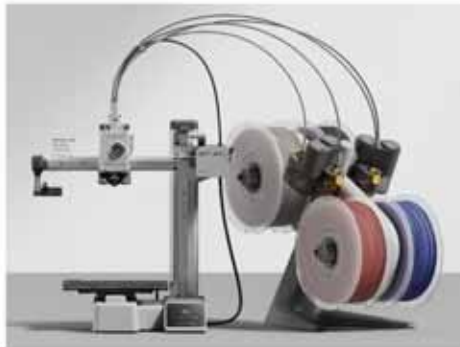


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	When shooting the time-lapse video, it is necessary to keep the horizontal position of the heat bed fixed and only change the position in the Z direction. However, the A1 series printer's heat bed was constantly moving during printing, causing the model to move horizontally as well. So, to successfully shoot time-lapse videos, the A1 series printer moves the heat bed to a fixed position and the nozzle to the purge wiper before each shooting then moves them back above the model to continue printing. Whether it is the traditional mode or smooth mode time-lapse photography, it will move the heat bed and tool head to a fixed position before taking the photo. You can see the moving path to the purge wiper in the traveling path previewed after slicing (see below), but if you do not enable the time-lapse feature before sending the print job, these moves will not be executed during the actual print process. Traditional mode: During the printing process, due to the leakage caused by the pause when taking the snapshot, the traditional mode of time-lapse photography does not have a prime tower to absorb this flaw, affecting the printing quality. So our strategy is to print defects into the infill as much as possible to ensure surface quality, but if the model has no infill area in this layer, defects are inevitable. In this case, it is not recommended to enable time-lapse photography in traditional mode but to use smooth mode. You will also receive a prompt before sending the print job.
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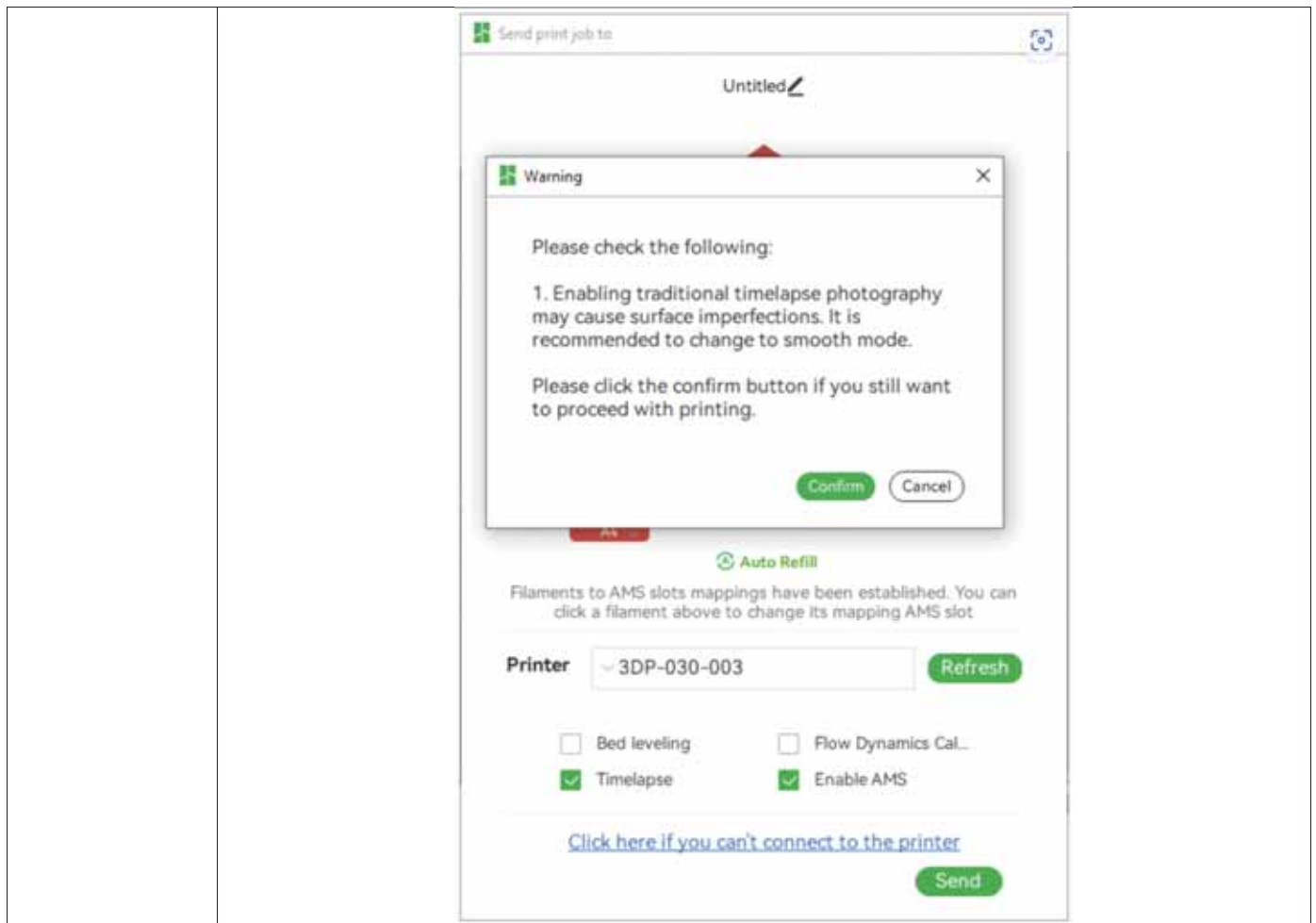


