

Designing Electronic Gadgets for Children's TV

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<https://www.youtube.com/watch?v=4ZinH3tybVU>
<https://www.bbc.co.uk/teach/microbit/articles/zvf8mbk>
<https://www.bbc.co.uk/teach/microbit/articles/z7dhh7h>

Various photos used throughout, with permission from BBC Education
Other content attributed to original source in provided links.

About Me

- Started at 11 on a (kit) 1K Sinclair ZX81
- 1st class honours Computer Science Degree
 - Embedded software engineer
 - micro:bit wizard
 - TV prop maker
 - book author, book and magazine editor
 - STEM Ambassador
 - teacher trainer
 - live sound engineer
 - music gig lighting engineer



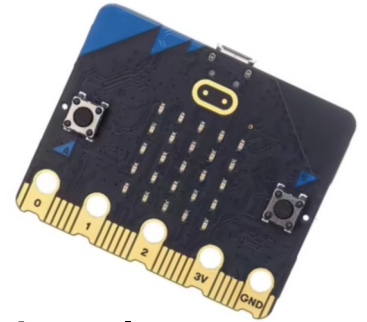
Photo credit: Phoenix FM

https://en.wikipedia.org/wiki/ZX81#/media/File:ZX81_kit.jpg

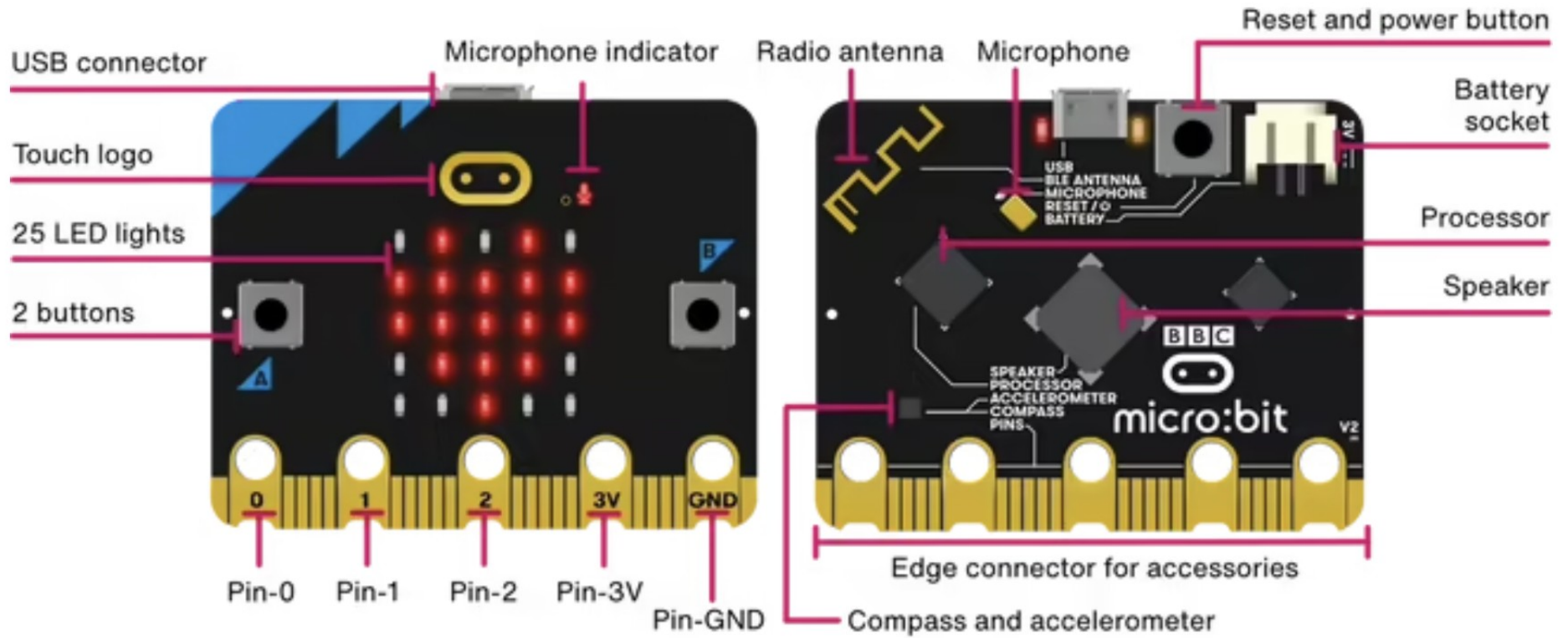
The BBC and Digital Literacy



- 1981 BBC Microcomputer
- 2015 Make It Digital campaign, 29 partners, including IET
- 2016 1 million micro:bits into year 7
- 2018 micro:bit Educational Foundation formed
- 2020 V2 micro:bit
- 2023 The Next Gen, 700,000 micro:bits for primary schools



The BBC micro:bit



An Innovation Process

- **IDEATE → CREATE → DELIVER**
 - Generate and select ideas
 - Validate and communicate the idea
 - Specify and Sign-off the idea
 - Build and test test test
 - Pack and travel
 - Rig, test test test, one-take!



Generate and Select Ideas

- Diverse and multi-disciplinary team
- Inspiring environment
- about 2 hours
- any idea is a good idea
- the big spreadsheet
- The ranking criteria

	0	1	2	3
Possible? How likely is it that we could build this and make it work?	Hard This is likely to be a lot of work with many aspects that could be tricky to deliver on.	Investigate There are aspects that we need to further investigate before saying if this is possible.	Ok It can be done, with a little bit of effort in the build and rehearse stages.	Easy/Done We either have an existing resource, or a small tweak to an existing resource will deliver this.
Effort? How much effort might be required to make this work?	Unbound There are many unknowns, it is impossible with the current information to say how much effort is required.	Risky There are aspects that might need some trial and error and iteration in order to make this work.	Moderate A bit of time required in the build stage to make this work.	Trivial Mostly download and run.
