

Reverse Engineering: Canon Pixma TS3322 Printer

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Summary Report

The Canon Pixma TS3322 is a wireless inkjet printer that allows printing from multiple devices. It copies and prints documents on both photo and standard paper. When considering what device we wanted to deconstruct and analyze, we chose a printer that our school no longer needed which had multiple complex mechanisms. We used it as a learning tool to better understand how everyday devices function using similar components that we use to structure and build our robot. We were also interested in learning how the parts could be recycled and possibly used in other everyday devices.

In the deconstruction of the Canon Pixma, we began removing the hard plastic exterior using a flathead screwdriver. Once removed, we were able to see the control panel that functioned using a circuit board and the top of the mechanism for scanning documents. As we continued to dismantle the piece, we carefully removed the glass. Then we took off the sliding system that the printer used to scan work. As we were taking this apart, we discovered that there was flex material to connect both the scanning and printing components to the circuit board. Once we took those pieces off, we could visualize that the ink cartridges were connected to the sliding bar that would carry the ink across the pages when printing. Below the cartridges was a series of gears connected to rods which created the intake for the paper tray. At the top of the printer, the circuit board connected to a small motor under which would activate both the intaking of the paper and the ink printing process. This printer was not only connected by screws but also interlocking plastic parts that held the larger plastic body of the printer together. We found three circuit boards in this printer and determined that they were of various sizes and also organized different aspects of the printer processes because they were connected to different parts. We were able to connect this to robotics because of the way the engineering design process was used and constructed in finding a solution that could create a seemingly effortless task while performing complicated functions.

For this experiment to be successful, we had to take our time and meticulously go step-by-step to understand how each of the smaller parts contributed to the whole printer. One of the biggest lessons we learned from breaking apart this printer is that it gave us the confidence to be more proactive in troubleshooting an issue when something may not be working. Taking apart a printer also helped us to simplify a device that seemed daunting for so many reasons. When we first took off the plastic and saw the interior of the printer, it was exciting to see all of the moving parts and figure out their interconnectedness and roles in the printing process.

External Anatomy



Figure 1.0: Top View

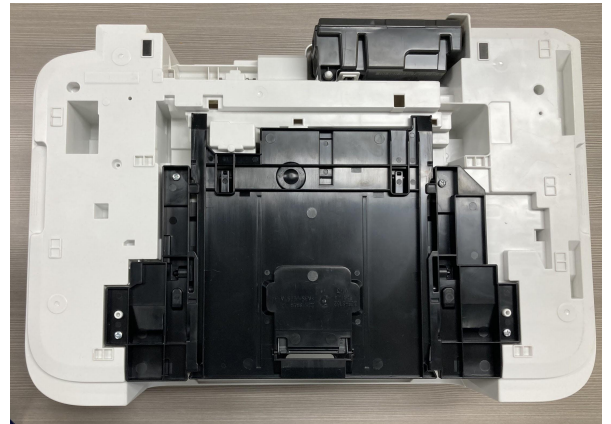


Figure 1.1: Bottom View



Figure 1.2: Right Side View



Figure 1.3: Left Side View

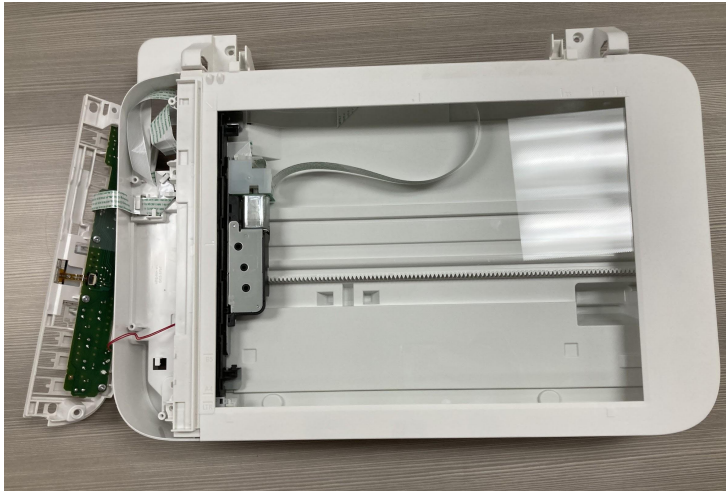



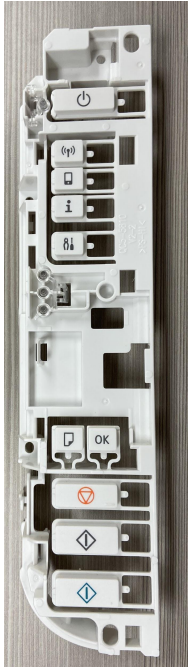
Figure 1.4: Front View



Figure 1.5: Back View

External Components

Component	Description	Function
	Outer plastic hardware around scanning portion of the printer	Used to protect the scanning component and creates a section to store and connect the circuit board controlling all functions
	External plastic hardware of the printer	Used to protect and store internal components