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Smooth mode: After selecting smooth mode time-lapse photography, a prime tower will be automatically generated by default. During the printing process, after pausing to take photos, the nozzle will print on the prime tower first, and then continue to print on the model, so that the leakage defects caused by the pause are absorbed by the prime tower.

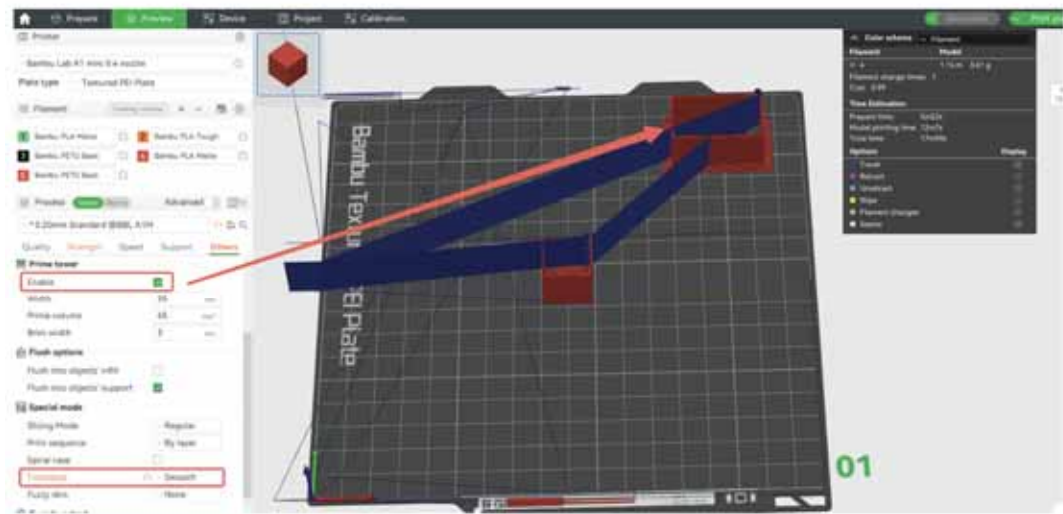


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Timelapse Fade-on Mode: When this mode is turned on, a cropping effect will appear when printing the first layer. As the number of layers increases, the image gradually changes from zooming in to zooming out.

