Bob Ross
IBIS Summit Meeting
DesignCon 2007
Santa Clara, California
February 1, 2007

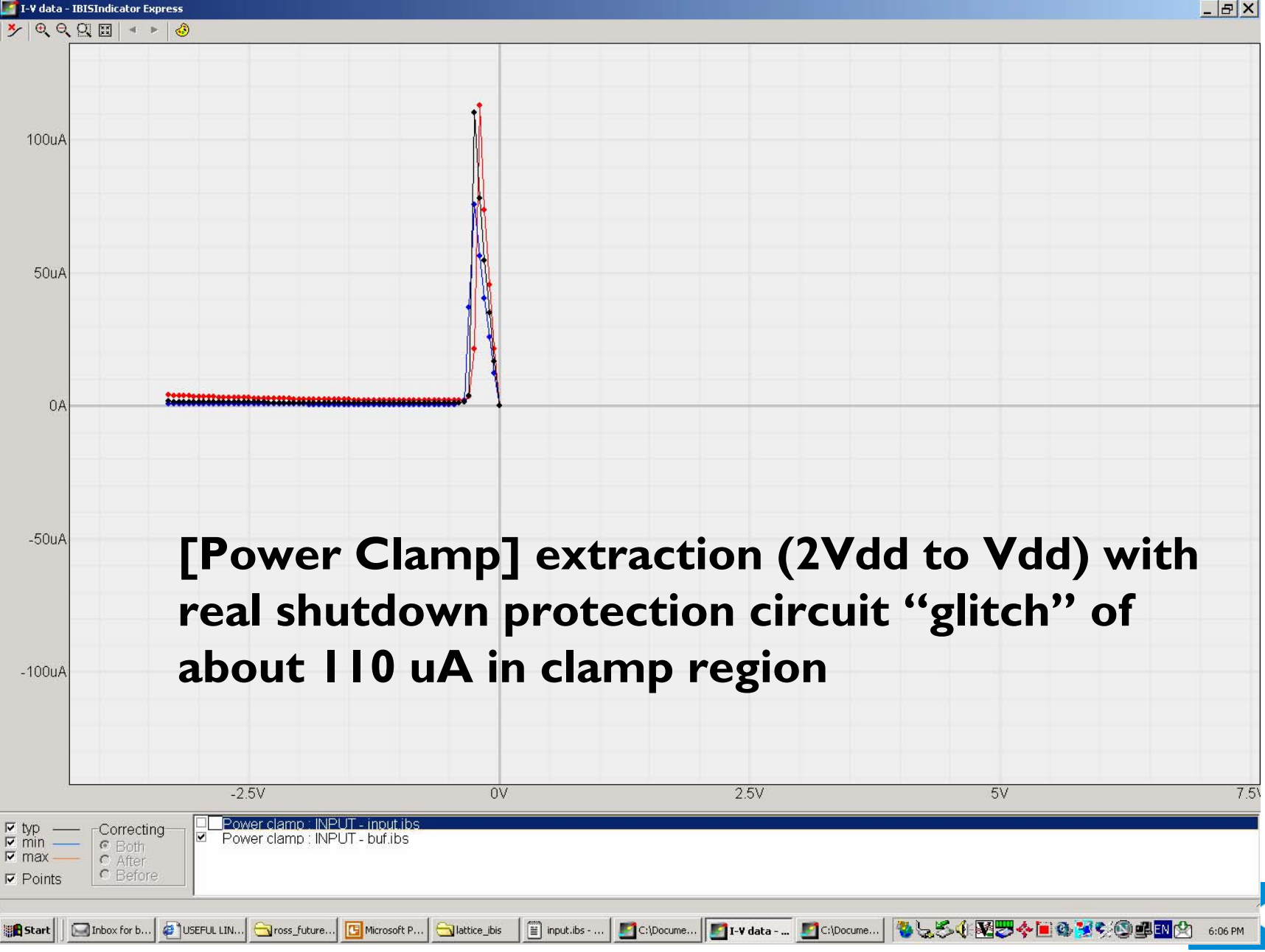
TERASPEED
CONSULTING
GROUP

© 2007 Teraspeed Consulting Group LLC

X for Exception Designation

- Kim Helliwell, "IBIS Quality Committee Report"
  http://www.eda.org/pub/ibis/summits/feb07/helliwell.pdf
- Real exceptions exist
- "X" means exception is noted (DOCUMENTED)
- Real examples
  - I-V Glitch
  - I-V tables not crossing 0 V, 0 A
  - DDRII (BUG93) – Error in ibischk4 parser
- Still discussing best approaches

