

Preliminary
Simulation Results
for the
Diode Discovery Process

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Why use Diode Detection?

Low Cost

- Requires 5ma alternating current source, comparator, diode, FET, capacitors.

Simple

- Low intelligence required. May be performed by an active patch panel or switch/hub.

Compatible

- Uses “extra pairs” to minimize 10/100T impact. (4-5,7-8)
- Supports 10BASE-T, 100BASE-T... can be designed to support 1000BASE-T with more sophisticated magnetics in the mid-span.

Safe

- 5ma current source limited... prevents excess power to incompatible devices.
- Diode method provides polarity detection to ensure proper connection.

Reliable

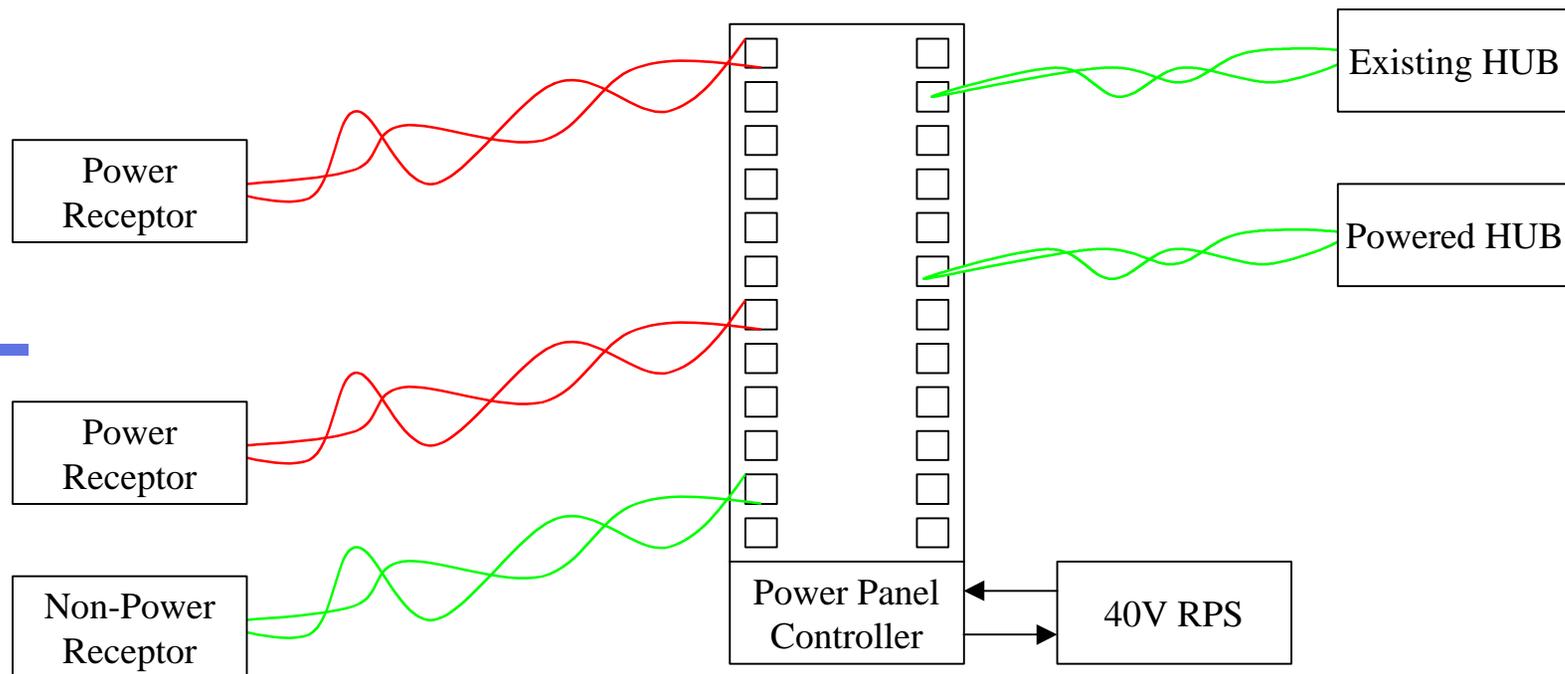
- Plenty of margin (>1v) on detection method
- Doesn't impact DC core on magnetic modules.

