802.3 Clause 104 (802.3cg and 802.3-2018) Maintenance Requests

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ANALOG DEVICES

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PSE and PD SCCP Timers Overlap

- PSE Table 104-4

Item	Parameter	Symbol	Unit	Min	Max	Class	Type	Additional information
8	Classification time	T_{Class}	ms	—	366	~~All~~Classes 0 to 9	All	See 104.4.5
					1300	Classes 10 to 15		

- PD Table 104-7

…							
15	SCCP watchdog timeout	$T_{SCCP\_watchdog}$	ms	150	200	~~All~~A, B, C, D	See 104.5.5
				~~1000~~ 1300	~~1300~~ 2000	E	

  - A PSE which needs between 1000 and 1300 ms to classify, allowable by Table 104-4 will cause the PD to timeout. SCCP classification is optional, the presenters are not aware of any implementations of this feature.

Cable Resistance Measurement and V_{Report_PD}

- For CRM, the PD is reports its voltage to the PSE so the PSE can perform a ΔV/ΔI calculation. Accuracy is +/-20mV.
- The existing +/-20mV tolerance requirement does not allow power coupling network resistance to be, optionally, measured
  - Removing the negative tolerance requirement allows greater design flexibility
  - Regardless any measurement error is capped by R_{Cable}, max and there is no risk to interoperability
- Change +/- to +

Table 104–10—VOLT_INFO register table

Bit(s)	Name	Description	R/W[a]
b[15:8]	Reserved	Value always 0	RO
b[7:0]	Voltage at PD PI during Presence Pulse	~~±~~ 20 mV tolerance, 10 mV per LSB	RO

[a]RO = Read only

DO_CLASSIFICATION: present_iwakeup

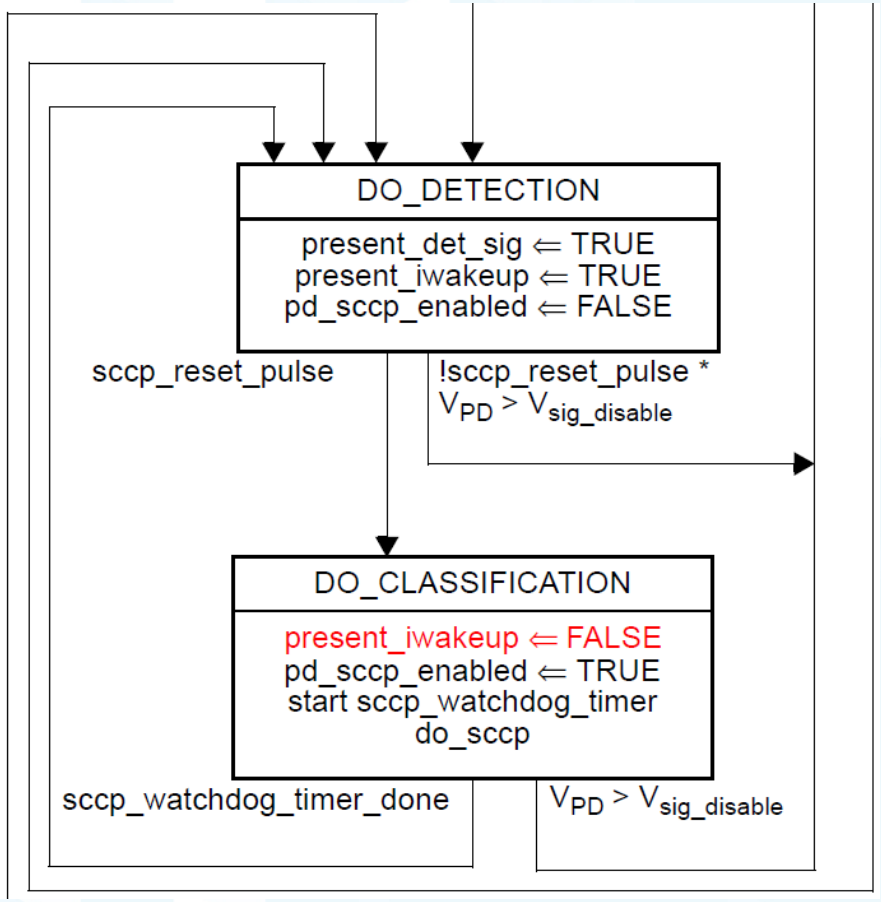
Technical, 802.3bu, Page 53, Figure 104-8

Comment

The PD state machine, as written, requires present_iwakeup to be TRUE in DO_CLASSIFICATION based on an assignment derived from DO_DETECTION. During classification the PD is engaged in SCCP signaling and cannot simultaneously present the iwakeup signature.