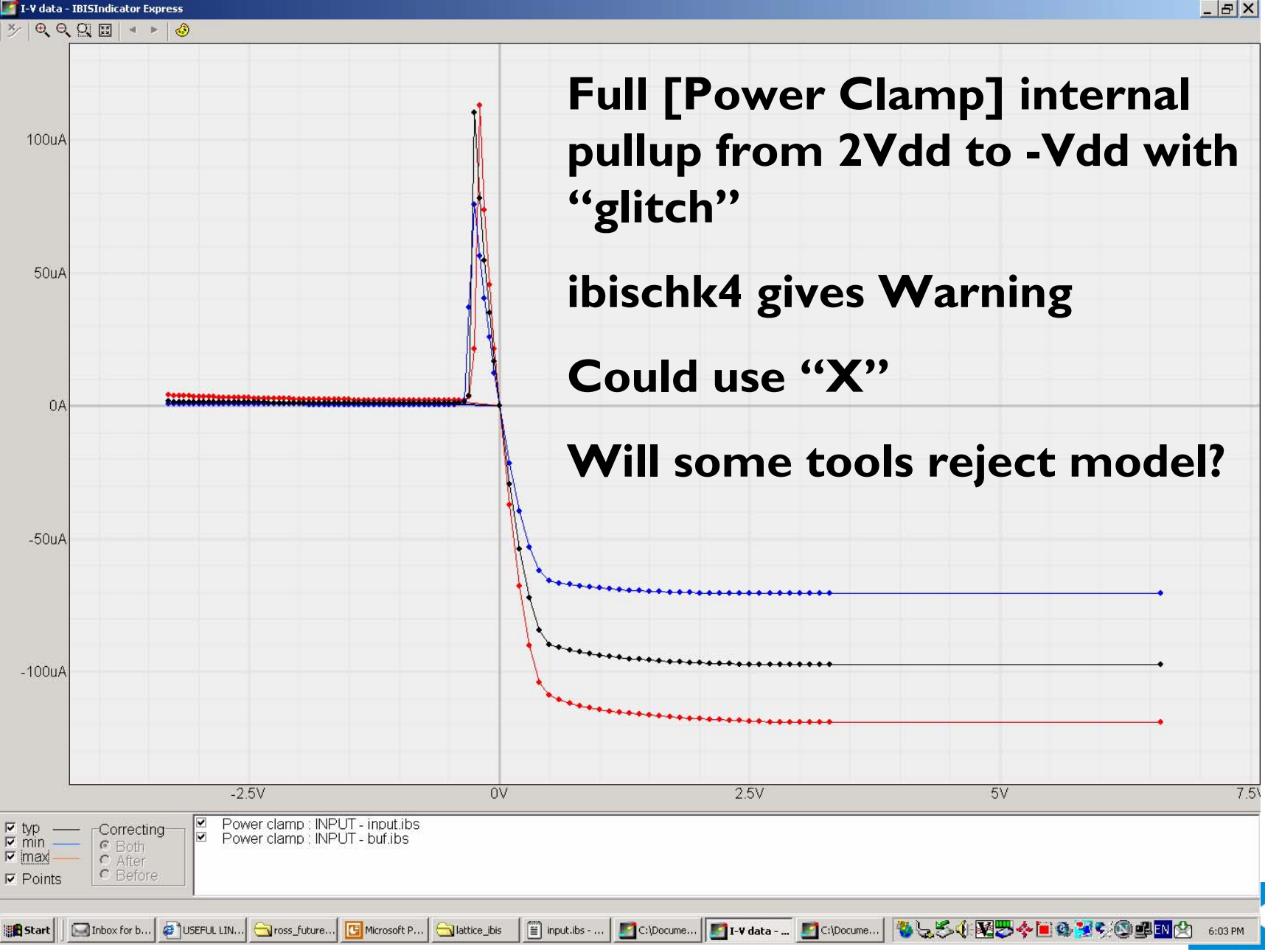
© 2007 Teraspeed Consulting Group LLC



[Power Clamp] extraction (2Vdd to Vdd) with real shutdown protection circuit "glitch" of about 110 uA in clamp region

