Study of a Single Use Camera

Functional Components and Arrangement

The true complexity of a disposable camera is hidden behind its smooth plastic outer shell and decals/stickers. Beneath the camera's outer frame there is room for numerous functional parts, each serving their own individual purpose in the camera's operation. The front of the camera holds the circuit board and both the lens and shutter mechanisms while the top contains the trigger and the counter. The back of the camera's shell contains the film and the film advance parts as well. The camera is held together by small clips and indentations on its sides.

Lens -
The Lens is the part which focuses the image on the film, when the shutter opens.

Shutter -
The Shutter is in between the lens and the film. It works on a spring mechanism that opens and closes really fast, i.e., just enough time to capture the picture on the film. The shutter opens and closes at a particular speed known as the “Shutter Speed”. The shutter speed of most of the recyclable cameras is 1/100s.

Film -
The film provides a medium for capturing the image. As light travels through the lens, an open shutter allows light to come in contact with the film strip and embed itself on it. The film can be developed by a special chemical process to view the pictures taken.
Film Transport -

The film transport allows the film to be wound up and moved along across the shutter. This process makes sure that the image is embedded on blank film and is not superimposed on another image. The film itself is stored on the coil-like plastic behind the internal components of the camera.

Viewfinder -

The ViewFinder is the part that allows the user to observe the picture that he/she wishes to capture.

Flash -

The Flash provides the extra amount of light that is needed to make the surroundings brighter in order to capture the picture with more precision and detail.

AA Energy Cell -

The battery provides electrical energy to the circuit board required for utilization of the flash.

Outer Housing -

The main purpose of the outer housing is to protect the internal parts of the camera from damaging, caused by the surroundings.

Inner Frame -
The main purpose of the inner frame is to provide a skeleton to the camera, and to keep the internal parts in their specific positions without movement.

**Disassembly**

To disassemble the single use camera, the outside casing must be split along the seam and pried apart to gain access the internals. With the outside plastic casing removed the next thing to go is some plastic containing the electronics of the camera along with some mechanical parts such as the shutter gear near the back of the camera. The electronics can be removed along with the battery that supplies the electricity. These parts can be used outside of the casing to produce the flash that you see when you take a photo. As well as the mechanics that can be removed, the lenses in the viewfinder can be removed and the lens that is used in the actual process of capturing the image. What is left is just the structural plastic that is used to hold the form of the camera and all the parts in place.

**Assembly**

To assemble the single use camera all that must be done is reverse the order of disassembly. Returning the lenses and electrical parts to the housings and structural plastic base and setting those back into the outside shell. If the lenses are placed in backwards the camera will not work as designed because the images will come out distorted from how they should. Same goes for the viewfinder lenses, the image that the user will see will be different from the camera sees and the images that the user is trying to create will not be produced.

**How the Camera Works**

The camera works by first winding/priming the gear in the back of the camera. The shutter is now set and this allows a spring to be released, and when triggered to expose the film by pressing the button on the top of the camera. This causes the shutter to momentarily open
and allows for the film to absorb the light coming in. The shutter then closes, and the film is moved from in front of the lens into a dark space of the camera where it can no longer be affected by light. A new blank portion of the film is moved in front of the lens until there is no more film. The film is then ready to be produced in a dark room or by machine.

Materials

As shown below, the camera is primarily and almost solely made of plastic but there are some electrical and mechanical components as well.

Top Row (Left to Right): Shutter, Viewfinder, AA Energy Cell
After a disposable camera has been used and of its film is exhausted, the camera is returned to the store for the film to be developed. The film is removed from the body of the camera and the main body of the camera is sent back to the manufacturer. For this product specifically, the manufacturer would be Kodak. Kodak then takes the cameras apart and inspects each part to see if there is any damage. Unharmed parts can be reused indefinitely in new cameras because they do not have to be melted down and recycled. If there is damage to the part or the part cannot meet inspection requirements, it will be melted down with other damaged parts. This liquid plastic can be remolded into new parts for the camera a limited amount of times. The circuit board is also an important component to be recycled because of the cost to produce it. A single circuit board has been known to be recycled 10 times.

A possible redesign for the camera that would make it more reusable and produce less waste would be to replace the current disposable/single use battery with a rechargeable battery that the manufacturer could recharge or refurbish when it was sent in for developing. This would significantly reduce the amount of trash the camera produces as each battery in the camera can’t be used again and is sent to a landfill. This would also benefit the manufacturer.
because although the rechargeable batteries are more expensive, eventually it will cost less to recharge the batteries than to just keep buying more disposable ones.

**Flow Chart**

**Bibliography**


http://www.instructables.com/answers/How­does­a­capacitor­charger­circuit­work­in­a­di­s/