Suggested Remedy

Modify Figure 104-8 as follows, specifically setting present_iwakeup to FALSE in DO_CLASSIFICATION.



Post-sleep Classification

Technical, 802.3bu, Page 53, Figure 104-8

Comment

The PD state machine, as written, does not allow a PD to respond to SCCP classification on PD_SLEEP exit.

Suggested Remedy

Change

wakeup

TRUE: the PD requires the full operating voltage at the PI.

FALSE: the PD is ready to go to sleep.

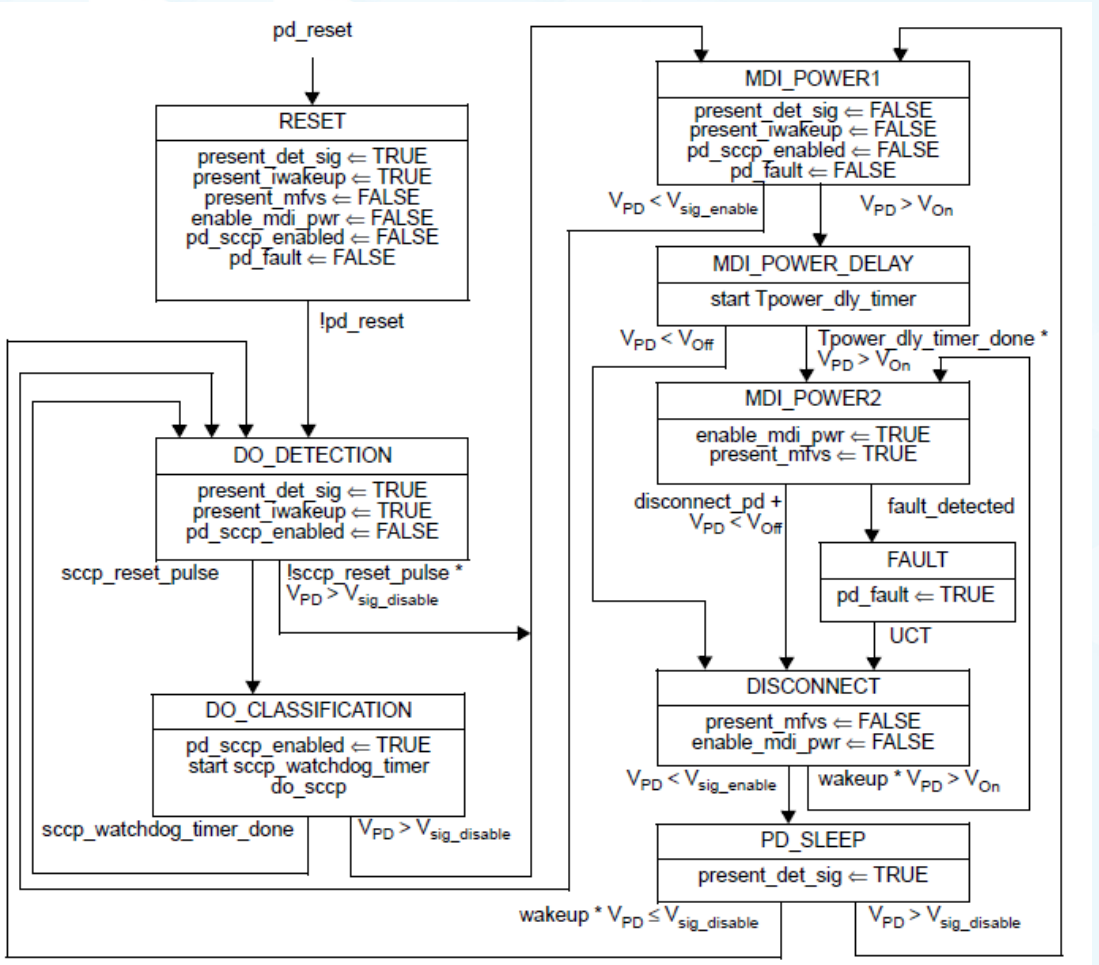
To

wakeup

An implementation specific variable enabling the PD to request wakeup. A PD supporting SCCP sets wakeup TRUE if sccp_reset_pulse is TRUE.