Flexible

- Allows distribution from hub or patch panel.
- Allows DC or AC distribution

Why use Diode Detection?

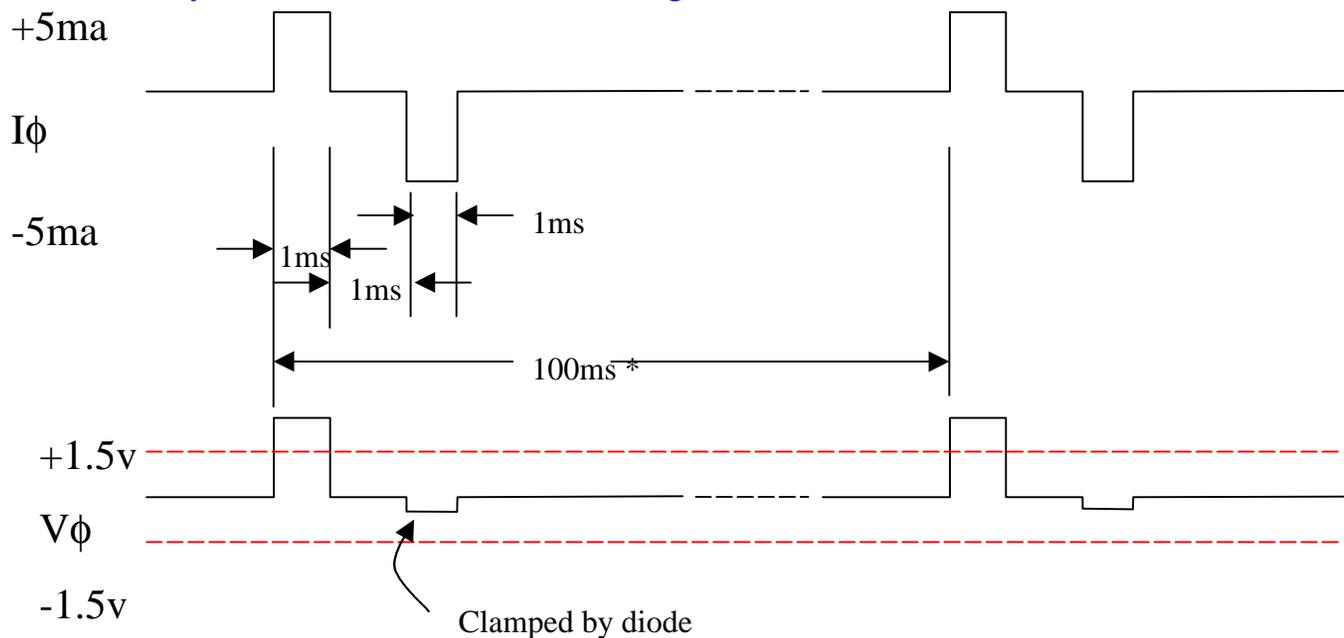
- Allows patch panel or hub to supply power.
- Doesn't interfere with signal pairs.
- Simplifies Customer upgrade path... works with existing equipment.
- May support detection of conflict with other distributor.
- Low frequency detection allows uController to perform function.



