Hot-Plug Problem & its Solution

in SCSI Systems

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Developed by

Tyco Electronics (a.k.a. AMP)

The Hot-Plug Problem ...

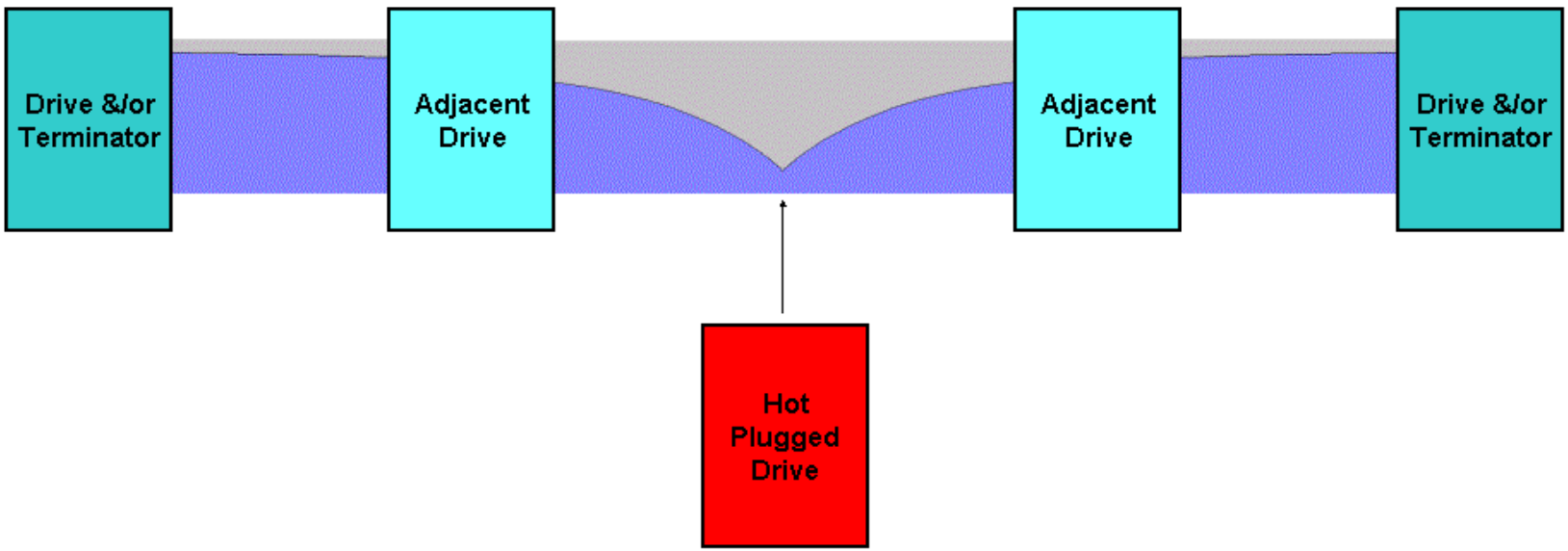
- Why am I here instead of at SFF?
  - this is a connector, right?

The Hot-Plug Problem ...

- Right! But ...
  - the **Hot Plug** Problem is a System Problem that requires a System Perspective.
  - Once the solution is accepted, the connector specification will be taken to SFF.

The Hot-Plug Problem ...

Bus Path (Media) Showing Energy Depletion on a Signal Line

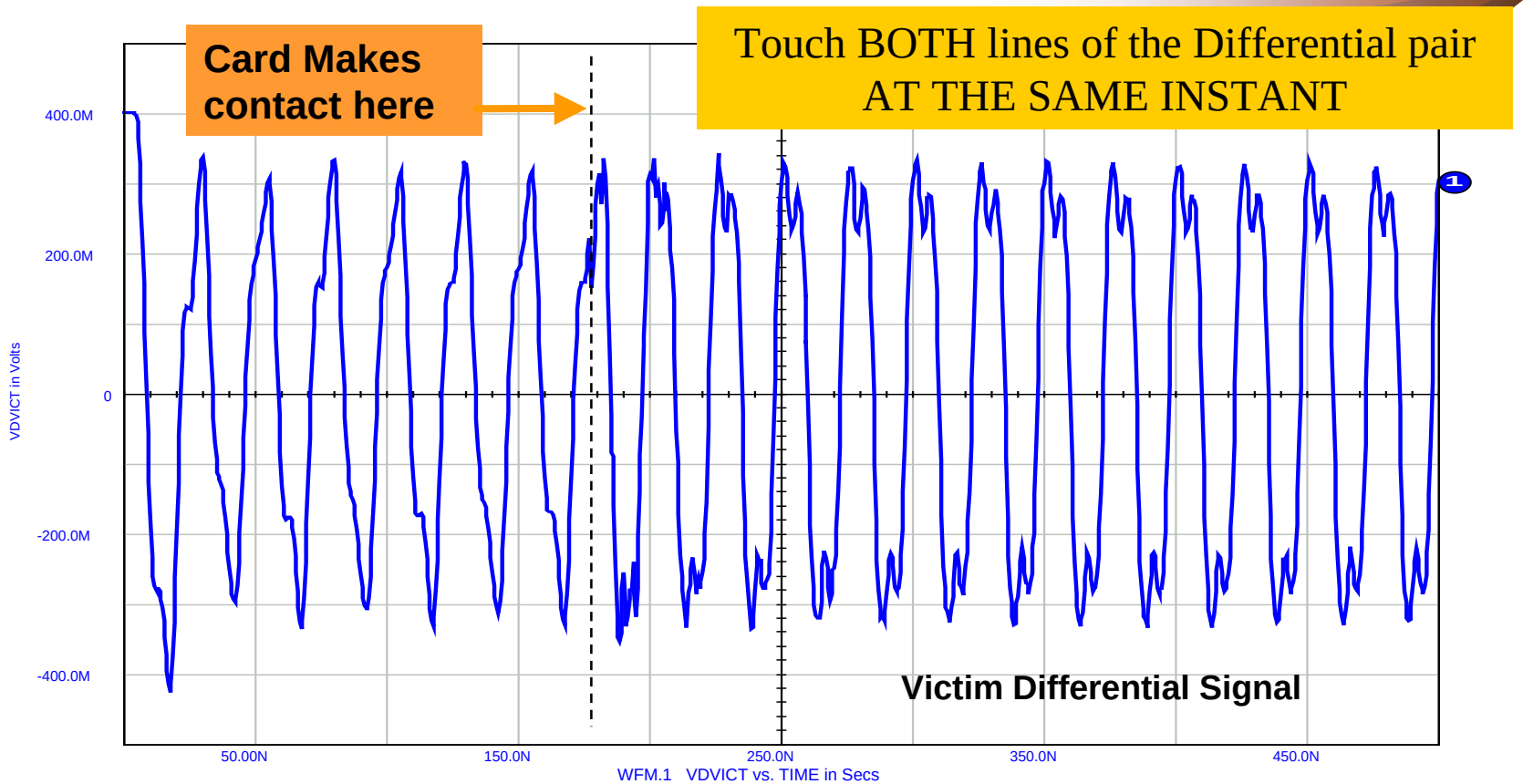


The Hot-Plug Problem ...

- Is there *REALLY* a Hot Plug Problem?
- Why haven't we seen it?

... and if there is such a problem, we already fixed it!

The Hot-Plug Problem …



The Hot-Plug Problem ...