Reliable? How reliable might it be in use?	Not Significant risk of this being very hard or impossible to get any level of reliability out of it in practice. Might be ok to show a general idea, if editorial is correct.	Hard There are aspects that will be hard to control enough to make it reliable, but this might be ok in a non-live setup where we can take multiple shoots.	Constrain If we constrain some aspect of the project, it increases likelihood that it will work as we desire.	Fine It either works already, or we are very confident it will work.
At Home? Can people follow along with this and replicate it at home themselves?	No Not possible to follow along at home with this one.	Aspect Lots of pieces that need to slot together, we might still be able to explain a selective aspect of a bigger project for at-home use.	Extra With some extra parts, the project can be replicated in full at home.	Standalone The project could be completely replicated at home in its full form without any extra parts.

Validate and Communicate the Idea

- Build prototypes and test
- The little 1 minute VT
<https://www.youtube.com/watch?v=ejIWrrRniCo>
- Involve the wider team (producers, coordinators, management, outside partners)
- Reccy visits (often remote)



Specification and Sign-off

- Avoid all the emails – one document
 - pass around like a token
- V1 document is the spec
 - sign-off “I will build this for you”

Queries	
Parameters	
<u>micro:bit</u> powered!	

Detail redacted, to protect confidentiality

Project	2 – Navigator 3xN – Proximity Sign (configured at rig-time)
Story brief	
How it might work	
Risks/Mitigation	
Parts Required	

Build and Test Test Test

- Build it and make it work
- Test and refine
- Think of all the things that might go wrong or be hard
- Built in TV-modes
- V2 doc with rig/operate instructions



Pack and Travel

- Building something that:
 - really works
 - is safe to be hit by a 6 foot Gladiator
 - is safe for children to use
 - looks great on TV
 - passes the BBC health and safety review
 - is easy to lug through London via the underground
- Cows on the line in Milton Keynes



Rig, Test, One-Take

- “You’ve got just a few minutes on set”
- Blue-tak and command strips
- “Cut! First take! Let’s have a cuppa!”

“We’re going to call you ‘one-take Dave’ ”



sound engineer
assistant producer
producer
presenter
presenter
production coordinator
gladiator



assistant producer
gladiator
camera operator
researcher
wizard
assistant producer
researcher
executive producer

The Team

Photo credit: Scott Kershaw Photography
Photo also available from various LinkedIn posts

Secrets to Success

- A top class team – people doing what they are expert at
- Trust your expert
- A shared innovation process that everyone understands
- A fast way to grade, rank, and filter ideas
- A design document with a sign-off gate
- Fast tiny prototypes to get everyone on the same page
- Test, test and test again



The Children Say it All...