Diode Detection Method (Voltage based)



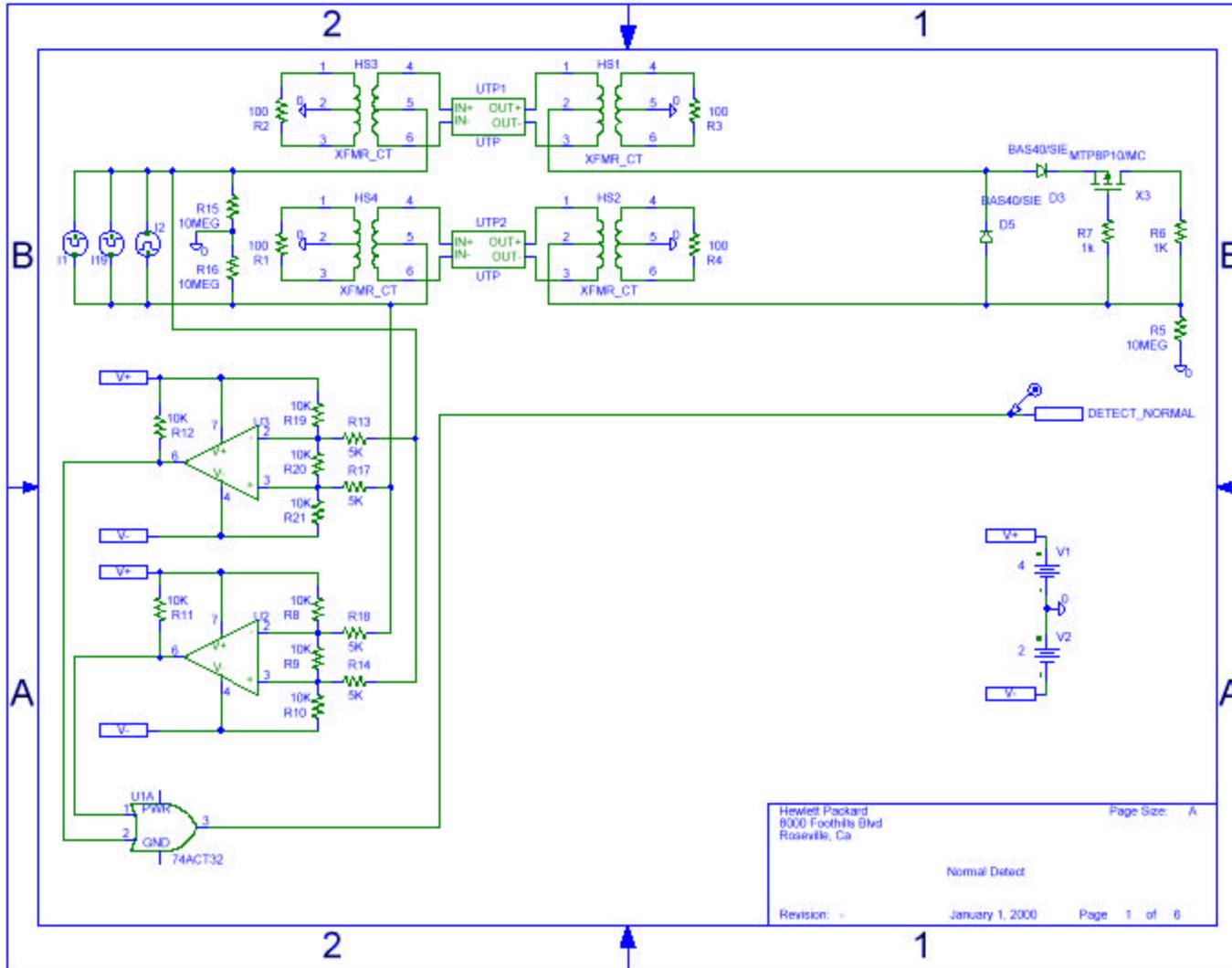
- Provides assurance of proper polarity prior to turning on full voltage.
- Low duty cycle reduces power to shorted/incompatible devices.
- FET automatically turns on at 4Vto prevent load from limiting voltage during detection
- Slew Rate Control on edges will reduce EMI during detection
- Long Pulse Widths make it possible to implement with small uController
- May use Current detection or Voltage detection.



