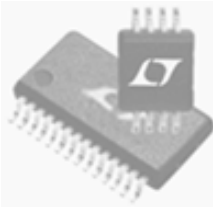


IEEE P802.3at DTE Power Enhancements Task Force

Classification Ad Hoc Status Report 7-17-06

Clay Stanford
Linear Technology



IEEE P802.3at Classification Ad Hoc

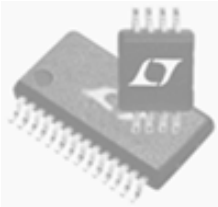
This summary is based solely on Clay's recollection of the events, decisions, and desires of the ad hoc group. I encourage ad hoc participants to speak up if they feel I have omitted important information.

- **6 meetings via teleconference ending 7/12/06, each approximately 1 hour long.**
- **Typically around 15 participants**
- **Common Participants indicated on sidebar**
- **If I don't have your name, or don't have it correct contact me so we have a complete set.**

Some of the Ad Hoc Participants

David Law	Yair Darshan
Sajol Ghoshal	Daniel Feldman
Taufique Ahmed	Matt Landry
Wael Diab	Steve Robbins
Chad Jones	Martin Patoka
Hugh Barrass	Dan Dove
Ramesh Sastry	George
Thong Huynh	Frank
Geoff Thompson	John Yates
Joe DeNicholas	Jan Krellner
Keith Hopwood	Fred Schindler
Rick Frosch	Christian Beia

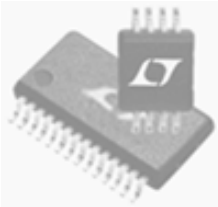
Progress!!



Remember From Austin Meeting it was Decided:

- Layer 1 classification will be limited to no more than 10 classes including the existing .af classes
- Lowest Power Class will be 2W

Ad Hoc Agreements!!

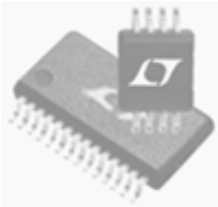


From the June/July Ad Hoc Meetings it was Generally Agreed:

- One additional class between 7W and 15.4W
- Class definitions will extend up to P_{system_max}
- Will not define classifications above P_{system_max}

(This might cause confusion and system vendors might implement systems delivering power above P_{system_max} , either by accident or by purpose.)

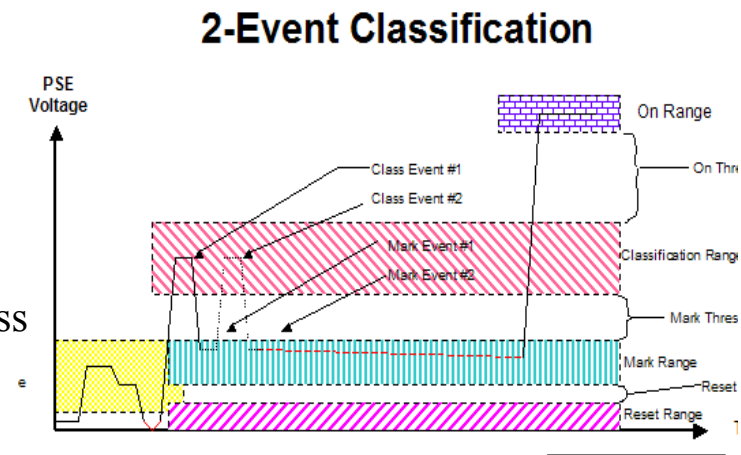
P_{system_max} is the maximum power deliverable over 2-pair as determined by the 802.3at committee.