Meet the school crowned Gladiators micro:bit champions | Newsround

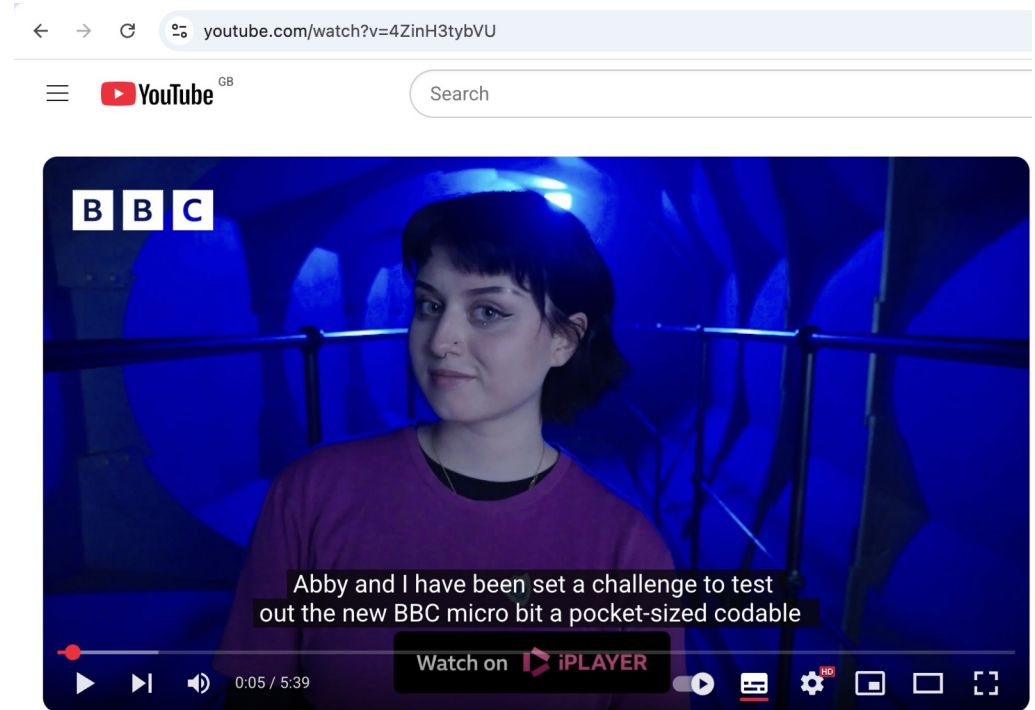
<https://www.youtube.com/watch?v=UnUS1CjRwbl>

Links

- Assembly Video: <https://www.bbc.co.uk/teach/microbit/articles/z4d4qyc>
- Football Academy Video: <https://www.bbc.co.uk/teach/microbit/articles/zvf8mbk>
- The Dumping Ground Video: <https://www.bbc.co.uk/teach/microbit/articles/zg9tb7h>
- So Awkward Video: <https://www.bbc.co.uk/teach/microbit/articles/zg386rd>
- Bro's in Control Video: <https://www.bbc.co.uk/teach/microbit/articles/zrrqp9q>
- Blue Peter Video: <https://www.youtube.com/watch?v=4ZinH3tybVU>
- Blue Peter write-up: <https://www.bbc.co.uk/teach/microbit/articles/z2ffcxs>
- Saturday Mash-up Live Video: <https://www.bbc.co.uk/teach/microbit/articles/z7dhb7h>
- CBBC Newsround Video: <https://www.youtube.com/watch?v=UnUS1CjRwbl>
- David Whale YouTube VT Clips: <https://www.youtube.com/@whaleygeek3639/videos>



A Proud Moment



@JoelM and Abby Cook use Micro:bit to solve escape room puzzles | CBBC #challenge

<https://www.youtube.com/watch?v=4ZinH3tybVU>

Questions for The micro:bit Wizard!



Photo credit: Scott Kershaw Photography