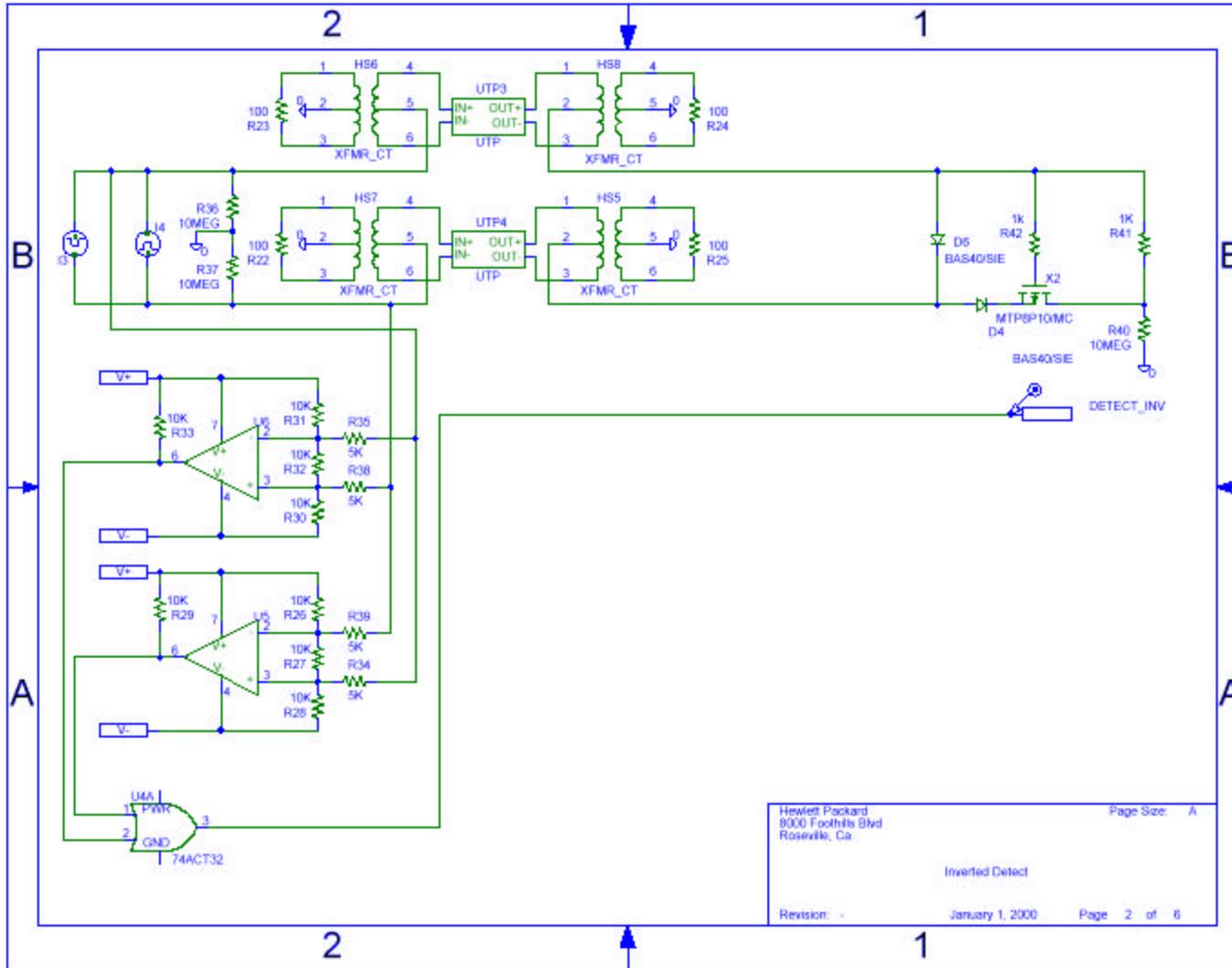
* may be randomized to allow detection of other sources attached.