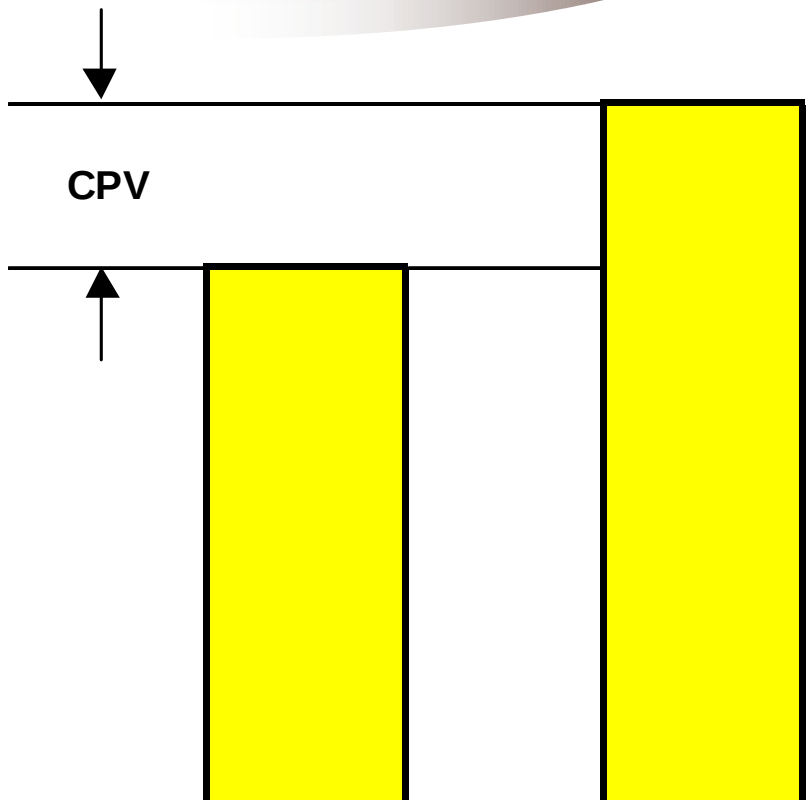
But that's not reality ...

Select Velocity Range:

Maximum		Minimum
2.0	Ft/sec	0.2
0.0240	mils/usec	0.0024

Contact Point Variation (CPV):

Minimum		Maximum
1.0	mils	5.0
41.67	usec	2083.33



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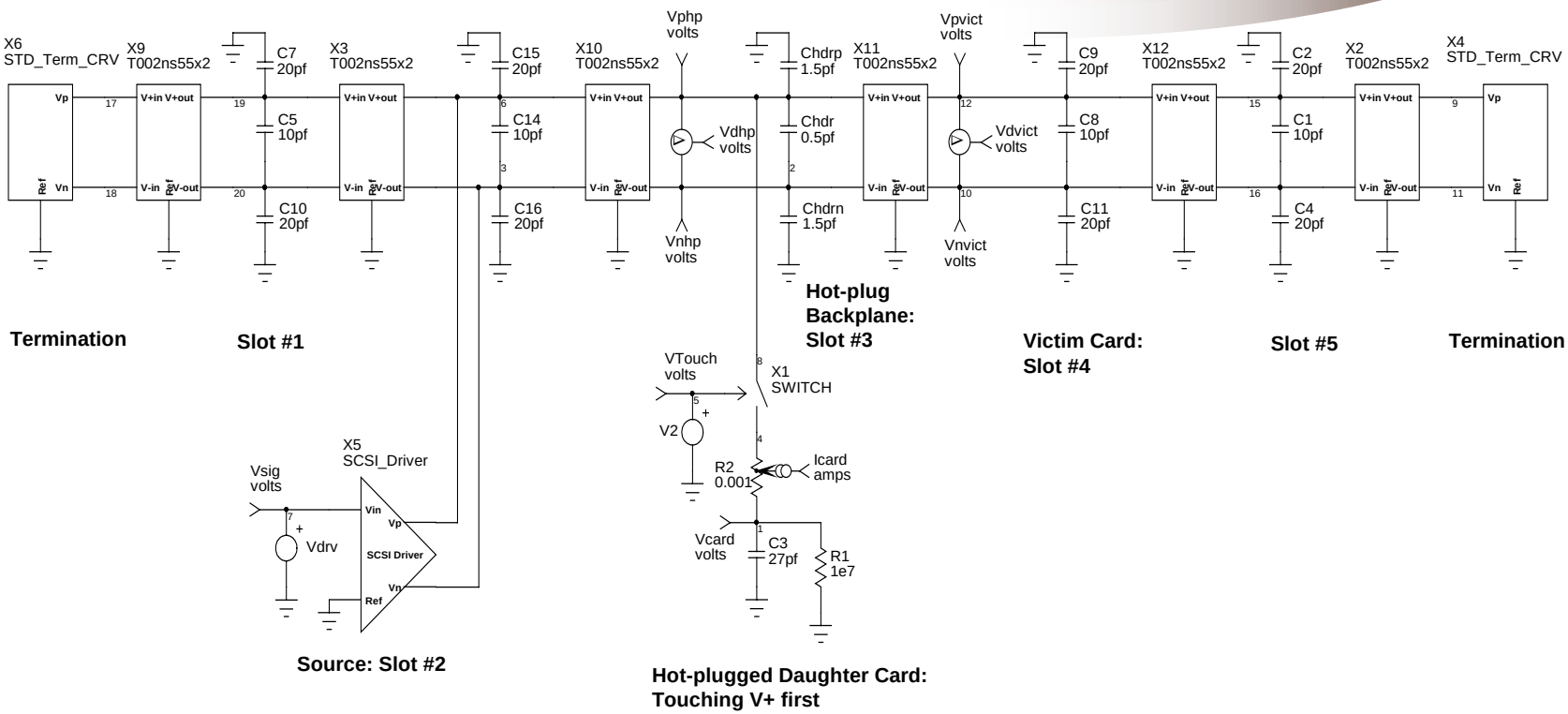

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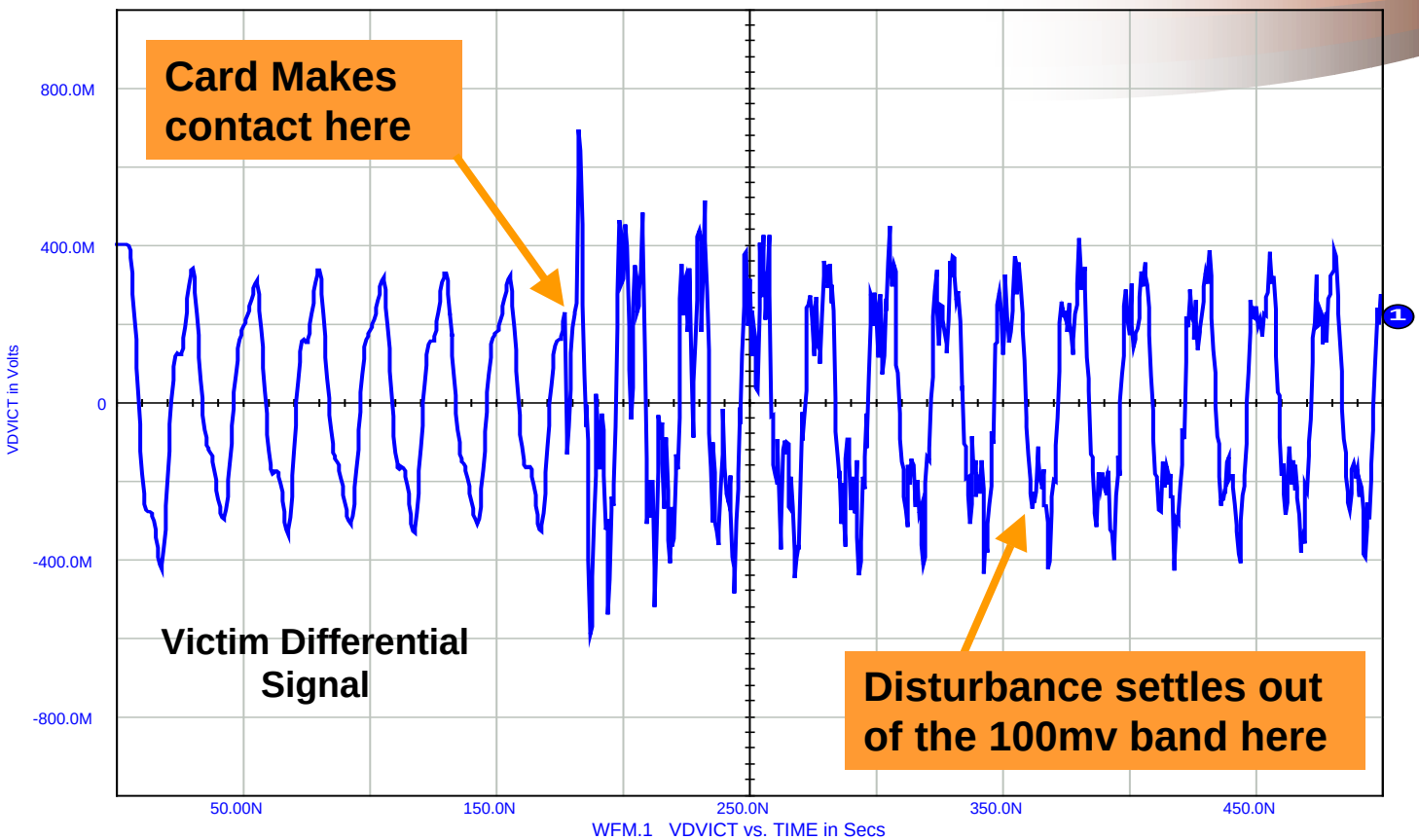

