802.3af Ad Hoc on Detection

March 13, 2001 Progress Report

Don Stewart

March 12 Face-to-Face Meeting

- Discussed most controversial issues
- Prepared Motions to capture key conclusions
- Updated proposed PSE detection “source material” (for 802.3af and editor)
- *Partially* updated proposed Detection PD “source material” (for 802.3af and editor)

March 12 Attendees (not all for full day)

- Ataee, Mehran
- Bachand, Jerry
- Brooks, Rick
- Brown, Kevin
- Burton, Scott
- Cullin, Chris
- Darshan, Yair
- Diab, Wael
- Dwelley, Dave
- Eddings, Clay
- Glasser, Richard
- Huynh, Thong
- Injeti, Anand
- Inn, Bruce
- Jackson, Steve
- Jetzt, John
- Karam, Roger
- Kerenti, Larry
- Kohl, David
- Knollman, Dieter
- Lum, Mellissa
- Lynch, Brian
- Mak, Barry
- Moore, Robert
- Nakamura, Carl
- Rasimas, Jennifer
- Schwartz, Peter
- Stapleton, Nick
- Stewart, Don
- Vergnousd, Gerarol
- Woodring, Mike

March 12 - Leakage

- Discussion
  - Currents of 200 uA can cause failure
  - Several vendors say parts meeting < 10 uA can be made available at today's or reasonable prices
  - PD: needs < 10 uA and can achieve
  - PSE: needs < 30 uA total and can achieve (Darshan)
- Leakage show of hands:
  - The risk associated with having to achieve < +/- 30 uA leakage in PSE and < +/- 10 uA in PD is ….
    - Acceptable: 24
    - Non acceptable: 0

March 12 - Multiple Power Classes

- Show of hands
  - Believe there is market need for the standard to support multiple classifications: 17
  - Do not believe there is market need for this: 10
- Discussed two methods of supporting multi-classes that would not impact the initial 25K ohm slope detection or tolerances
- 802.3af needs to decide if this is an objective

March 12 - Multiple Power Classes

- Proposed two motions for 802.3af to consider (no one on 3/12 opposed these)
  - The standard shall enable multiple power classes provided the means of signaling them is compatible with 25K ohm slope detection
  - PSEs and PDs shall not be required to support multiple classes

March 12 - Tolerance

- Capacitance Limits
  - PD: < 100 nF
  - Cable: < 10 nF
  - PSE: < 500 nF
- Source impedance of PSE: Need to control to ensure one PSE does not power another
  - By show of hands, the group strongly favored devising a PSE source impedance specification based on those impedances it shall not exhibit, rather than specifying a narrow set it must exhibit

March 12 - Tolerance (Continued)

- Proposed a motion for 802.3af to consider

  (On 3/12, 28 votes supported this, zero opposed it)
- Motion: Detection tolerances will be as follows:
  - PDs will exhibit a slope of 25 K ohms, +/- 5%
  - PSEs shall detect slopes between 19K ohms and 26.5 K ohms
  - PSEs shall reject slopes < 15 K ohms and > 33 K ohms
  - The PSE source impedance shall fall in the “shall reject” range: < 15 K ohms or > 33 K ohms

March 12 - Other Results

- Noise Spec at Line Frequencies
  - Show of hands: “We need a specification for common mode noise between 40 and 500 Hz”
    - Agree: 22
    - Oppose: 0
  - We do not have limits to propose at this time
- Time to complete detection
  - Show of hands: “A PSE shall be able to complete detection in < 500 mSec”
    - Approve: 23
    - Oppose: 0

March 12 - Other Results (continued)

- Simultaneous “full power” on two pair sets
  - Not a Detection issue
  - Informal show of hands: “Believe a PD should be allowed to draw full power over each of two pairs sets simultaneously”
    - Agree: 0
    - Oppose: Many hands
- Full power on one pair set and stand-by power on the other pair set
  - There is some interest
  - Not a detection issue
  - 802.3af can consider

PSE and PD Detection Source Material

- Plan was to walk through two documents and update based on 3/12 discussions
  - Bring to 802.3af on 3/14 so other Detection ad hoc members could review
  - Upon ad hoc approval, turn over to Mike as Detection ad hoc input
- Updated PSE material is available for this
- We ran short of time for PD material. Need an hour to finish

Next Steps

- Like to get an hour to finish PD source walk through
- Propose Ad Hoc spend time on 3/13 to
  - Try to agree on a concept for multiple classifications (if 802.3af supports) (1 hour)
  - Agree on where current limiting is performed and how to spec (1 hour)

(Start Backup Slides)

Reflector Discussion (High Prior.)

- PD and PSE Capacitance: Filtering and detection time tradeoffs (27)
  - Seemed agreement that < 1 uF (total for PSE, PD, cable) is feasible. Lower helps detection time, higher gives filter options.
  - Based on Lab results, Yair proposed maximums: 470 nF for PSE, 100 nF for PD, and 10 nF for cable. Suggested these provide sufficient EMI, ESD filtering
- Signature Tolerance Budget (17)
  - Much discussion but little resolution. We need a restatement of the budget and debate issues

Reflector Discussion (High Prior.)

- Detection Time (9)
  - Support that 200 mSec is too tight for PSE to detect. Increasing to (at least) 300 mSec was supported.
- Protection of DTE/PD/People (8)
  - No expressed consensus that we need anything beyond two point measurements and timing limitations
- Rejection of Big cap terminations (6)
  - Seemed agreement that large (legacy device) cap terminations should be rejected.

Reflector Discussion (High Prior.)

- Leakage (5)
  - Concern of lack of spec sheets showing low leakage at low voltages. A few MOSFET sheets with low leakage were found
- 75K Source Impedance. Effect on EMI?
  - Arguments made: high source Z is better than low
- Multiple Classes (4)
  - Very limited discussion. Adds some value.
- Noise Immunity (2)
  - Little discussion. One proposal for up to 0.5 Vpp ripple for f < 500Hz.

Reflector Discussion (Med Prior.)

- Motor boating, Oscillations. (8)
  - Motor boating is an issue for dual power and in single power situations.
  - There is agreement we need specs to avoid or limit this. Two complementary proposals for specs:
    - (1) Minimum time PSE port is to be off after an “unplug” even,
    - (2) PD should give a signature only if it intends to draw within normal current range
- Protection of PSE (4)
  - There were suggestions we should spec the maximum inductance and capacitance at the PD. No opposition expressed to this.

Reflector Discussion (Low Prior or outside scope)

- Current Limiting, Where to perform (31)
  - Some consensus that PSE current limit should be set to higher value than PD current limit. The controlling current limit on start up is in the PD.
- Maximum Currents/Times: Turn-on, Turn-off
  - Much discussion
- Power Dissipation during Start-up
  - Much discussion. Conclusion is TBD.
- Power over Both Pairs: Simultaneous Power Sources (9)
  - Received questions but no one was advocating that we support this

Reflector Discussion (Low Prior or outside scope)

- Extraneous Power from PD or PSE (10)
  - Consensus was that a PD can not provide power. Also seemed agreed that mid-span units can not deliver power back toward LAN switch
- Noise Spec for PD (5)
  - Arguments made that EMI limits protects data