- Can be modified to work with AC power insertion by doing the following;
- Add a resistor in series with the diode
- Perform “current detection” rather than voltage detection

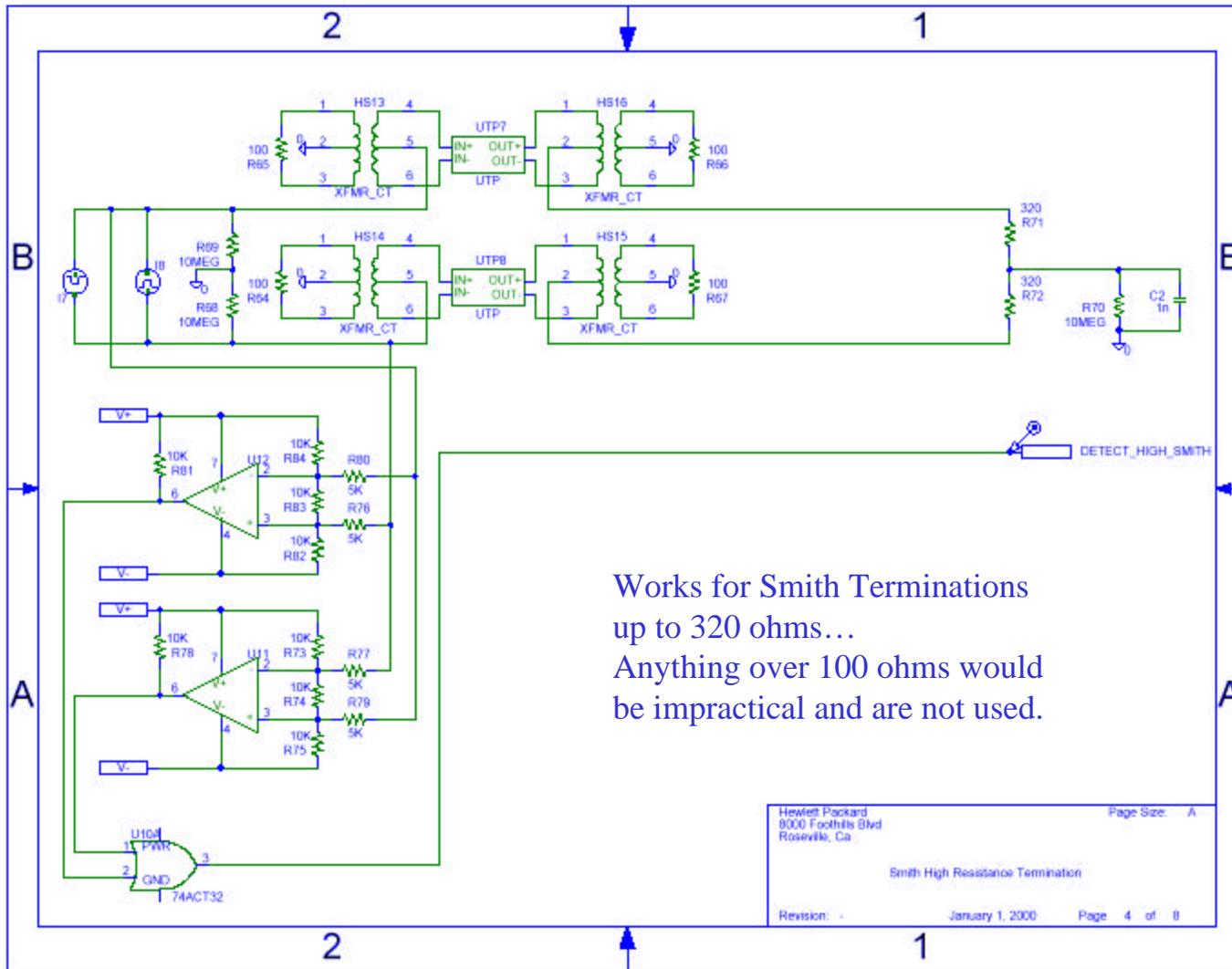
Normal Pairs