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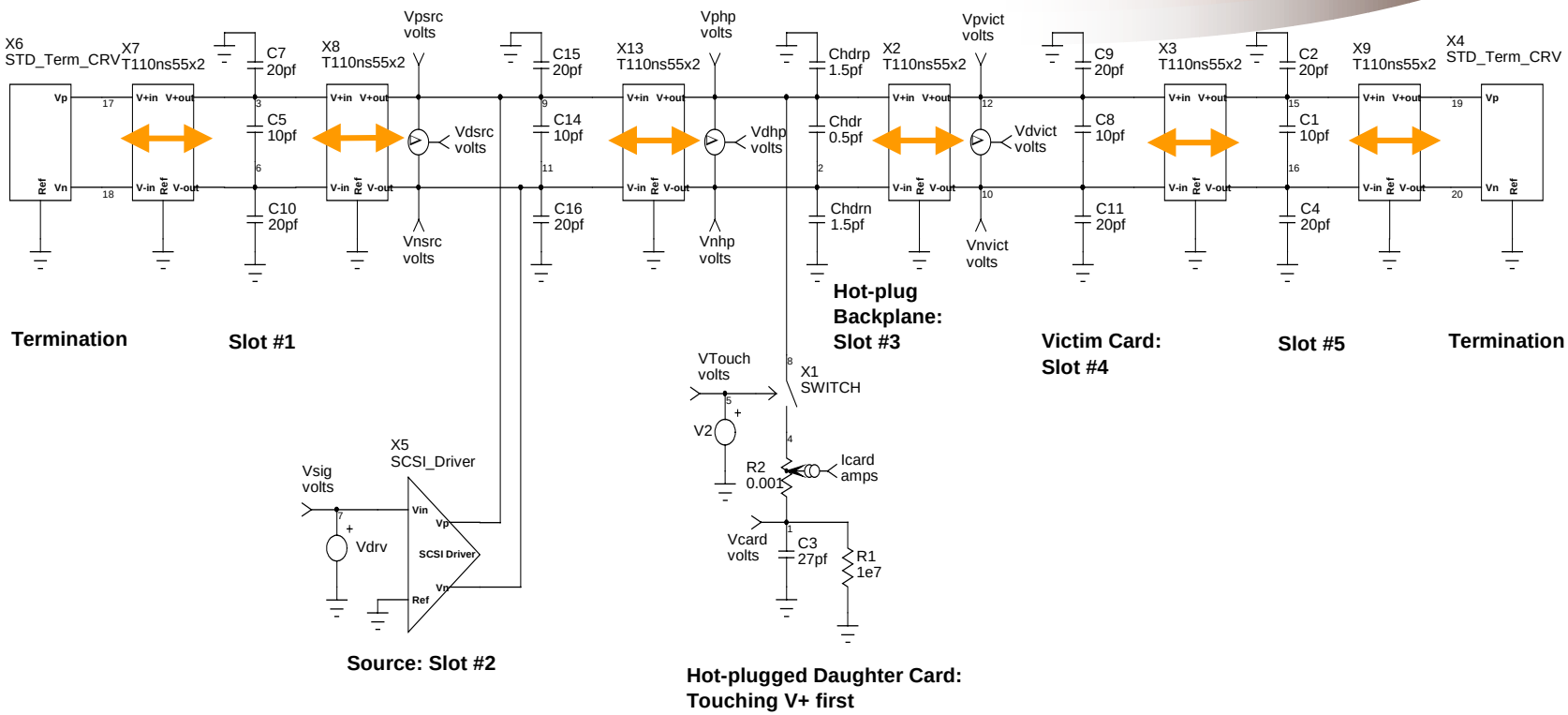

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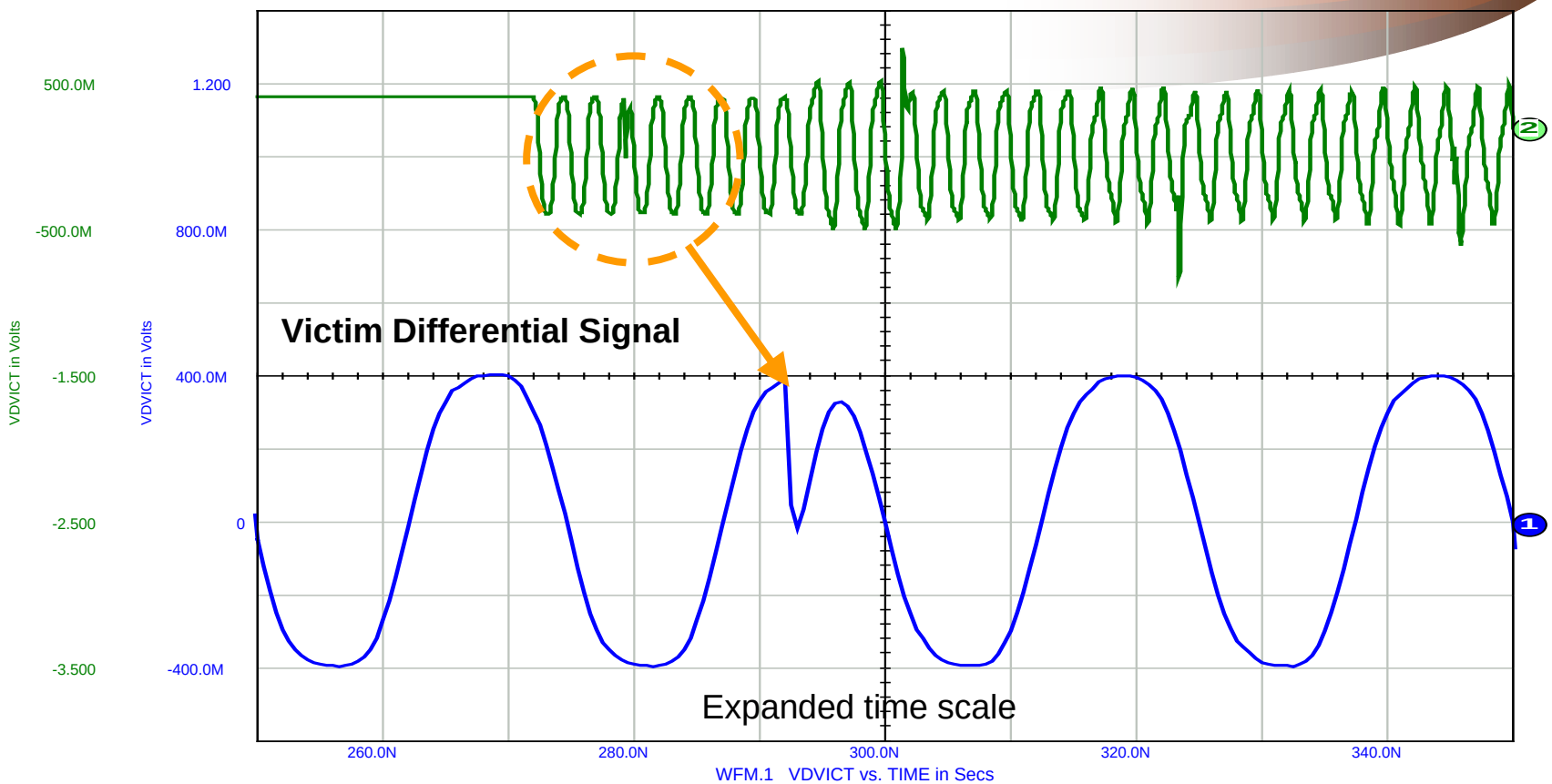