© 2007 Teraspeed Consulting Group LLC

TERASPEED CONSULTING GROUP



Full [Power Clamp] internal pullup from 2Vdd to -Vdd with "glitch"

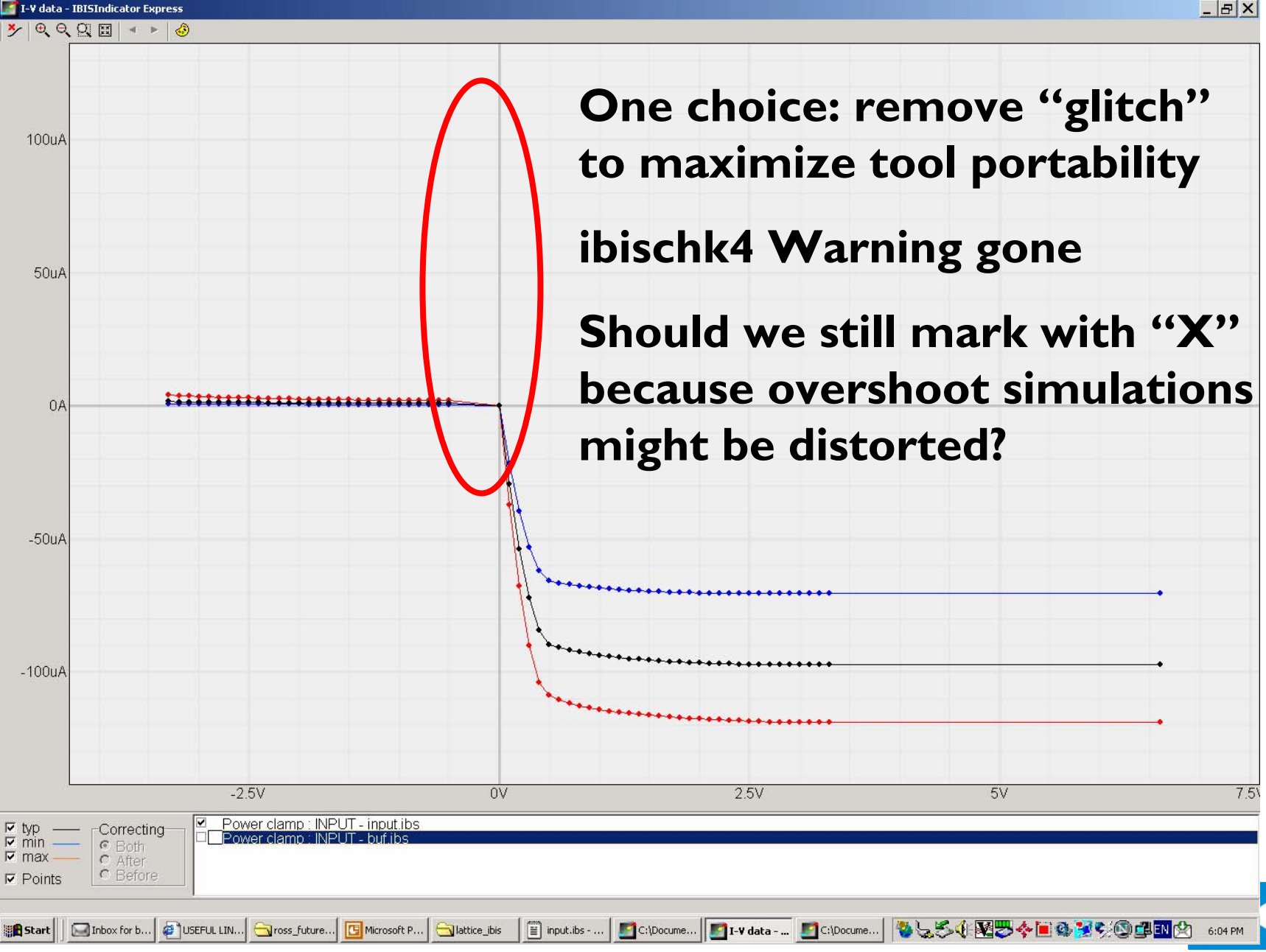
ibischk4 gives Warning

Could use "X"

Will some tools reject model?