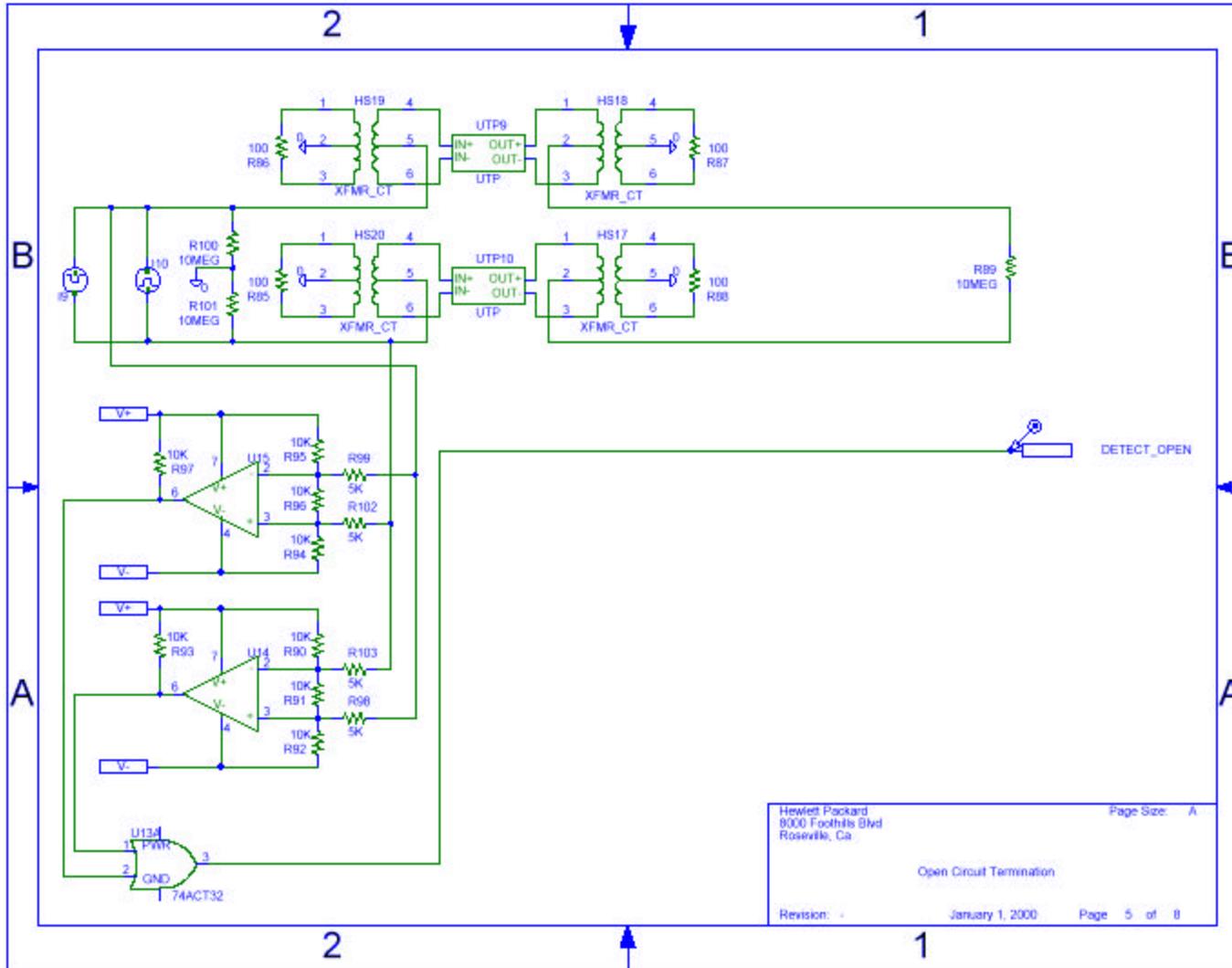
Inverted Pairs



High Smith Pairs

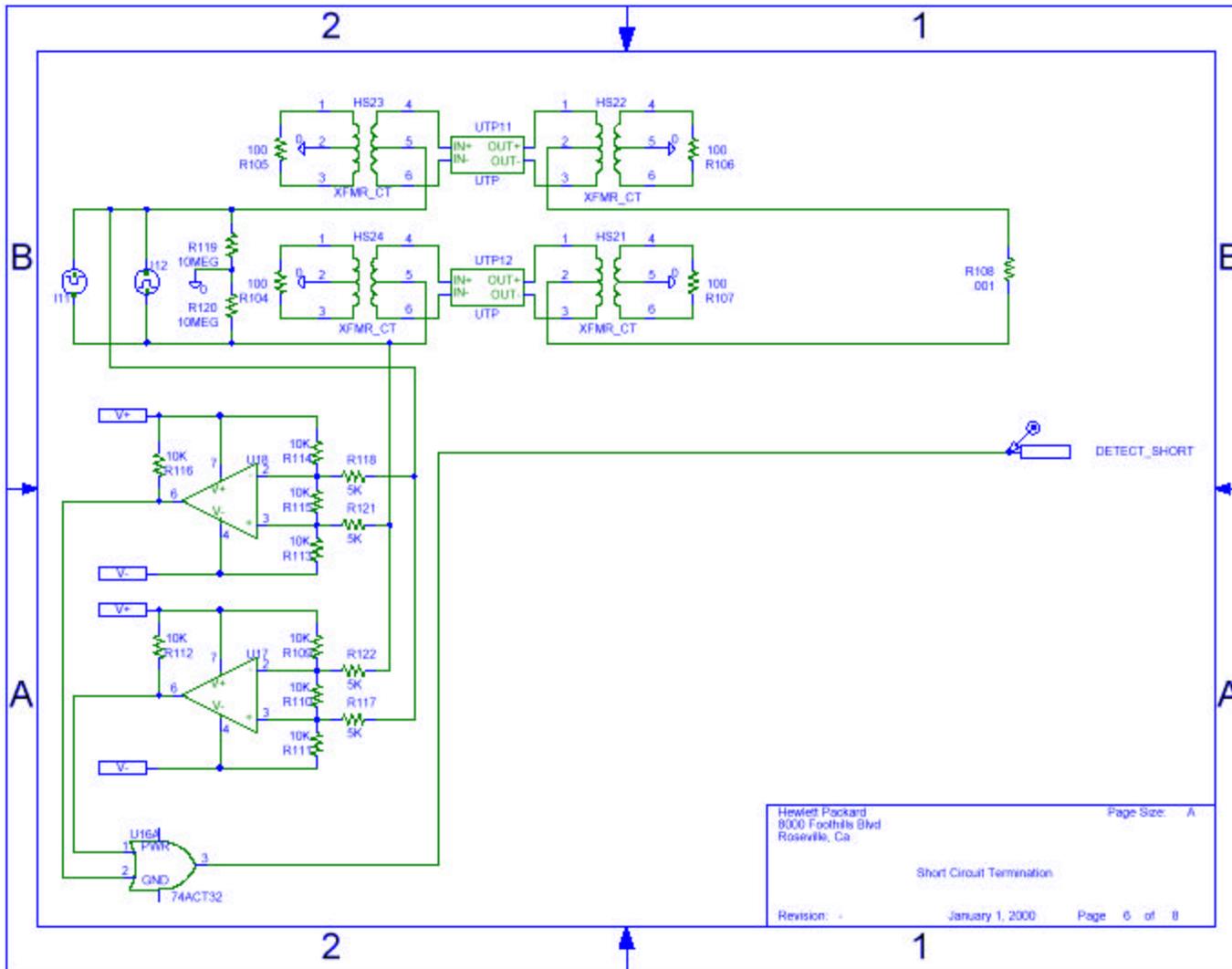