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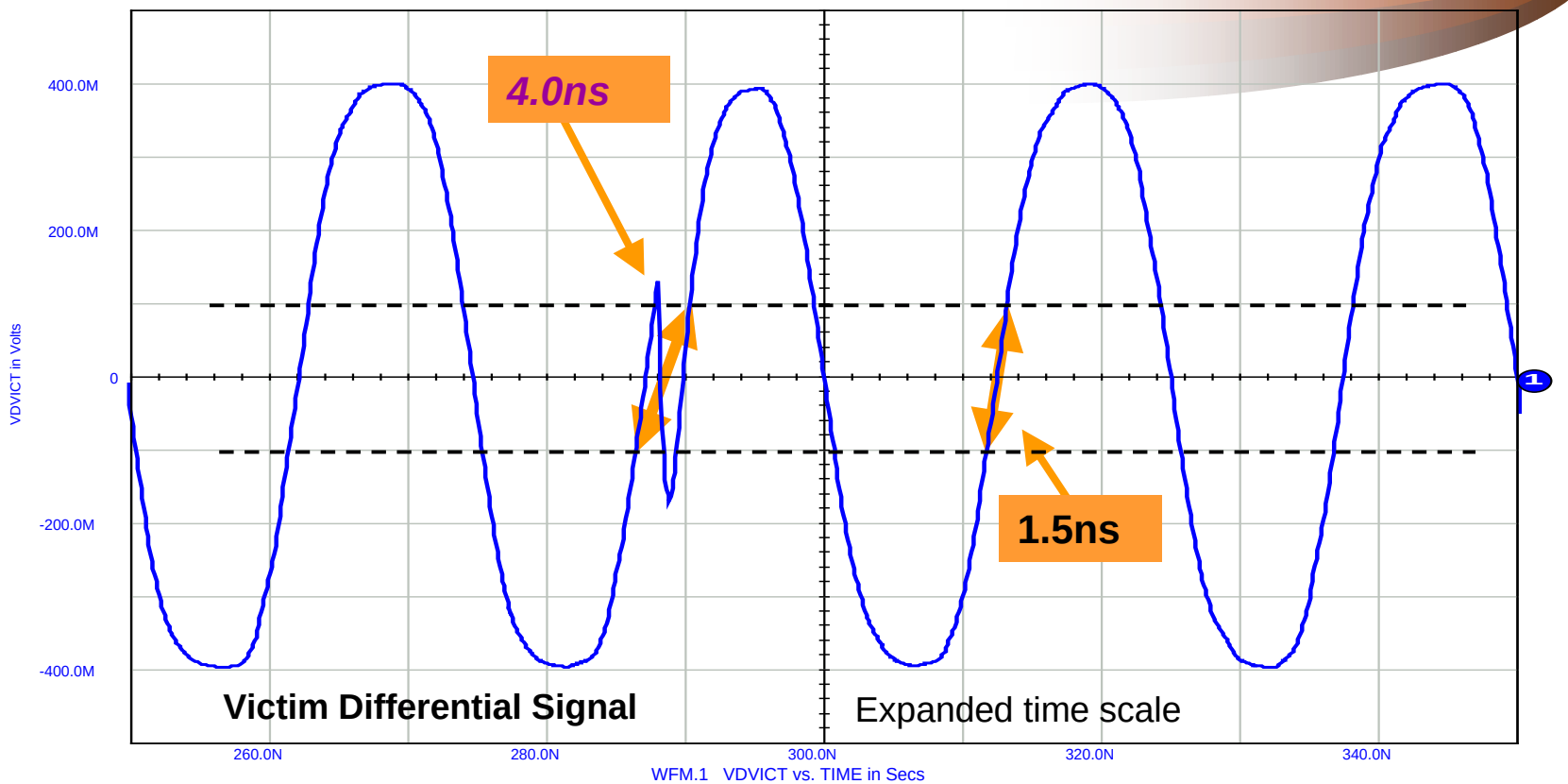

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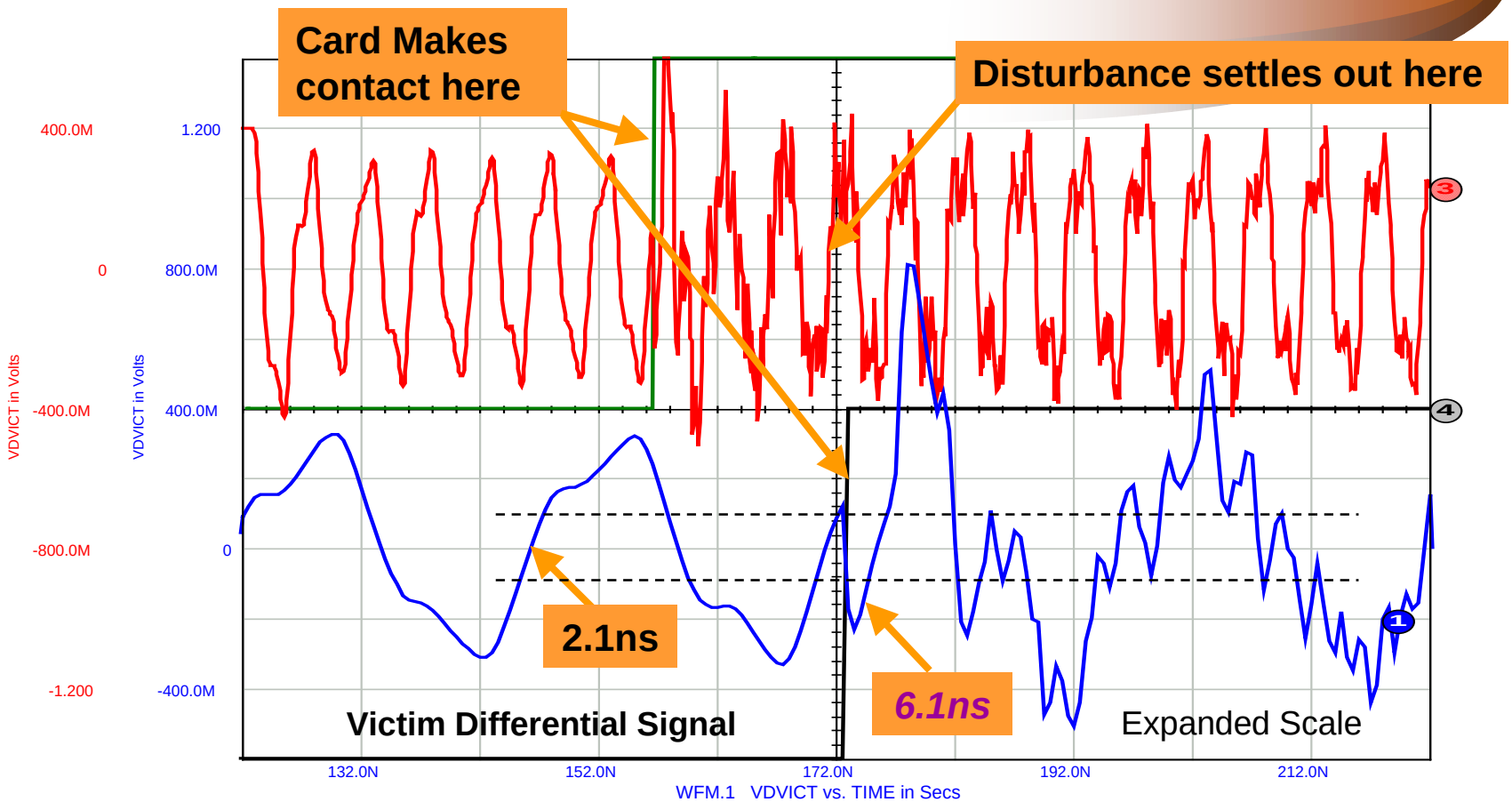


The Hot-Plug Problem ...

- We have another System issue ...
  - When, exactly, does the disturbance occur?
- This gets us into probabilities ...

The Hot-Plug Problem ...

- Criticality depends on - Type of Signal line
  - synchronous
    - did it ‘hit’ the sample period?
    - did the edge get out of spec?
  - asynchronous (level sensitive)
    - did the edge get out of spec?
    - is the magnitude great enough to cause a problem?
    - can the line cause a problem at that time?

The Hot-Plug Problem ...

- The net result?
- A detectable error will not occur every time.
- It is very difficult to capture hard evidence.
- The system works ‘most of the time.’

The Hot-Plug Problem ...