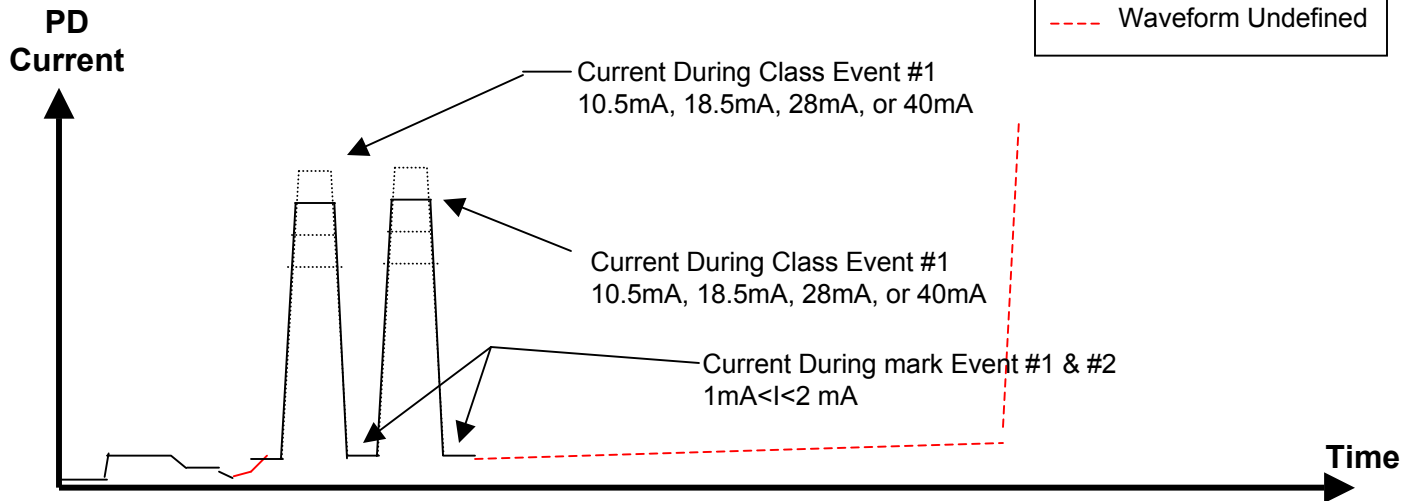
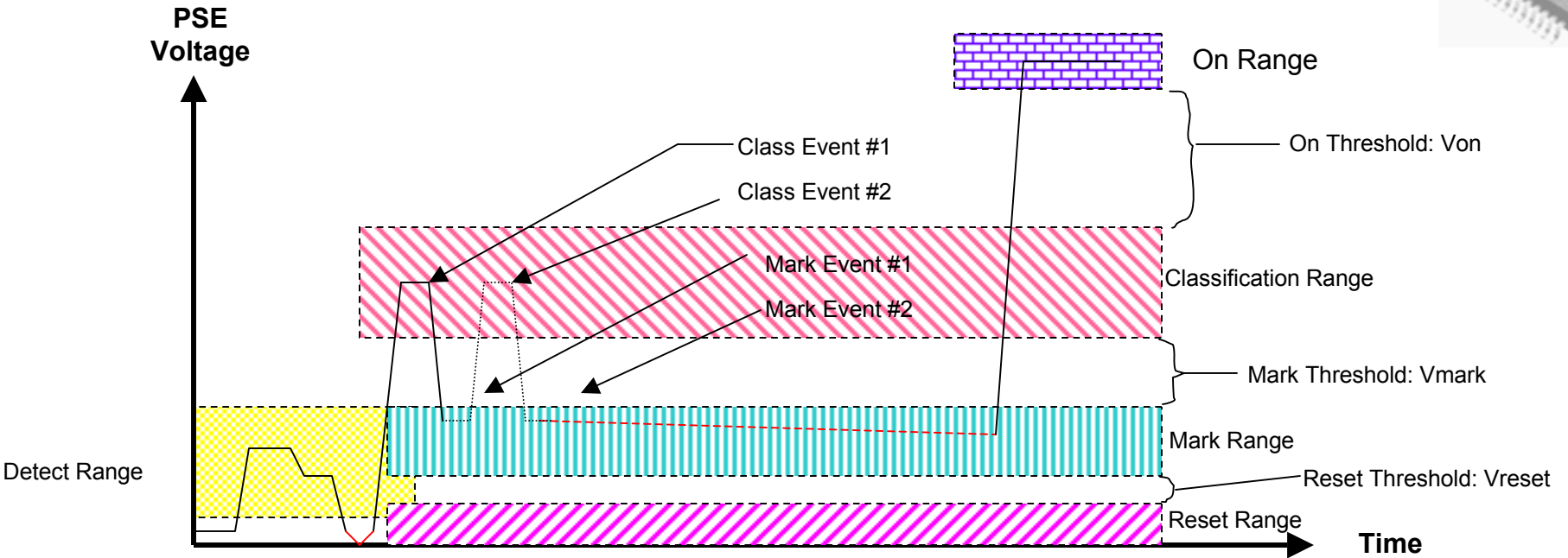
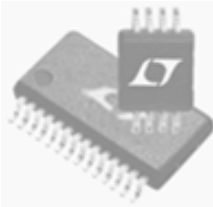
Ad Hoc Agreements Cont'

- Spare classification combinations will be available for future committees to define, for example higher power levels than Psystem_max.
- One classification combination will be defined as a hook to allow for future expansion of the classification method.
- 2-Event Classification method will be used to provide more classification information.
- 2-Event Classification will use low mark voltage** unless unsolvable issues arise.