© 2007 Teraspeed Consulting Group LLC

TERASPEED CONSULTING GROUP



One choice: remove "glitch" to maximize tool portability

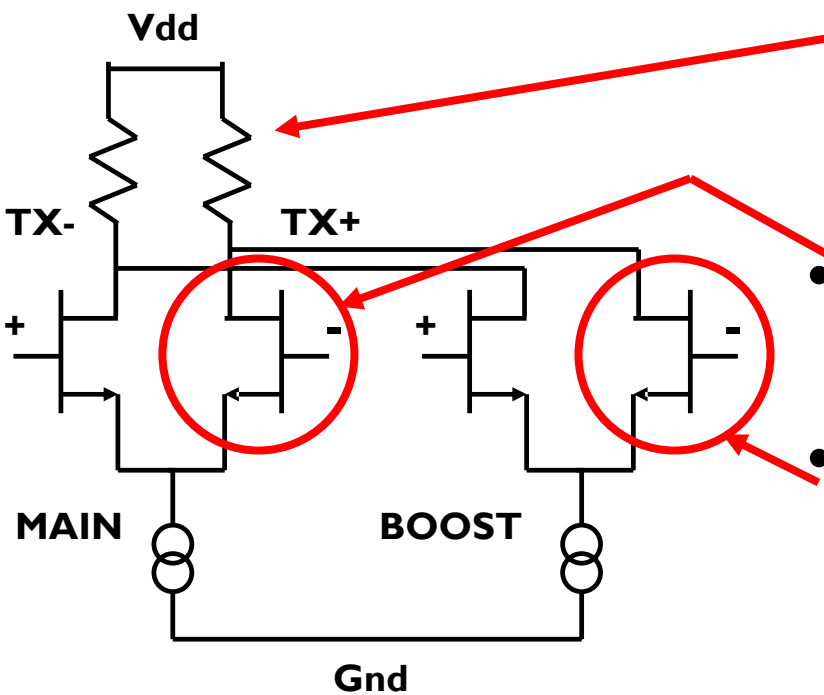
ibischk4 Warning gone

Should we still mark with "X" because overshoot simulations might be distorted?