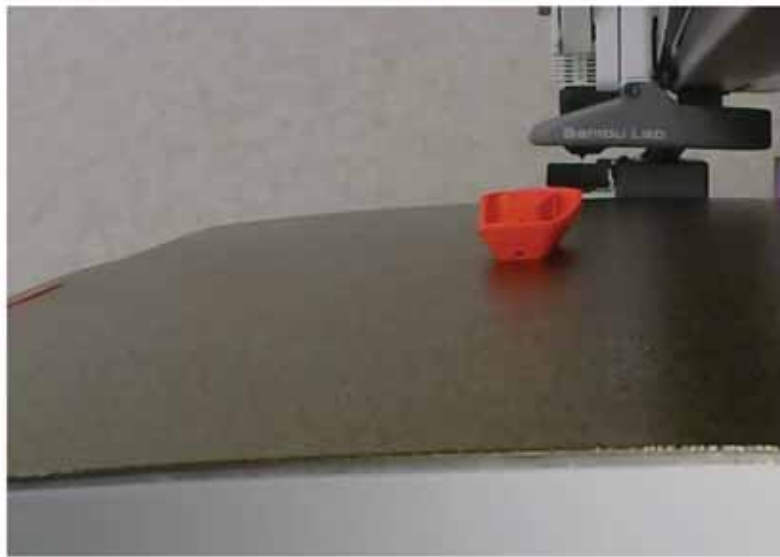


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In Bambu Studio, you can also download time-lapse video files from the "Device" - "MicroSD Card" page:

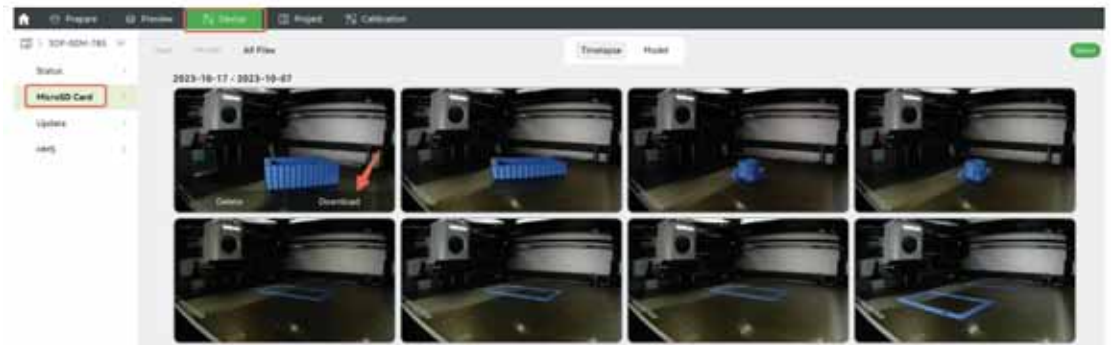


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See also, <https://wiki.bambulab.com/en/makerworld/tutorials/printing-tutorial-on-bambu-handy>:

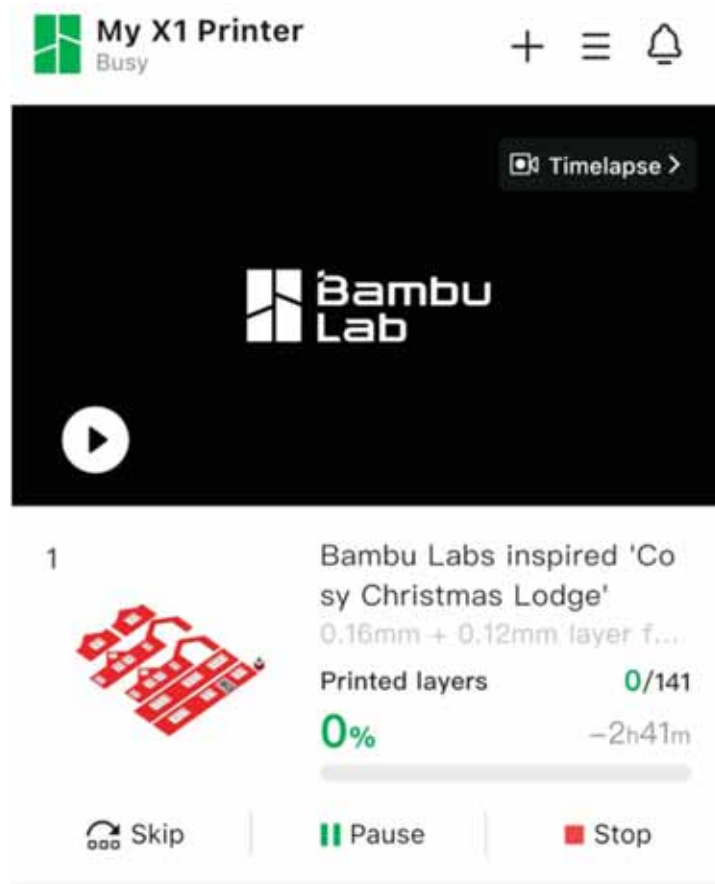


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See also, <https://wiki.bambulab.com/en/studio-handy/handy/bambu-handy-quick-start>:



1. Under the TimeLapse tab, you can watch and manage timelapse videos on your SD card. After clicking into an individual video, you can download or share that video.

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	Defendants literally infringe this claim, including this claim element. To the extent discovery shows otherwise, Defendants infringe under the doctrine of equivalents by the Accused Instrumentalities (e.g., including Bambu Lab 3D printers) including steps (e.g., Bambu Studio or Bambu Handy providing a user interface to present an image and a two-dimensional projection) that are equivalent to this element of the claim. The above steps of the Accused Instrumentalities are insubstantially different from what is required by the claim language. In addition, the step(s) perform the same function (e.g., providing a user interface to a remote user that presents an image of the build volume from the video camera and a two-dimensional projection of the three-dimensional model from the point of view of the video camera), in substantially the same way (e.g., provide information via a user interface), to achieve substantially the same result (e.g., provide information to the remote user via the image and two-dimensional projection) as would be achieved by the element.
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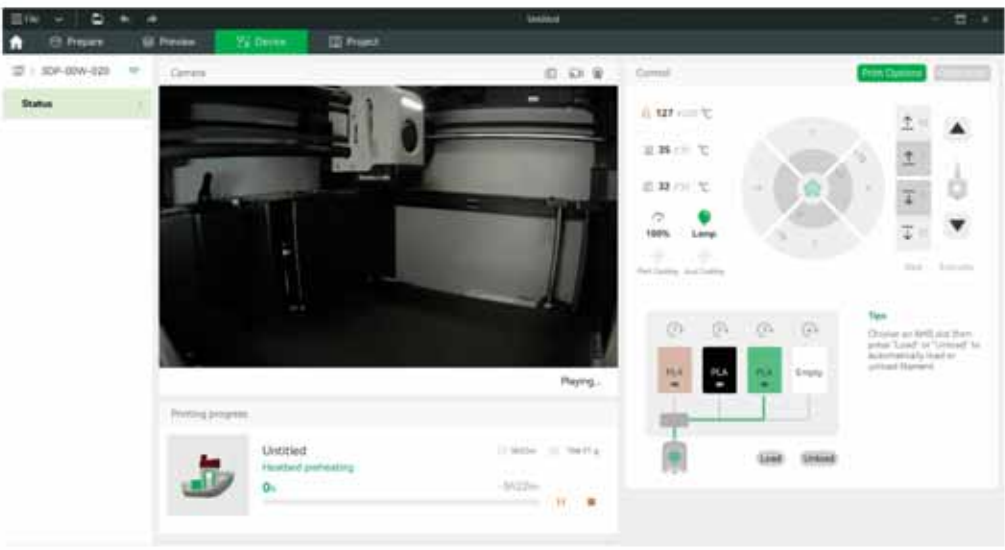
20. The method of claim 19 further comprising transmitting status information over the data network upon completion of the object.	The Accused Instrumentalities are each used for transmitting status information over the data network upon completion of the object. For example, Bambu Studio provides status information of the printer, indicated below. This status information (e.g., image content) of the printer can be provided over the data network at any time, including completion of the printing (e.g., at 100% completion). Control printer Control bed temperature, nozzle temperature, speed level, fan on/off, move the tool head along XYZE, calibrate the printer, and adjust AMS settings.  The screenshot displays the Bambu Studio software interface. At the top, there are tabs for 'File', 'Prepare', 'Preview', 'Device', and 'Project'. The 'Device' tab is active. Below the tabs, there's a 'Status' section on the left showing 'SDP-00W-020'. The main area features a live camera feed of the printer. To the right of the camera feed is a 'Control' panel with various temperature readouts (127.7, 35.7, 32.7) and a 'Lamp' indicator. Below the camera feed is a 'Printing progress' section showing 'Untitled' with 'Heatedbed preheating' at 0%. On the far right, there's a 'Print Options' panel with a circular control dial and buttons for 'Load' and 'Unload'. https://wiki.bambulab.com/en/software/bambu-studio/remote-control
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	Bambu Handy offers a similar experience, as shown below: Printer Control Printer Control contains control options for both the printer and AMS sections. On the main screen, you can directly control the nozzle temperature, heat bed temperature and speed, or click on the color block corresponding to each filament to view material information. Clicking on Printer or AMS on the left side of the module takes you to the detail page, where you can move the printer axes in addition to what you can do on the main screen, control some parts (such as the light and cooling fan), and control the AMS to perform load/unload actions.
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3DP-00M-219
Busy