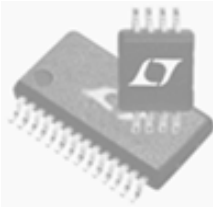
**Low mark voltage refers to voltage separating each class event. The range may be approximately 7-10V (TBD!!)



2-Event Classification



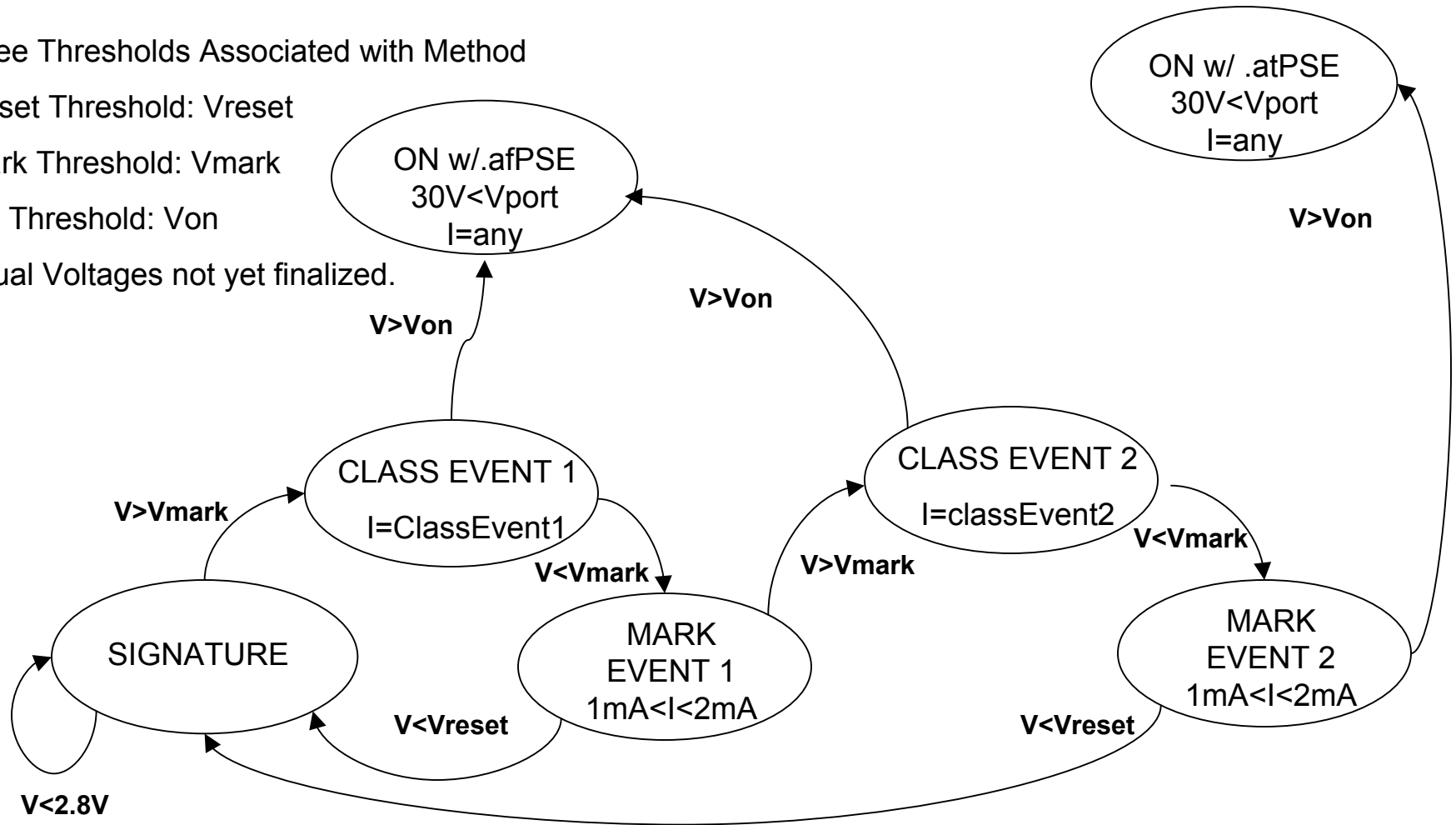
2-Event Classification State Engine in PD