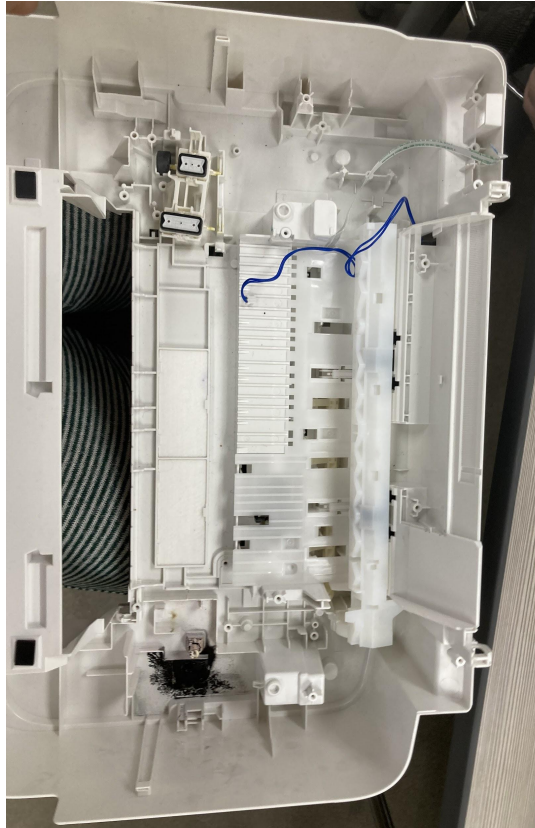
Plastic protection for circuit board controlling the function buttons

Used to easily control the functions applied when printer is in use



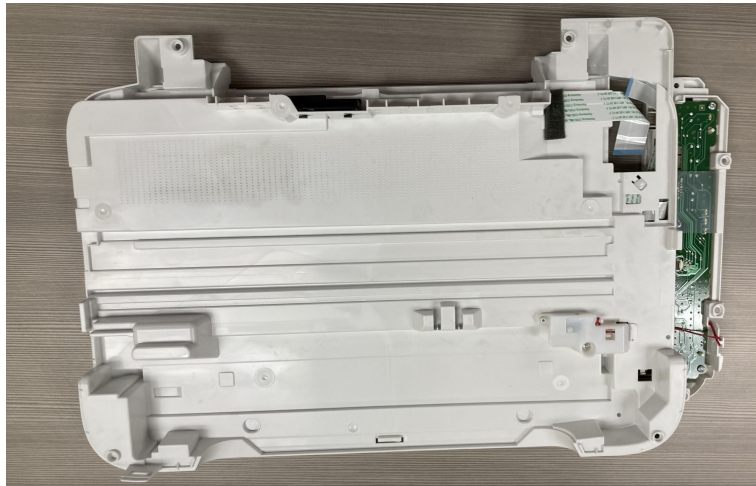
Outer plastic and glass over scanning mechanism