+

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🔔

Heatbed preheating

Timelapse >

1



Foldable Book or Tablet St
and
Standard Book Stand, 0.2...

Printed layers
0/91
0%
~4h11m

⏸ Pause

■ Stop


Printer

46 → 75°C


23 → 70°C


100%


AMS


PLA


PETG


PLA


Empty

<https://wiki.bambulab.com/en/studio-handy/handy/bambu-handy-quick-start>

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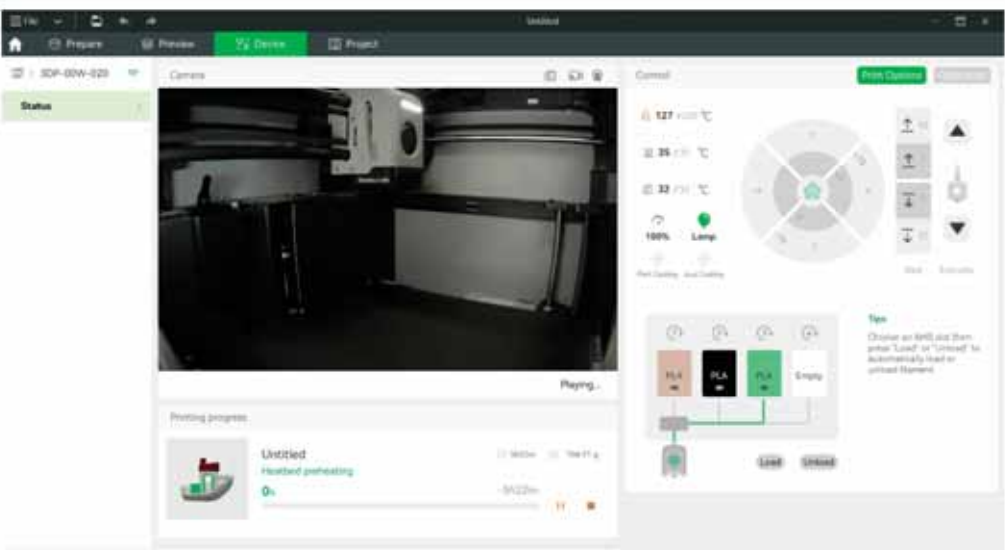
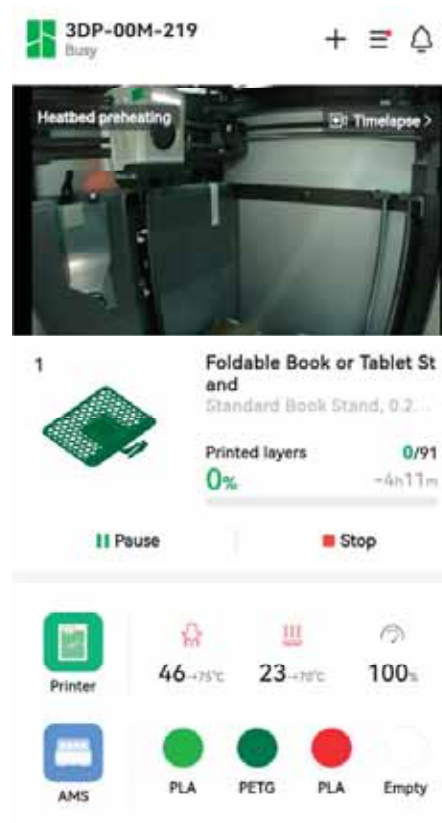
21. The method of claim 20 wherein the status information includes data presented through the user interface.	For each of the Accused Instrumentalities, the status information includes data presented through the user interface. For example, Bambu Studio provides status information (<i>e.g.</i>, image content, percent completion) of the printer, indicated below. This status information of the printer can be provided at any time.  https://wiki.bambulab.com/en/software/bambu-studio/remote-control
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Bambu Handy similarly present the data through the interface.