- What must a system developer do?
- Use good design practices
  - minimize reflections, noise, attenuation, ...
- Use Simulation and Testing
  - identify possible problems and investigate them

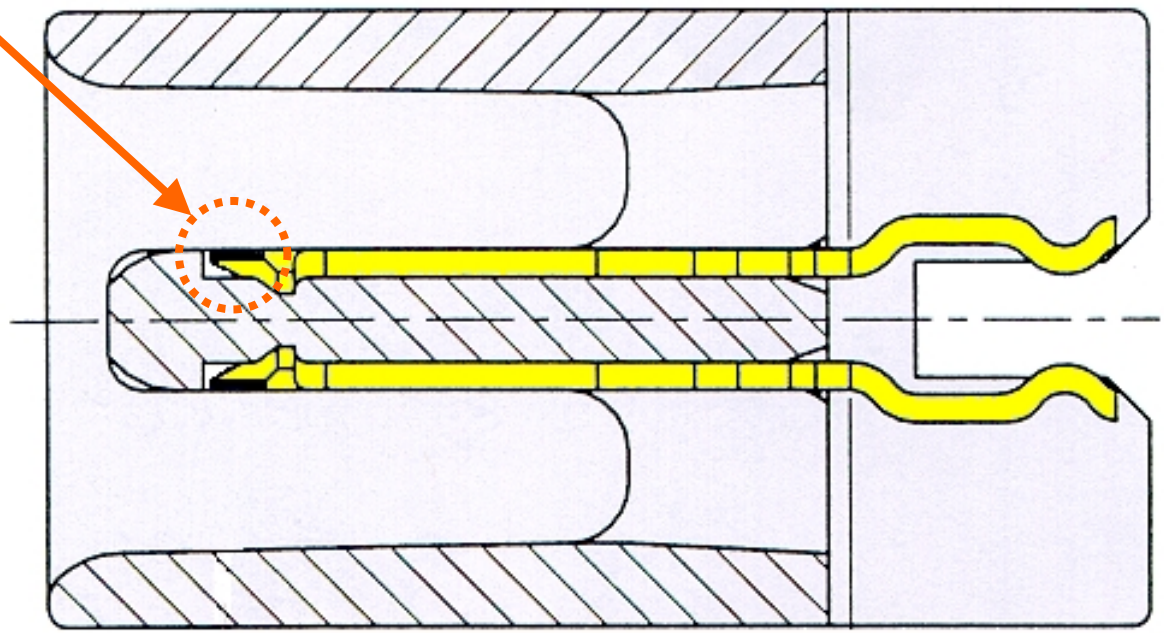
*The Hot-Plug **Solution** …*

- You must limit the rate at which energy is taken from the bus.

- Resistive Tip Contacts do that.

*The Hot-Plug **Solution** ...*

- Modify the SCA-2 Plug ...



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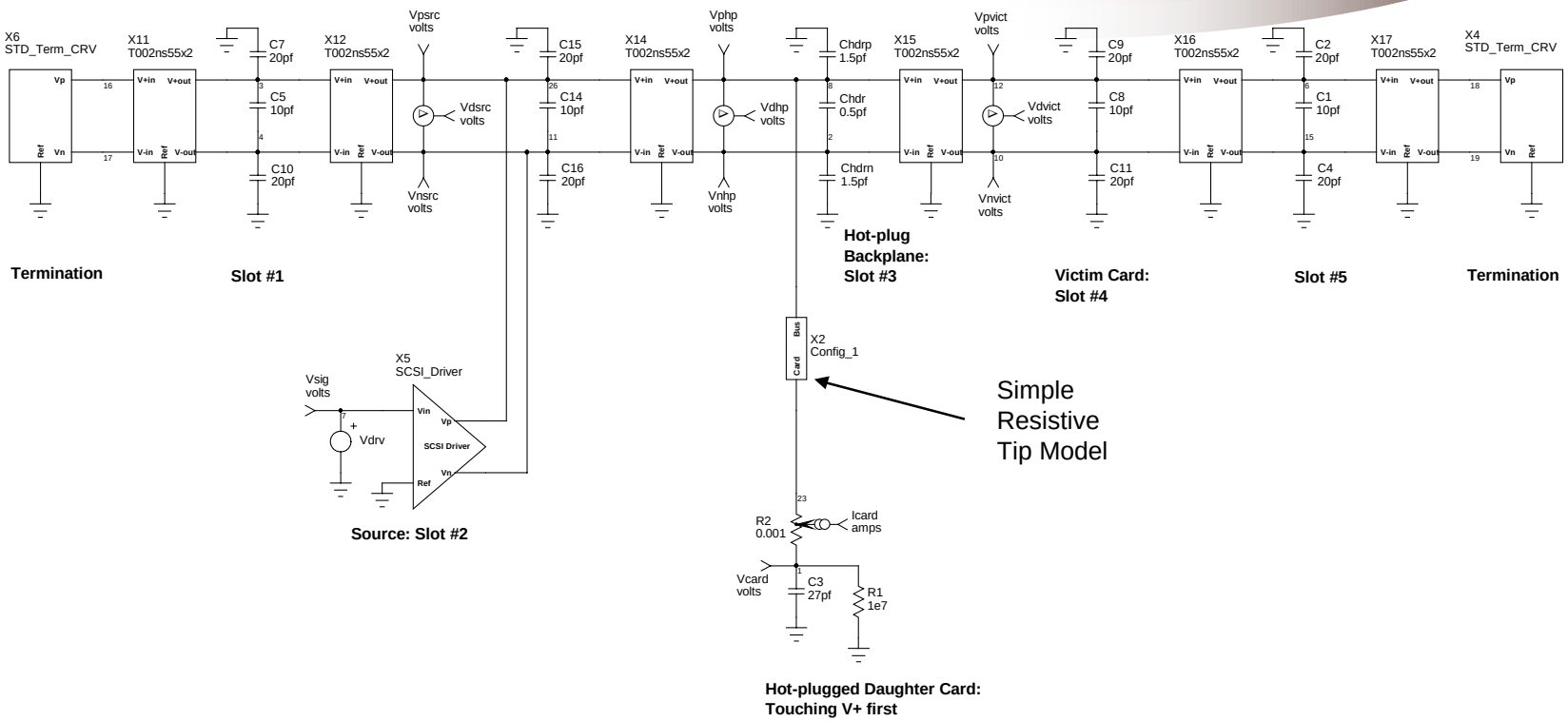

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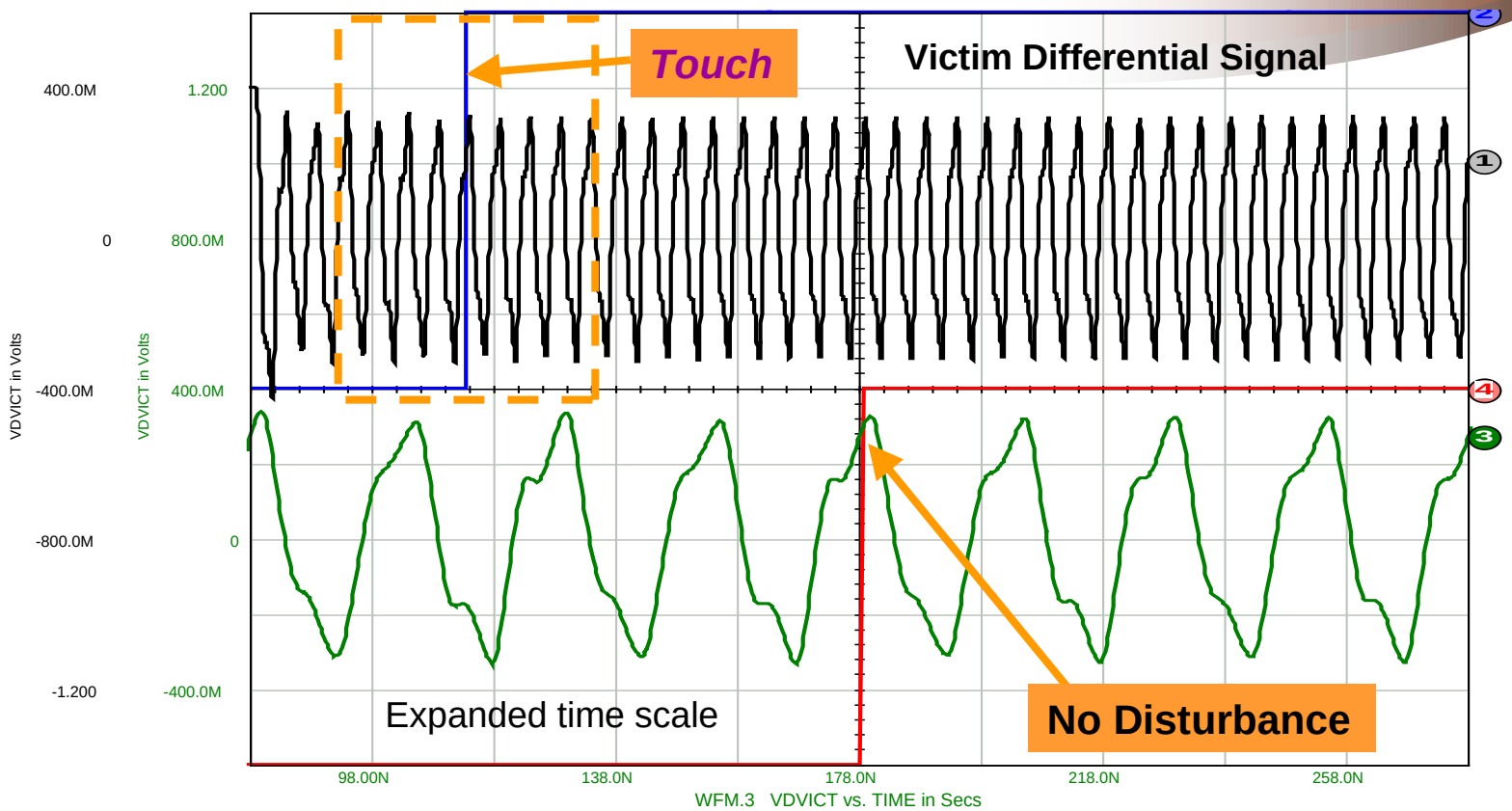