Creates a flat surface to properly place paper to be scanned



Interior plastic where all internal components are stored

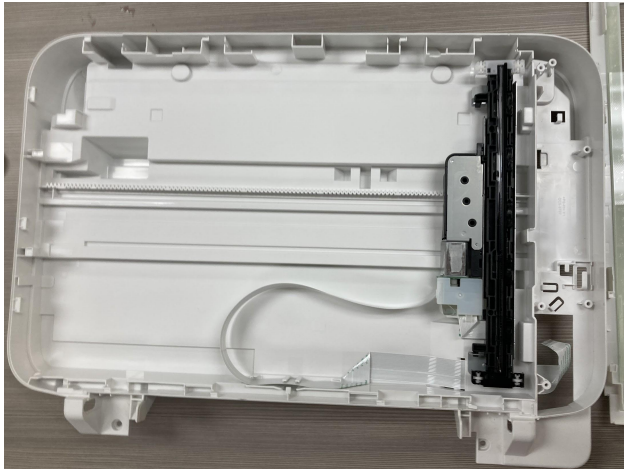


Protects and connects all internal components used for the printing process

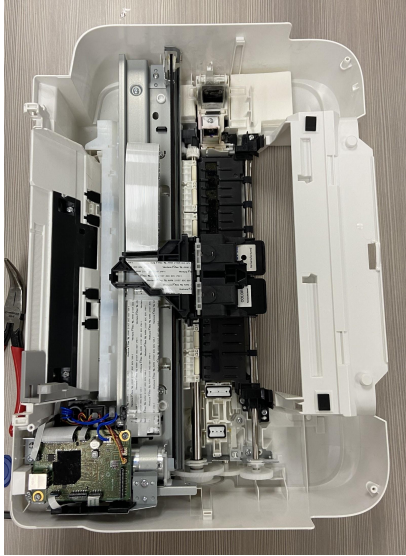
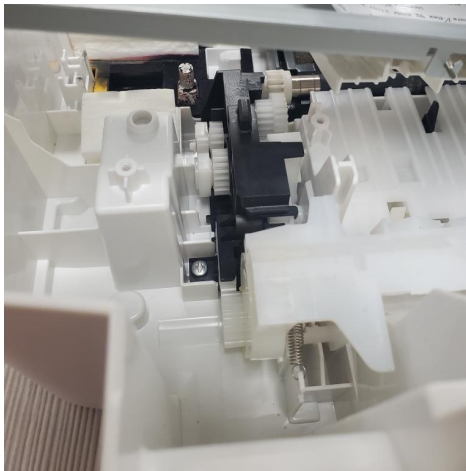




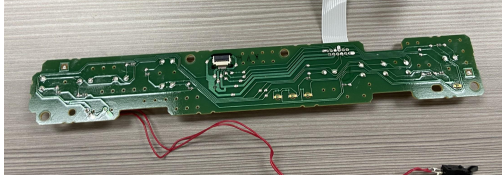
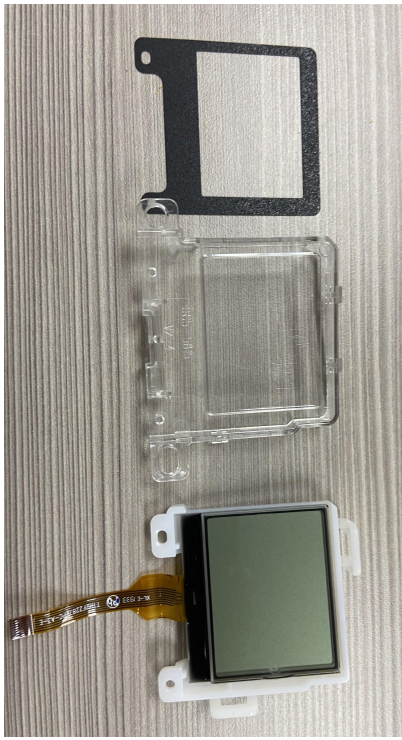

Outer plastic that separates the scanner from the printing section

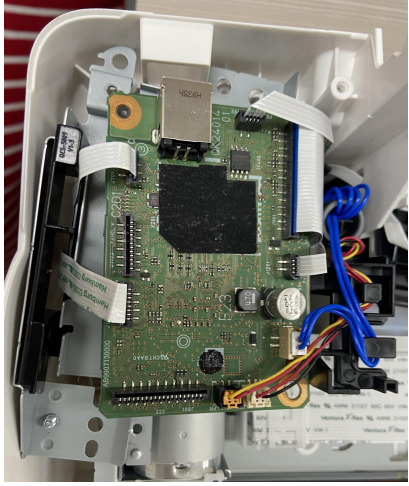


Creates a barrier between the scanning and printing section and keeps connecting wires organized

Internal Components

Component	Description	Function
	Scanning mechanism that utilizes a sliding bar	Scans documents
	Interior of the ink cartridge	Used to store and distribute ink when printer is in use
	Gears used to connect rods creating an intake motion	Allows for rods to rotate and creates an intake mechanism used for moving paper

	<p>Full interior view of the printing process</p>	<p>Includes the main circuit board, motor, inking mechanism, and paper intake system and connects them together</p>
	<p>Gears and mechanism for sliding bar on scanning portion of the printer</p>	<p>Allows for the the bar to slide that is powered by a motor to scan a document</p>
	<p>Motor connection utilized for the scanning portion of the printer</p>	<p>Used to rotate gears and allow for the sliding mechanism to scan documents</p>
	<p>Motor connected to the main circuit board</p>	<p>Allows for power for the printing mechanisms to rotate gears and perform proper functions</p>

	<p>Circuit board connected to the plastic portion of hardware controlling buttons</p>	<p>Controls the functions that need to be used to connect to the main circuit board</p>
	<p>Display screen for printing actions</p>	<p>Used to display actions of the functions that the printer will perform</p>
	<p>Rod connection to gears for printing intake</p>	<p>Used to intake paper from tray and move through the inking process</p>

	<p>Main circuit board connection</p>	<p>Used to connect all computer components to function together simultaneously</p>
	<p>Circuit board used to connect the motor and scanning mechanism</p>	<p>Used to connect all computer components to function together simultaneously and scan a document</p>
	<p>Ink distributor for printing mechanism</p>	<p>Used to collect the amount of ink needed to print the text or image on paper</p>

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