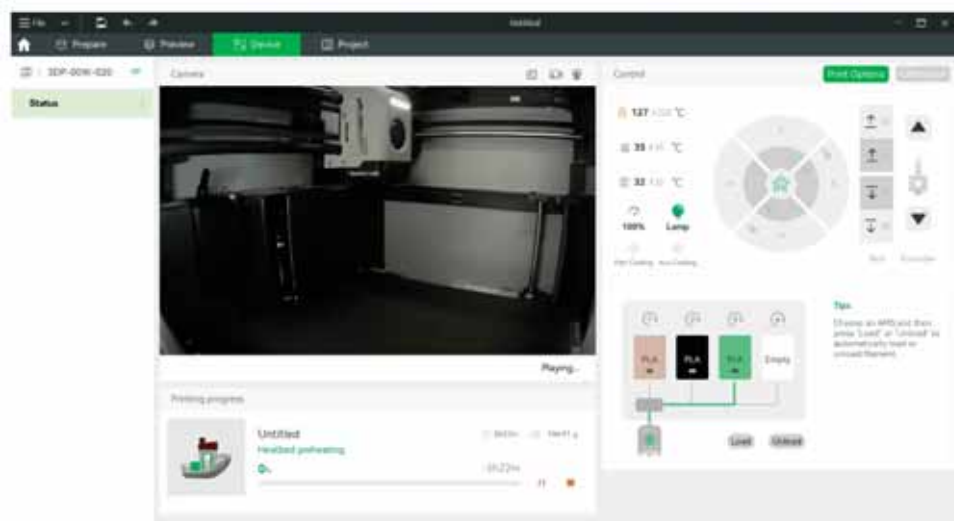
<https://wiki.bambulab.com/en/studio-handy/handy/bambu-handy-quick-start>

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22. The method of claim 20 wherein the status information includes a digital image from the video camera.

For each of the Accused Instrumentalities, the status information includes a digital image from the video camera.

For example, Bambu Studio provides status information, including a digital image from the video camera.



<https://wiki.bambulab.com/en/software/bambu-studio/remote-control>

Bambu Handy offers a similar experience.

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	Printer Monitoring Image You can view the current returned image at any time by clicking the play button in the monitor image returned by the printer. Click the Camera button at the bottom right corner of the screen to take a picture, and the captured picture will be saved to the cell phone album. You can also click the Full Screen button at the bottom right corner to enter full screen mode to view the returned image. In full-screen mode, users can adjust the screen size by two-finger zoom, so that it is easy to observe the printing details.
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<https://wiki.bambulab.com/en/studio-handy/handy/bambu-handy-quick-start>