© 2007 Teraspeed Consulting Group LLC

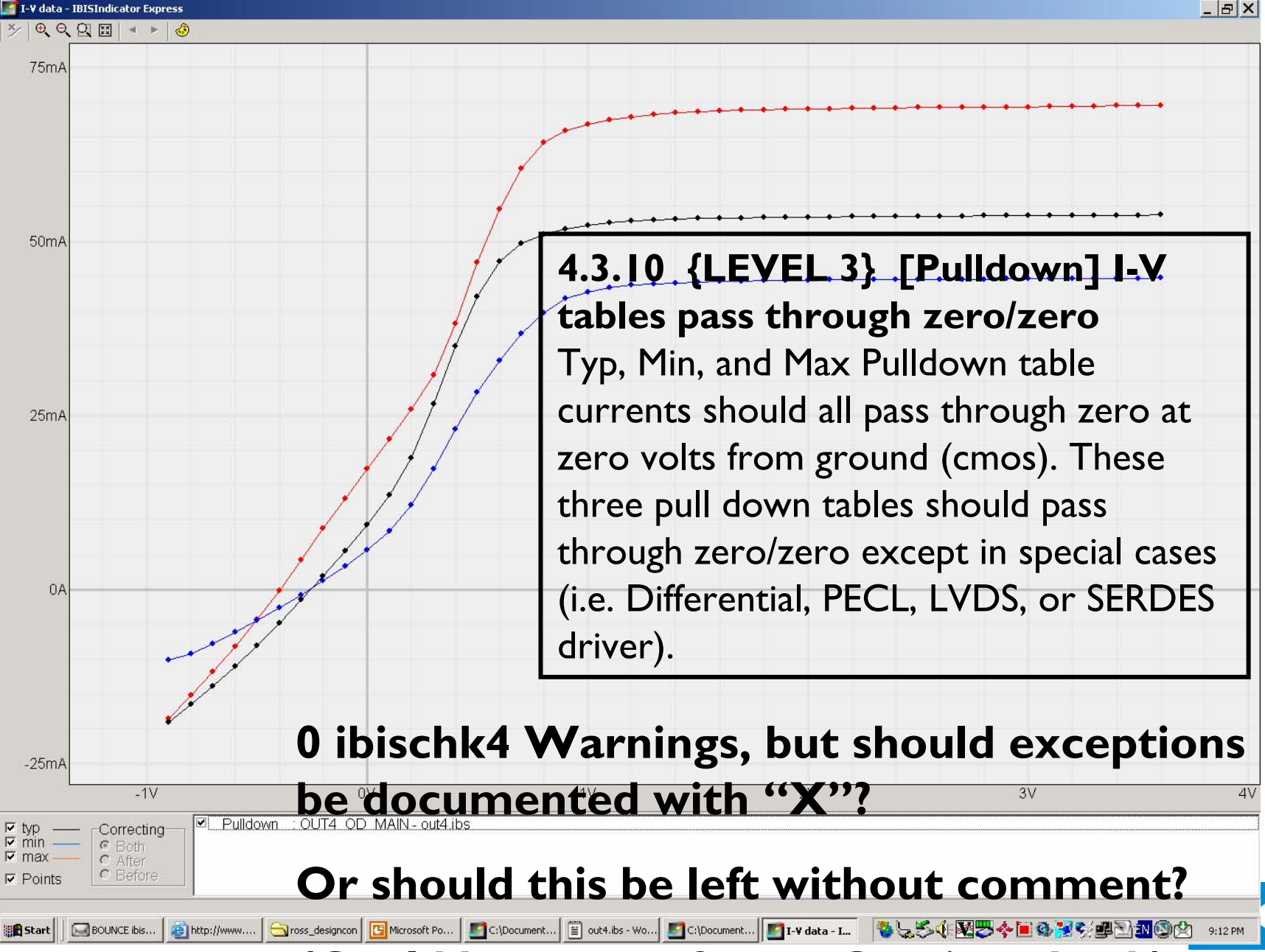
TERASPEED CONSULTING GROUP

CML Stearing Logic [Pulldown] Tables Produce Quality Document Exception



- Top-level
  - ODT [Power Clamp]
  - MAIN [Pulldown]
  - [Driver Schedule]
- MAIN [Pulldown]
  - Scaled waveforms
- BOOST [Pulldown]
  - Scaled waveforms

© 2007 Teraspeed Consulting Group LLC



4.3.10 {LEVEL 3} [Pulldown] I-V tables pass through zero/zero

Typ, Min, and Max Pulldown table currents should all pass through zero at zero volts from ground (cmos). These three pull down tables should pass through zero/zero except in special cases (i.e. Differential, PECL, LVDS, or SERDES driver).

0 ibischk4 Warnings, but should exceptions be documented with "X"?

Or should this be left without comment?

(Could become a future Caution check)

© 2007 Teraspeed Consulting Group LLC

TERASPEED CONSULTING GROUP

Parser Error for DDRII Models

```
[Model Selector]      DDRII_DIFFCLKIO_BI
|
DDRII_DIFFCLKIO_75    75 Ohm On Die Termination   | Default
DDRII_DIFFCLKIO_150   150 Ohm On Die Termination
DDRII_DIFFCLKIO_NO    No On Die Termination

----------


[Model]  DDRII_DIFFCLKIO_75

[Receiver Thresholds]
|
Vth = 0.90V
Vth_min = 0.882V
Vth_max = 0.918V
Threshold_sensitivity = 0.50
Reference_supply Power_clamp_ref
Vinh_ac = +250mV
Vinh_dc = +50mV
Vinl_ac = -250mV
Vinl_dc = -50mV
Tslew_ac = 300ps    | Based on JEDEC STANDARD JESD8-15A
|
| Differential parameters (generates Warning message when added)
|
| Vdiff_ac = +500mV
| Vdiff_dc = +100mV
|
```

Bad Warning for differential specifications with [Diff Pin], [Receiver Thresholds], and [Model Selector] (for setting on-die terminator) – BUG93

Comment the model?

© 2007 Teraspeed Consulting Group LLC

X Dilemma – Parser Gives Wrong Warning/Error

- Correct model with Warning/Error NOW, but in future, no Error or Warning (E.g., BUG93)
- Correct model and "X"
  - Yes for covering lag in EDA tool parser update
  - No because model is correct even though ibischk4 flags problem today (but then user is confused)
- Comment model parameters and "X"
  - Yes to document modification and suggest future change
  - No, should not depend on user changes
- Under discussion

© 2007 Teraspeed Consulting Group LLC

X Closure

- Several types of exception cases shown
- Vendors might handle cases differently
  - Real characterization with "X"
  - Modify model with or without "X"
  - Several models covering several cases
  - Ignore
- Main point is that "X" means the exceptions are known, and some resolutions might be suggested

TERASPEED CONSULTING GROUP

© 2007 Teraspeed Consulting Group LLC