MEETING 14 AGENDA:

Call to Order UPAMD Power Subgroup meeting – Paul Panepinto 5pm Pacific 21 April 2011

I. Introductions/Attendance
Bob Davis, Edgar Brown, Paul Panepinto

II. Approval of 04/21/2011 Power Subgroup Agenda
Bob – Motion to Approve; Edgar - Seconded

III. Presentation of 04/07/2011 Power Subgroup Meeting 13 Notes
Edgar – Motion; Bob - Seconded

IV. IEEE Call for Patents. See
https://development.standards.ieee.org/myproject/Public/mytools/mob/slideset.pdf

V. Discuss potential conflicts of interest –

1. Green Plug introduced the Green Power Processor, high-performance, low-power, mixed-signal processor for PID feedback loop and PFC control that also offers digital communication with sinks
2. Green Plug, like most of the members participating in the working group, intends to support the eventual spec, but cannot commit to that until it is defined
3. Does my role as chair of the Power Subgroup represent a conflict of interest either as defined formally in the IEEE rules or even just in any member's mind?
Paul proposal – ensure that we do not have any conflict of interest or even the appearance of such by sending an email to the broader working group to see if they support a change for the Power subgroup chair position or for me to remain in the role.

VI. Questions and Answers about all things related to the Power Subgroup Requirements
Please see the section below of questions initially posed by Bob Davis. Much was answered in item VIII, below, a discussion of the state diagram and messages.

VII. Review UPAMD website content

1. Where to look for what
2. Review current draft of Power Requirements and begin to challenge / fill in details (see attached.)

VIII. Validating the State Diagram and Messages – to ensure they are valid
1. For every conceivable interaction or state change (devices connecting, disconnecting, reversing roles, etc.) verify the correctness of the model – ensure synchronization with the communications subgroup who are responsible for the transfer of information.
Bob discussed the messages (1-16) currently defined.

The following notes reflect our discussion of the messages covered in Bob's email of 4/21, attached.

Fault Message (0) – to convey unusual or erroneous behavior.

Available Power Message (1) – Source info about its power resources – maximum capability and temporarily available power

Requested Power Message (2) – Sink info about the most power it will ever possibly need so that the source can determine its obligation to the sink as well as a limitation of power in case a sink tries to draw too much power. Current need allows the source to budget less power if the sink goes into a mode where it doesn't need full power. Minimum power informs the source of the bare minimum the sink can accept.

Priority: More discussion is necessary to define what this means. Is it priority who gets to talk on the bus? Is it priority who gets power when multiple loads use a common source? What happens when a source and sink both take the same priority? Who makes decisions for power delivery for demand-response? The source could simply forward and relay messages or it could make power delivery decisions for the sink, or both could negotiate what to do. Current thinking is the source makes

decisions, although it tries to negotiate with the sink. The sink can always refuse the power. Smart Grid messages will likely have lower priority than sinks; therefore, the sinks still have control.

Device class identifies whether a device is a source, sink, reversible, or has energy storage functionality.

Edgar and the Communications Subgroup will look at the possibility of moving some of the info in this message definition into the header to see if that provides any optimization.

Data Transfer (Request) Message(s) – can also be used when more than 8 bytes are needed, for example, long serial numbers, vendor names, etc.

We discussed the use of an Organizationally Unique Identifier (OUI) for each power port.

Please review all the messages in the attached message list and provide feedback.

Load Device Power State Message (16) – allows any source to access the power state of any connected device, to determine if it has energy storage, for example. A power source might request a sink with higher priority to use that storage temporarily so that a lesser priority sink can still get power in a high demand scenario.

Paul volunteered to attempt a textual description of the use cases that might apply to the UPAMD state diagram and messages. For example, we want to develop use cases that show things like:

- A source being connected to a smart sink
- A source being connected to a dumb sink
- A sink being disconnected
- A source and sink reversing roles
- Sources and sinks requesting information of various types.

Edgar volunteered to develop a network diagram, as time permits, that should be a visual tool in mapping use cases with state diagrams/messages to ensure completeness and correctness.

IX. New business?

X. Adjourn
Edgar – Motion.

QUESTIONS AND ANSWERS TO THINK ABOUT:

Please send your feedback on these questions and provide your view of the best answers.

1. What information does the power source have and how is it used?
    a. How is maximum available power defined and what does it mean?
    b. How is stored power defined and what does it mean?
    c. How does the maximum power and available power interact?
    d. What does the maximum available voltage and how is it described? ¼ volt increments?
    ANSWERED in the discussion on messages, above.

2. Should the Adapter/Source track delivered Watthours?
    Would it need storage to track or can it keep asking? Will it be optional? Probably should be optional. How will it do it? Any adapter that can measure current can track watthours. Profile what power has been delivered. Segmented by port? How much was consumed vs. how much is stored/available energy. Time series data, cumulative? Should track stored power on its network.

    SOME things are making Edgar rethink communication – value-add in terms of registers, capabilities, etc. not yet considered in the communications. Data requirements may need to be expanded. Think about TED, a home energy monitoring tool, as a model.

3. Should the Adapter/Source track current usage and demand profile? – Anticipation of future peak demand? Optional?
4. How and why should the Adapter/Source respond to changing Sink priority changes?
5. When and why should the Adapter/Source change its priority? Control purposes?
6. Who is in control of the Source/Sink power delivery and when?
7. What should be the required sink initiated Fault conditions and what is the response to each by Source?
8. What should be the required source initiated Fault conditions and what is the response to each by Sink?

9. How do we handle multiple parallel sinks on one port and can we? Laptop sees 45W available by signal but only 5W reaches it.
    a. Are parallel loads allowed? – NO, not allowed!!!
    b. Do parallel loads communicate? CAN bus will allow this. N/A
    c. How do we guarantee power to primary user? Who is primary user? Docking Station or Docked system N/A

10. How do we authenticate power source vendor?
11. What does an intelligent source need to know about the sinks that it is feeding?
    a. What sinks are critical and which are not critical.
    b. Life support level on each sink?
    c. Who can be dropped and when?
12. If priority and class are moved to CAN address, what other information should be in these messages for better control and reliability? Power used? Peak demand? UPAMD Version(4x4)?