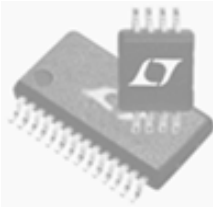
Three Thresholds Associated with Method

- Reset Threshold: V_{reset}
- Mark Threshold: V_{mark}
- On Threshold: V_{on}

Actual Voltages not yet finalized.

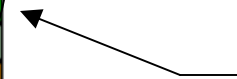


Preliminary Classification Table

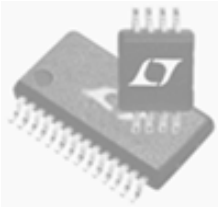


From Yair Darshan 7-18-06 with modifications

New Classes	1st attempt	2nd attempt	Code Interpretation	PD[W]	PSE[W]
	0	0	AF PD	12.95	15.4
	0	1	ERROR		
	0	2	ERROR		
	0	3	ERROR		
	0	4	ERROR		
	1	0	ERROR		
	1	1	AF PD	2.84	4
1	1	2	AT PD	2	2.02
2	1	3	AT PD	2.84	2.88
3	1	4	AT PD	15.87	17.38
	2	0	ERROR		
4	2	1	AT PD	18.78	20.99
	2	2	AF PD	6.49	7.00
5	2	3	AT PD	21.7	24.77
6	2	4	AT PD	24.62	28.75
	3	0	ERROR		
7	3	1	AT PD	9.72	10.24
8	3	2	AT PD	27.53	32.97
	3	3	AF PD	12.95	15.40
9	3	4	AT PD	30.45	37.47
	4	0	ERROR		
10	4	1	AT PD Future	35	45.27
11	4	2	AT PD Future	40	55.28
12	4	3	AT PD Future	45	68.38
	4	4	AF PD	12.95	15.4

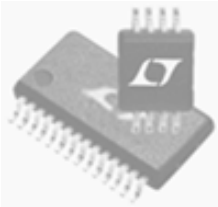


Not finalized!



Previous Ad Hoc Agreements

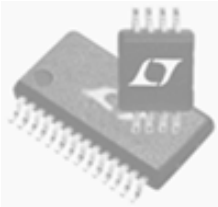
- Backward compatibility with 802.3af is required.
- Mutual identification is required:
 - a. An AT-PD must be able to distinguish between AF-PSE and AT-PSE
 - b. An AT-PSE must be able to distinguish between AF-PD and AT-PD.
- Classification will be mandatory in AT-PD and AT-PSE as a method to implement mutual identification.
- Class policing will remain optional.
- 25K signature resistance will not be changed.
- 802.3af class resolution is too coarse and finer resolution will be implemented.
- “Variable classification resolution” by either PSE or PD will not be used.
- Adding more information into classification such as vendor ID will not be supported.
- One of the purposes of classification is to implement power allocation (management) prior to powering the PD.
- Advanced power management, for example dynamic power allocation will not be done in layer 1. (It may be performed in Layer 2.)
- Classification method will support midspan and endpoint PSEs, i.e. performed in layer 1.



Issues Still Needing to be Resolved

- Classification voltage, current, and time specifications
- Single or dual signature for 4-pair PD
- Classification power levels
- What hardware configurations should be supported (I.E. midspan +endpoint,etc)

LOWER-LEVEL ISSUES NEEDING DISCUSSION



- Is it acceptable to power for example a 20 watt PD using all 4-pair when it could be powered with only 2 pair?
- Should a 4-pair PD that fails to get power provide user with a two-level failure indication, one for an AF-PSE and another for a 2-pair AT-PSE?
- Several questions interrelated to the architecture used for 4-pair systems:
 - Should 4P verification be done during classification or detection?
 - In a split cable installation using a 4P AT PSE, is it expected that both PDs should receive power?
- How does system react if PD shorts port with load capacitor? Is this allowed in .at?
- How to treat reserved classes, power or do not power?