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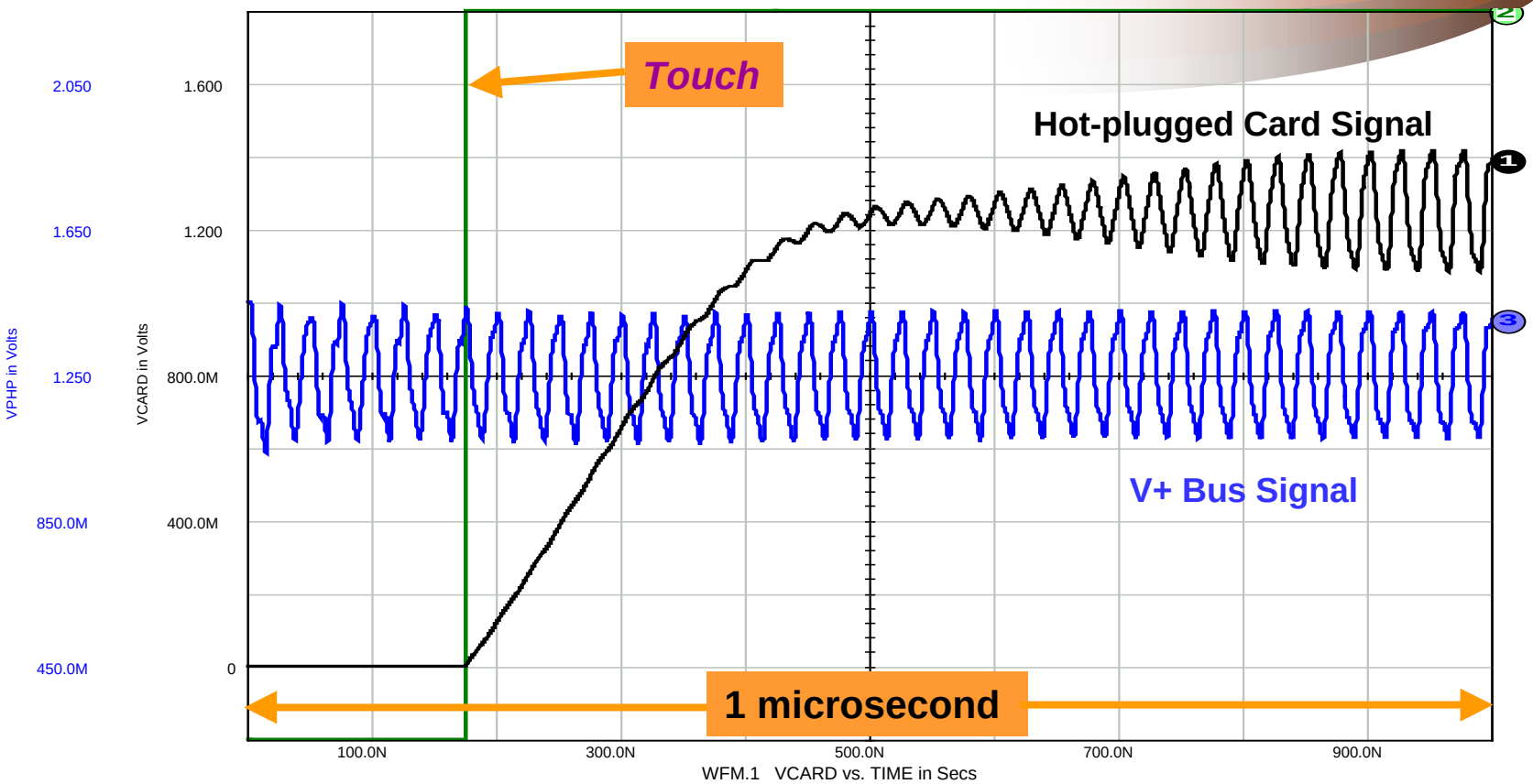

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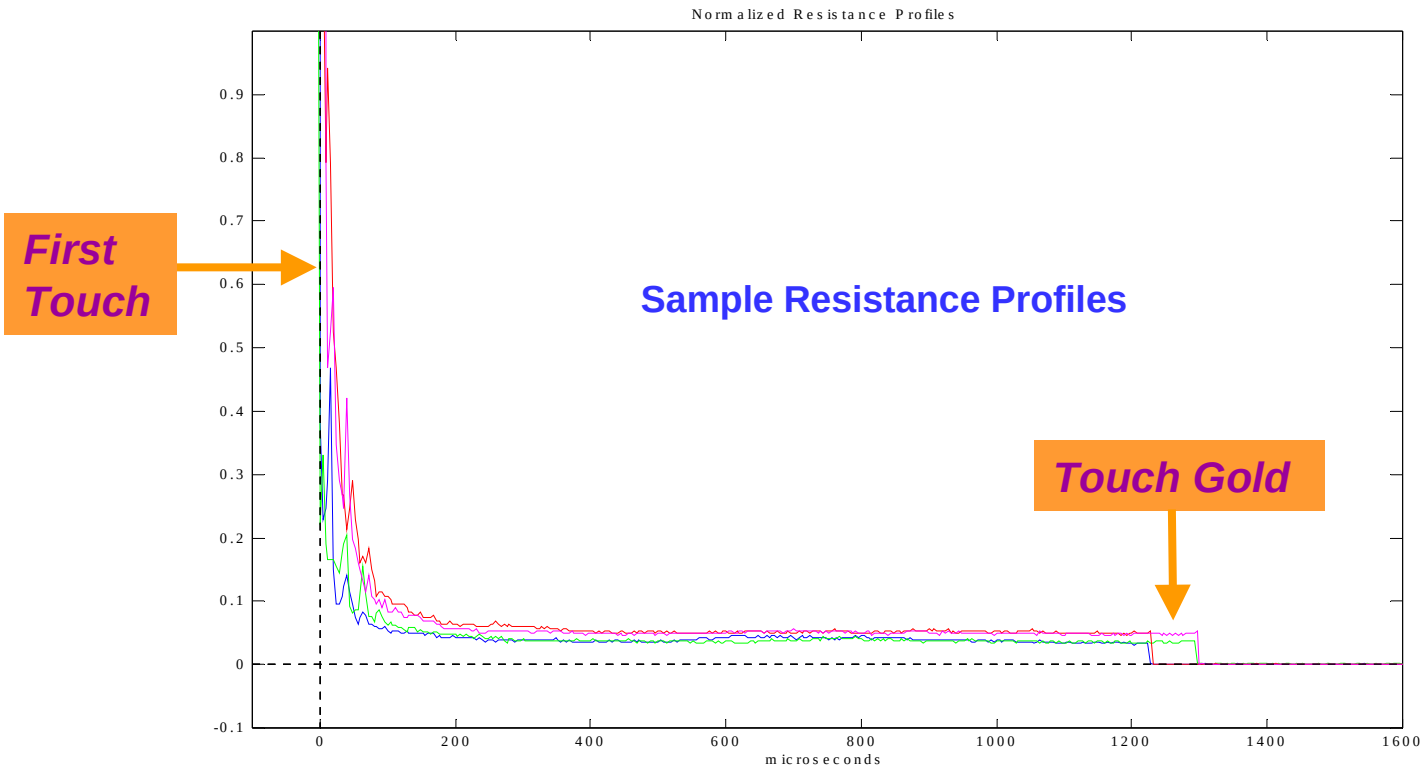