TRUE: the PD requires the full operating voltage at the PI.

FALSE: the PD is ready to go to sleep.



- THE EXISTING TEXT LACKS CLARITY AND HIDES THE LINK TO SCCP wakeup

PD Current During Disconnect

Technical, 802.3bu, Page 56

Comment

Meeting the T_{OFF} requirement when significant bulk capacitance is present requires the PD to pull down with a reasonable discharge current. The existing I_{Sleep_PD} requirement is at odds with the requirement to discharge the PD bulk cap within T_{OFF}.

The PD is not presenting a valid detection signature in the DISCONNECT state and the PSE state diagram has a matching T_{OFF} timer during the PSE's SETTLE_SLEEP state.

Removing the PD I_{Sleep_PD} requirement in the DISCONNECT state allows the PD is discharge itself when disconnected from the PSE. This modification will not affect PSE/PD interoperability.

104.5.6.3 Input Current states:

During operation in the DISCONNECT and PD_SLEEP states, the PD shall not draw current in excess of I_{Sleep_PD} as specified in Table 104–7.

Suggested Remedy

Modify 145.5.6.3

During operation in the ~~DISCONNECT and~~ PD_SLEEP state~~s~~, the PD shall not draw current in excess of I_{Sleep_PD} as specified in Table 104–7.

- THE Isleep LIMIT REALLY WAS MEANT TO APPLY DURING "SLEEP", NOT "DISCONNECT", THE TRANSITION TO SLEEP, WHEN THE PD NEEDS TO DISCHARGE

C_{IN_CLASS}

Technical, 802.3cg, Page 93, Table 104-7, Item 6b

Comment

- C_{IN_CLASS} is limited to ensure that excessive rise and fall times do not interfere with SCCP
  - t_R and t_F can accommodate C_{IN_CLASS} of up to 1.5uF
- C_{IN_CLASS}, max is 0.4uF for Type E
- This value is unnecessarily restrictive and potentially infeasible
  - A reservoir cap is required to maintain PD operation during Reset commands

Suggested Remedy

Modify Table 104-7, Item 6b

6b	Input capacitance during DO_CLASSIFICATION state	C_{IN_Class}	µF	—	0.2	~~All~~A, B, C, D	All classes Applies during tR and tF only.
				—	0.4 1.5	E	

$V_{sig\_disable}$ and V_{PUP} Tracking Proposed Remedy

Table 104–5—Valid PD detection signature characteristics, measured at PD PI

Parameter	Conditions	Min	Max	Unit
V_{good}	7mA<I_{PD}<17mA, PD exiting RESET state	4.05	4.55	V
$I_{signature\_limit}$	V_{PD}<$V_{sig\_disable}$ max	—	24	mA
$V_{sig\_disable}$	V_{PD} rising	4.6	5.75	V
V_{sig_enable}	V_{PD} falling	3.6	4.3	V

Table 104–8—SCCP electrical requirements

Item	Parameter	Symbol	Unit	Min	Max	PSE/ PD Type	Additional information
1	PSE Pull-up Voltage (Classes 0 to 9)	V_{PUP}	V	$V_{good\_PSE\ max}$	5	All	See Table 104–3
	PSE Pull-up Voltage (Classes 10 to 15)				5.5		

Technical, 802.3bu, Page 54, Table 104-5

Comment

Transitions from DO_CLASSIFICATION to MDI_POWER1 pragmatically occur between $V_{PUP,max}$ and $V_{sig\_disable,max}$. In 802.3bu, for Classes 0-9, this decision region spans 0.75V. In 802.3cg, for Classes 10-15, V_{PUP} changed to 5.5V, without a corresponding change to $V_{sig\_disable}$. The resulting decision region is reduced to 0.25V.

Suggested Remedy

Modify 104-5 as follows, splitting $V_{sig\_disable}$ into two rows

Table 104–5—Valid PD detection signature characteristics, measured at PD PI

Parameter	Conditions	Min	Max	Unit
V_{good}	7mA<I_{PD}<17mA, PD exiting RESET state	4.05	4.55	V
$I_{signature\_limit}$	V_{PD}<$V_{sig\_disable}$ max	—	24	mA
$V_{sig\_disable}$, Classes 0 to 9	V_{PD} rising	4.6	5.75	V
$V_{sig\_disable}$, Classes 10 to 15	V_{PD} rising	5.75	6.5	V
V_{sig_enable}	V_{PD} falling	3.6	4.3	V