

CASE STUDY: LIFELINE FREEPLAY RADIO

1.0 Overview



The Freeplay Foundation was formed by the Freeplay Group as an independent entity to deal specifically with NGOs and the distribution of the Wind-Up Freeplay Radio to poor people in Africa. Originally this involved the distribution of the same radios available in the Developed World. The Lifeline Radio however, was designed especially and solely for the Freeplay Foundation to distribute in the Developing World. It is “Robustly constructed to operate in the harshest conditions and climates, the Lifeline radio is rugged, colourful, easy to use, receives excellent AM/FM/SW reception and plays non-stop for 24 hours on wind up energy or solar power.”

The key features can be described as:

- Robust – UV, dust and humidity resistant and survives falls from a two storey building.
- Large, simple and differently shaped tactile controls.
- Powered through a rechargeable battery charged by a detachable waterproof solar panel and a crank handle connected to a simple dynamo.
- Most delicate part – the antenna – designed to be easily replaced by any piece of wire.
- Obviously designed for children to act as a deterrent to thieves.

The product was designed with close consultations with children’s focus groups in South Africa, Kenya and Rwanda.

Around 50,000 lifelines have been built since its launch in early 2003.

3.0 Technology

The Lifeline uses direct charge rather than the coil based system used in the original wind-up radio. This charges a battery directly from an alternator rather than a tensioned spring. This method was chosen due to increased durability and robustness against failure.

2.0 Construction

Casing

The casing is built from UV stabilised 3mm thick ABS, no specific ribs but many features and external styling add strength.

Handle integrated into casing with finger mouldings.

Held together by 7 screws.

Recyclable.

Available in 4 different colours.



Power



Runs off a 3 cell 3.6V rechargeable and replaceable battery pack in screwed shut housing. Batteries charged via solar panel or wind up crank.

Can charge and play at the same time from both sources. Will operate directly if battery is not present.

Solar Panel

Polycrystalline 5V 52mA (@ 95,000 lux) on glass substrate.

Housed in waterproof Polycarbonate and ABS UV resistant shell.



Detachable on 2.5 m wire, connected to casing via 3.5mm jack.

Wind up mechanism

Crank attached to simple alternator via series of gears and directly charges battery.

Glass filled nylon winder.



Gears

Gears built from nylon and acetal

Oil-filled, sintered brass bushes

Manufacture

All plastics components are injection moulded. The tooling cost was an estimated \$50,000.

All parts made in China.

4.0 Results

The Lifeline is claimed to be enormously successful, although there was no direct feedback from the field available. Returns were dramatically down compared to the earlier models, although this could be a result of a lack of infrastructure.

There were no current plans for a replacement, if there was one, the inclusion of flash memory would be considered.

5.0 Lessons for Kinkajou

The product proves toughness and reliability of material. UV stabilised ABS would provide sufficient strength for the casing of kinkajou.

A similar winder could be used for indexing on the Kinkajou, could be locked in position in the same way to prevent unwinding of microfilm.

Glass filled nylon could be used for the lens housing due to its toughness.



Concept suggests that similar sources of renewable power could be integrated for self sufficiency. This is an issue that all research has highlighted – that you can not rely on batteries being available. Although power requirements are lower, the difference is not considerable and the radio can run for 24hrs non stop on fully charged battery.

The solar panel runs at 5V 52mA, or 0.26W. Therefore to power a 5W LED, assuming 7W would be required, a solar panel 28 times the size would be required – around 0.25 sq m. This would result in one-to-one charging. The solar panel would therefore be too big to integrate directly into the package, but could possibly be stowed in a bigger package, particularly if the solar panel could be made to be foldable. The battery in the radio would also be too low power being 3.6V @ 1.3Ah, or 4.7W, but a slightly larger version could be purchased and could be integrated into the casing, removing the need for a separate car battery.

In terms of price, The Freeplay Foundation claims that a donation of £35 will buy a radio for a child. This is higher than the anticipated price for Kinkajou, but the device has more parts and is more complex than Kinkajou.

Much of the design considerations in the Lifeline are similar to that of Kinkajou:

- Bulky robust design
- Simplicity of use
- Designed to be obviously different from other tools so it is less likely to be stolen and more obvious if it is.

Some possible shortcomings of the design:

- Batteries and solar panel which would be desirable and could easily go missing due to the modular, detachable nature. (Although the radio can still function without either).
- Fiddly design of solar panel difficult to replace in holder.