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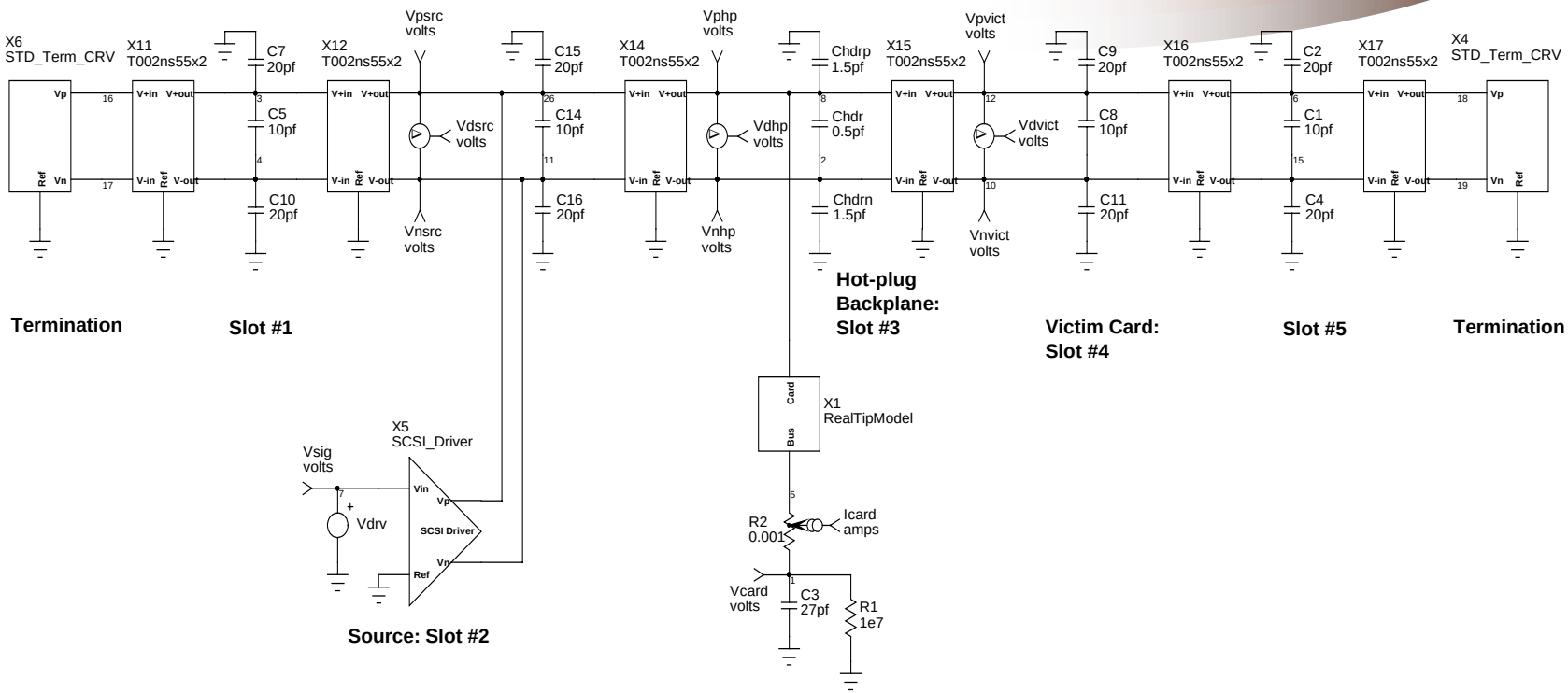

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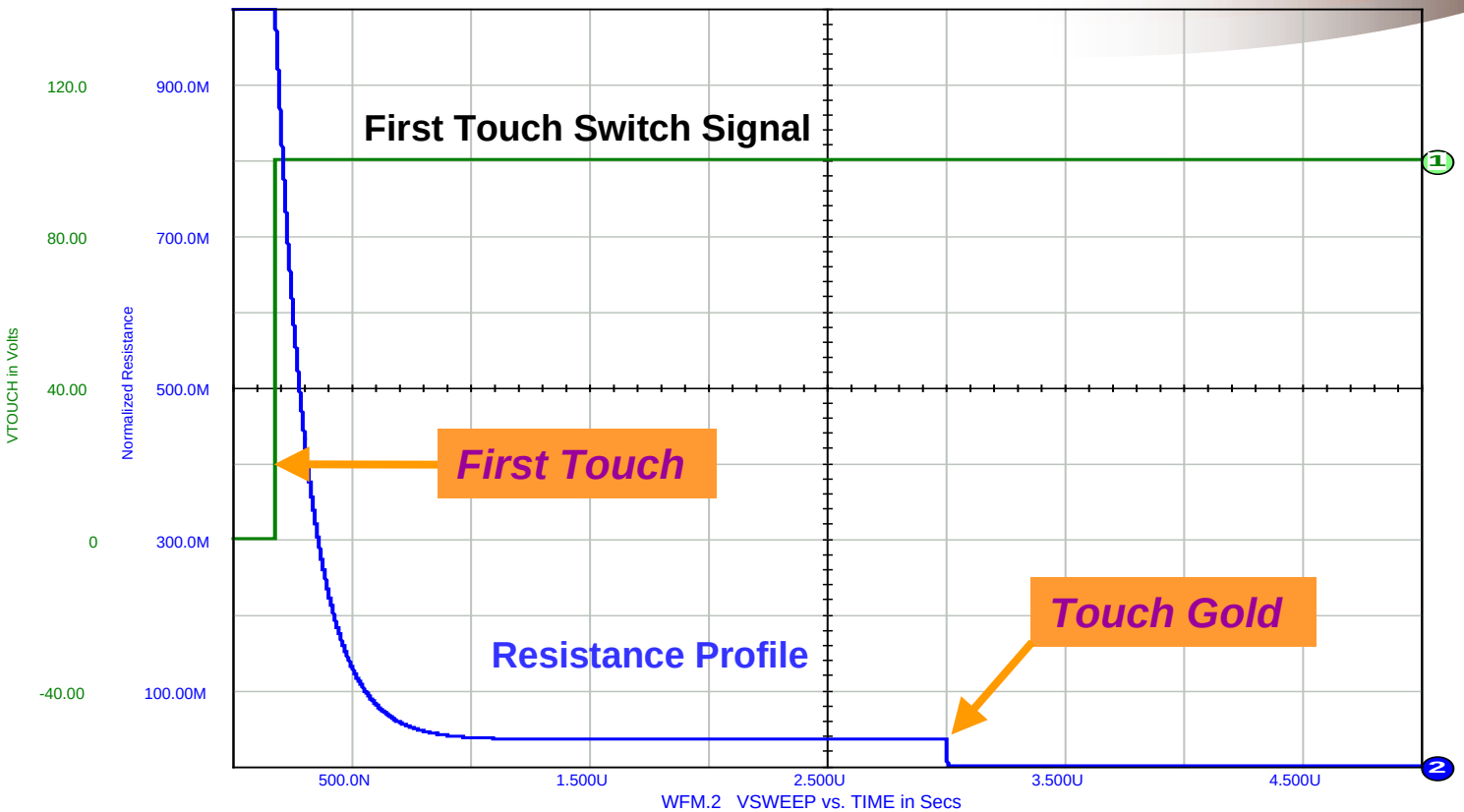

