

INVENTION DISCLOSURE

1. **Invention Title.**

Sink-Source Power Negotiation over Data Connector

2. **Invention Summary.**

Data connectors, such as HDMI (example only), could also be used to power devices. Devices can be either a power sink, or a power source. The invention establishes a protocol for devices to negotiate what power features the devices have, and set up a power sink-source relationship. Elaborations might also include:

- swapping the sink-source relationship
- negotiation of specific voltage/current
- AC/DC negotiation
- Handling of stand-by modes

3. **Invention Description.**

a. Describe the invention in detail.

See above. See attached drawing.

Additional details provided in the examples below. Example 1, illustrates a simple 2-bit signaling protocol between two devices to indicate the various powering states possible. The tables illustrate a (non-exhaustive) list of possible connection configurations that are representative of the various powering states available.

Example 1: a 2-bit message with the following meanings:

- 00 = No powering ability
- 01 = Power consumer
- 10 = Power Supplier
- 11 = Power Consumer and/or Power Supplier

Device A

Powering Declaration Message "01" >
ACK
Begin consuming power

Device B

ACK
< Power Declaration Message "1x"
Begin Supplying Power

Device A

Powering Declaration Message "1x" >
ACK
Do not supply power

Device B

ACK
< Power Declaration Message "00"
Do not consume power

Device A		Device B
Powering Declaration Message “x1” >		ACK
ACK	<	Power Declaration Message “00”
Do not consume power		Do not supply power

Device A		Device B
Powering Declaration Message “x1” >		ACK
ACK	<	Power Declaration Message “10”
Begin Consuming power		Begin Supplying Power

Device A		Device B
Powering Declaration Message “11” >		ACK
ACK	<	Power Declaration Message “11”
Do not consume power		Do not supply power

Device A		Device B (Legacy device)
Powering Declaration Message “xx” >		No-ACK
Do not supply power & Do not consume power		

Device A		Device B (Legacy device)
Powering Declaration Message “xx” >		No-ACK
Do not consume power		

Example 2 illustrates the possibility of adding another level of complexity such as a bi-modal powering ability where two possible powering states might be available such as high-voltage and low-voltage, or high-current and lower-current, or AC and DC power as examples. The signal protocols describe all the various possibilities while the tables only show a few representative powering states.

Example 2: a 3-bit message with the following meanings:

- 000 = No powering ability
- 001 = Mode-A Power consumer
- 010 = Mode-A Power Supplier
- 011 = Mode-A Power Consumer and/or Power Supplier
- 100 = Mode-B Power consumer
- 101 = Mode-B Power Supplier
- 110 = Mode-B Power Consumer and/or Power Supplier
- 111 = Mode-A/B Power Consumer and/or Power Supplier

Device A		Device B
Powering Declaration Message “100” >		ACK
ACK	<	Power Declaration Message “1x1”
Begin consuming Mode B power		Begin Supplying Mode B Power

Device A

Powering Declaration Message "01x" >
ACK
Do not supply power

Device B

ACK
< Power Declaration Message "1x0"
Do not consume power

Device A

Powering Declaration Message "0x1" >
ACK
Begin consuming Mode-A power

Device B

ACK
< Power Declaration Message "111"
Begin Supplying Mode-A Power

- b. Why was the invention developed? What problem(s) does the invention solve?
How is it better?**
Fewer cables; addition of power to data connectors.
 - c. Briefly outline the potential commercial value and customers of the invention.**
Gargantuan.
- 4. HOW is your invention different from existing products, processes, systems?**
No known intelligent power negotiation among DATA connector.

Device A ← → Device B



0x1 > Device

1x0 ; > source factor

else No, false, No, low?

could use, eg. E010

Elaborations

SWAP (battery status)

Standby

Voltage/current

AC/DC

7