MicroUSB vs. Apple’s Lightning Cable

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Overview of USB Connectors

Type A connectors connect to the host (e.g., computers)

Type B connectors connect to peripheral devices (e.g., cell phones)

Mini-B used to be the standard, but was deprecated in 2007 in favor of Micro-B, which was mechanically stronger and thinner.
Overview of USB Data Transmission

- Half-duplex differential signaling
  - Each bit uses two wires instead of one
  - Logic state is signified by one wire being more positive than the other
  - Reduces common-mode noise

- NRZI encoding
  - “Non-Return-to-Zero Inverted”
  - Logical ‘1’ is represented by a transition at the clock edge
  - Logical ‘0’ is represented by no transition at the clock edge
The Mode Detect (or ID) pin is part of the USB On-The-Go (OTG) specification. It determines which connected device is the host and which is the slave.
Lightning Cable
Lightning Cable BQ2025 Chip
Lightning Cable Pinout

1. Power
2. Identification/Control 0
3. Lane 1 -
4. Lane 1 +
5. Identification/Control 1
6. Lane 0 -
7. Lane 0 +
8. Ground
Lightning Cable Reversibility

![Diagram of Lightning Cable Reversibility](image-url)
Lightning Cable Reversibility

1. Phone attempts to communicate with BQ2025 on Pin 5, but receives no response.

2. Phone attempts to communicate with BQ2025 on Pin 1 and receives a response. Phone now knows the orientation of the cable.

3. Phone and cable exchange further information using Pin 1.
MicroUSB  Lightning
MicroUSB

lower power rating

1.8A at 5V, 9W

May find 2A wire

Lightning

higher power rating

2A, at least 12W

enough power to charge an iPad
MicroUSB

lower power rating
mechanically fragile

Lightning

higher power rating
durable
**MicroUSB**

- lower power rating
- mechanically fragile
- cheaper
  
  $1 - $7

**Lightning**

- higher power rating
- durable
- more expensive
  
  $6 - $15
  
  directly from Apple: $19 - $29
**MicroUSB**

- lower power rating
- mechanically fragile
- cheaper

**Lightning**

- higher power rating
- durable
- more expensive
- reversible
**MicroUSB**

- lower power rating
- mechanically fragile
- cheaper
- not reversible
- universal between Brands

  Different types may be needed for tablets

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**Lightning**

- higher power rating
- durable
- more expensive
- reversible
- universal between Apple products

  Not usable by other products
<table>
<thead>
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Sources


"USB Type-C: One Cable to Connect Them All - CNET." CNET. Web. 11 Dec. 2015.