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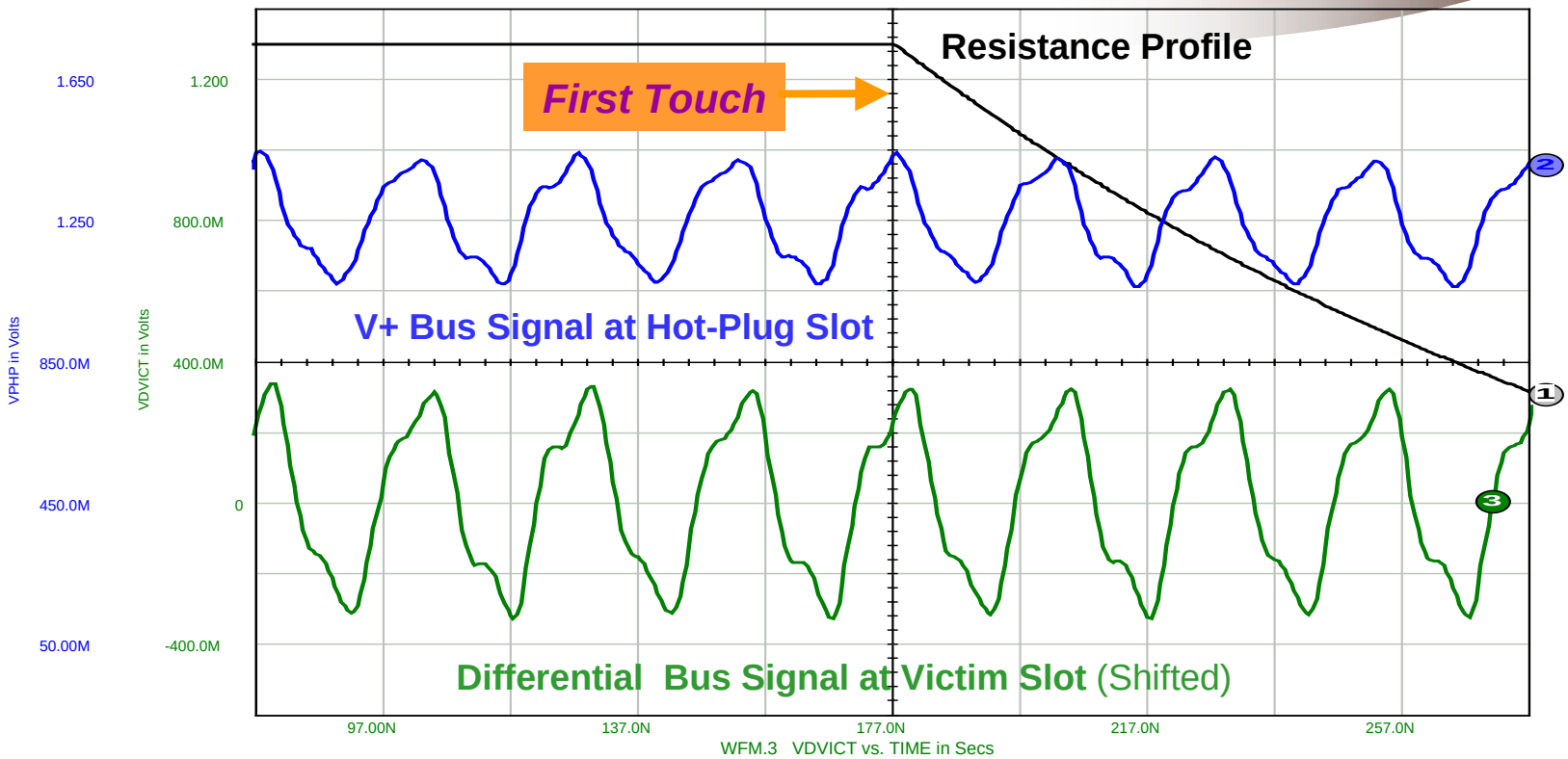

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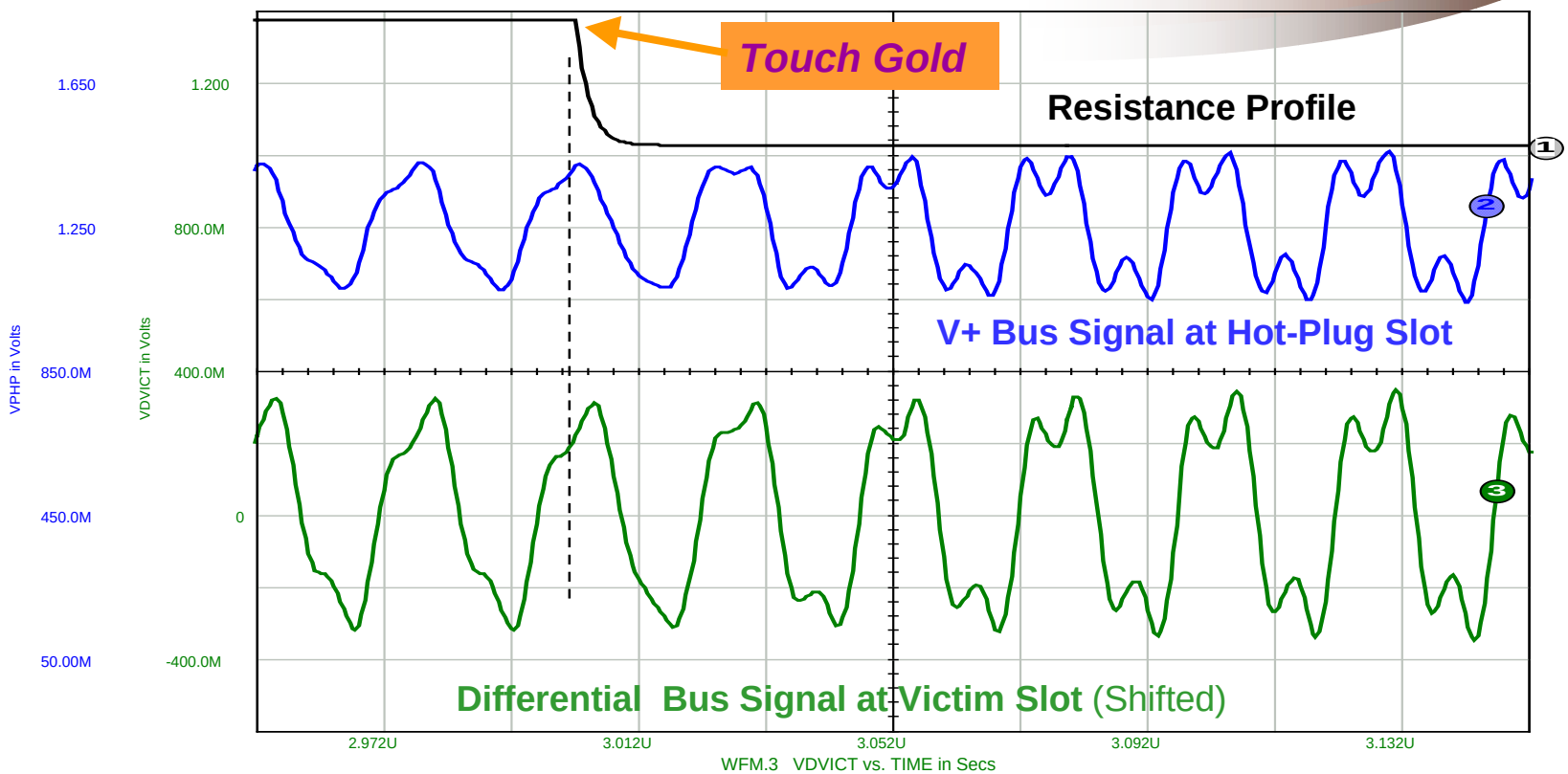

*The Hot-Plug **Solution** ...*

- There *REALLY* is a Hot Plug Problem!
- It is difficult to identify (but not impossible)
- ... and there is a **Solution**!

*The Hot-Plug **Solution** …*

- We have a Hot Plug Safe product.
  - it is for a different bus
  - it is currently under a confidentiality agreement
  - it will be jointly announced at
    - DesignCon 2000 (San Jose, CA)
    - Bus and Board Conference (San Diego, CA)

*The Hot-Plug **Solution** ...*

- Why did we make a Product for another bus standard when we had started with SCSI?
- Because we had a major customer that ...
  - identified the problem in their product
  - worked with us to establish the solution
  - and is committed to using our product

*The Hot-Plug **Solution** …*

- The product has passed Verification Testing:
  - Bellcore, uncontrolled environment, Mixed Flowing Gas
  - Durability
- The product is currently in Qualification Testing:
  - Bellcore, uncontrolled environment, Mixed Flowing Gas
  - Durability
  - Temperature / Humidity

*The Hot-Plug **Solution** …*

- Tyco Electronics (a.k.a. AMP) has your

Hot Plug **Solution**