

# Universal Power Adapter for Mobile Devices

## IEEE P1823 UPAMD

### Communications Subcommittee

Start Times:

11 January 7:00 a.m. PST UTC-8 (1500GMT/Zulu)

Attendance: Paul Penepinto, Lee Atkinson, Gary Verdun, Bob Davis, Ignatius Lee, Edgar Brown

#### Minutes

Call to Order, UPAMD Communications Subcommittee meeting - Edgar Brown 1510Z

- I. Informal Agenda based on December 14th meeting
- II. IEEE Patent slides presented. See <http://standards.ieee.org/board/pat/pat-slideset.ppt>
- III. Physical layer definitions
  - A. Adapter modalities (Analog vs. Digital):

*Two modes of operation, a digital communication scheme with an underlying basic, 'degraded', 'minimalistic', or 'cost effective' mode. Lee A.: addressing printers and other devices that would require higher voltages or negotiation should be more economical with a scalable digital communication scheme than otherwise. Bob: Phrasing of the standard should require a 'complex' communications scheme with a 'degraded' mode, to ensure compatibility.*
  - B. Digital communications with Analog detection:

*Consensus is going towards Digital communications for all negotiation with analog detection of device presence.*  
*Bob: Analog 'communications' with multiple levels and such would have a similar cost of implementation (microcontroller, A/Ds and such), as a purely digital implementation. Lee: Static power capability can be communicated over only the power lines (as in submitted proposal).*
  - C. Number of wires/connector pins:

*4 connector pins actually provides for a smaller connector and 4 wires allows for a faster differential communications growth path. Lee A.: We require some estimates on the latency required for messaging protocols. This would determine communications speed and requirements for differential wiring. Edgar: This was done some time ago, but they need to be revisited to reconcile them with our current thinking. Lee/Gary: Discussion on Dell's adapter implementation of 1-wire™ communications, with the advantage of a single power domain. A basic trade-off exists between latency requirements and 1-wire or 2-wire communication schemes. For future proofing 4-wires is preferable, for cabling cost 3 (or even 2) wires is preferable. Edgar: Standards such as CAN could support one or two wire communications. Gary: 1-wire communications is preferable from environmental, cost, and other considerations, but lifetime of standard and lower voltages on differential communications, especially requirements of newer processes and silicon costs, might make 2-wires preferable.*  
*Bob/Gary: Full state machines would improve comprehension. Edgar: Transitions between degraded mode and full communications should be well defined at the highest level of the machine.*

D. Review of Lee's 2-wire (total, including power) proposal:

*Lee: This scheme only attempts to communicate power capabilities over the power wires while remaining compatible with the digital communications scheme. Bob: Being only two wires it cannot be intrinsically safe, i.e., assure that no sparking will occur on disconnect. If this mode is allowed we could have cables in the market that **only** allows it and uses the same connector; i.e., we need to require only one cable.*

E. Cabling and EMI:

*Gary: Differential and lower voltages would simplify EMI requirements, but the presence of a ferrite on the cable close to the sink might be required. As part of the standard a "Test Sink" **that includes a noise source**, should be specified. EMI should be part of the standard.*

*Lee/Gary: The standard cable should have very strict requirements to be able to use the UPAMD logo. Some of our requirements can be relaxed **only** for captive cables, that still allows for inexpensive adapters.*

F. Spark safe/intrinsic safety:

*Bob: We might be able to claim intrinsic safety (UL913, EN50020), but we currently don't have enough information on the details of these standards. We have to specify how to bring down the power on the system before the main power lines disconnect.*

IV. Smart grid requirements:

*Bob: Future proofing for compatibility with the smart grid might be required, as some of the work might impose restrictions on UPAMD-class devices. Gary: Most communications on the smart grid seem limited to on/off and power limits, which should be very easy to support. Some of the communications would very probably be wireless which might leave it to the device to implement. Bob: Some of the communications might need to get to the adapters, not only the devices. Paul: the smart grid requirements might not get down to the "lamp level" UPAMD adapters. Bob: A large laptop or computer can have similar power requirements to a refrigerator, so it is not out of the question that UPAMD would have to deal with this.*

V. Next steps:

- A. Meaning of 'degraded' mode (e.g., analog scheme)
- B. State machine definitions, including separation of analog vs. Digital
- C. Cable requirements
- D. Proper definition of "intrinsically safe" requirements (Bob: tracking down UL liaisons)

VI. Next Meeting on Jan 25 @ 5pm Pacific.

- A. Ongoing e-mail discussion regarding communication requirements and proposals.

VII. Adjournment: 1655Z

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PLEASE SEND ANY CHANGES OR ADDITIONS TO EDGAR BROWN [EBROWN@AXIONBIO.COM](mailto:EBROWN@AXIONBIO.COM).