Open Pairs

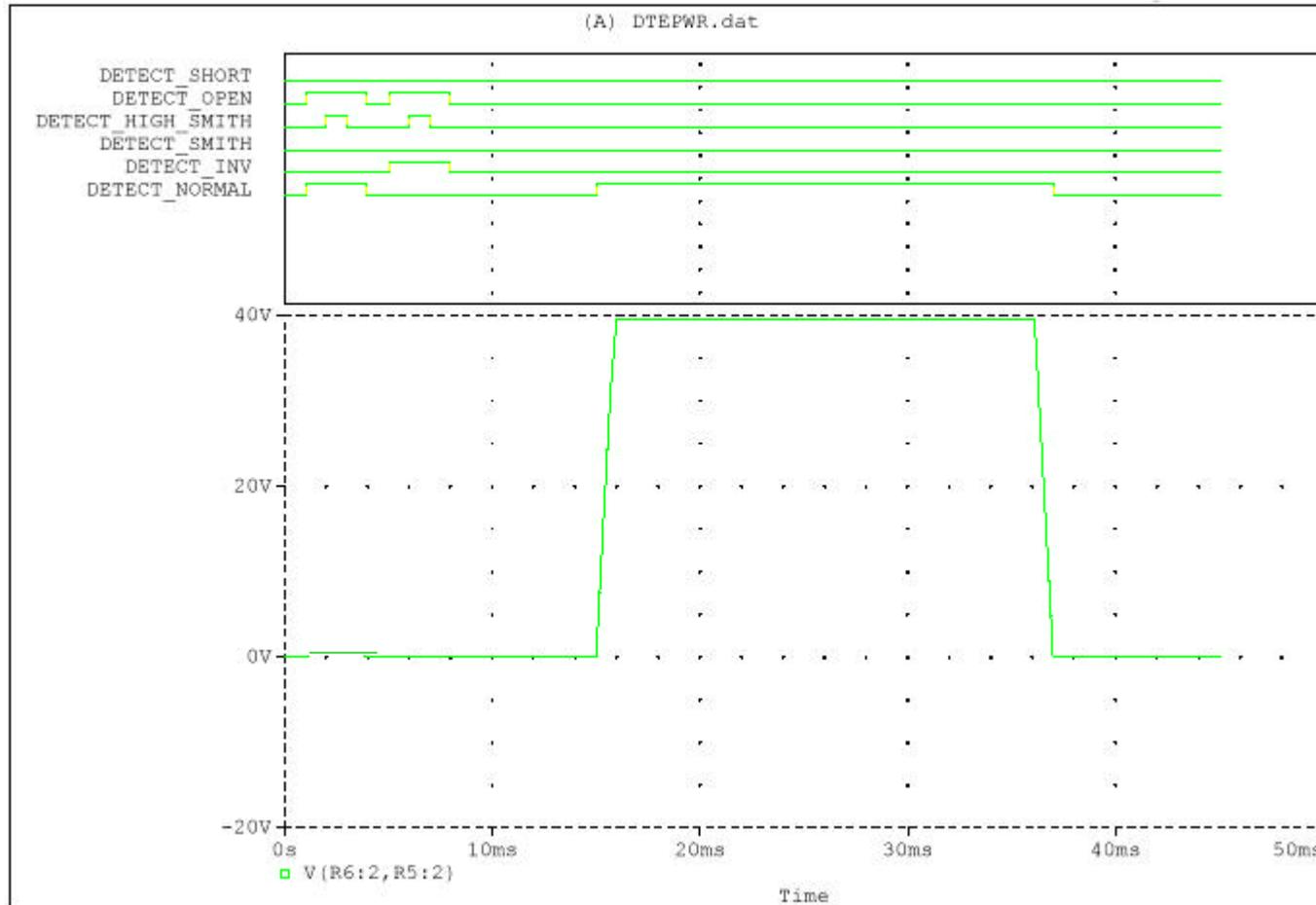


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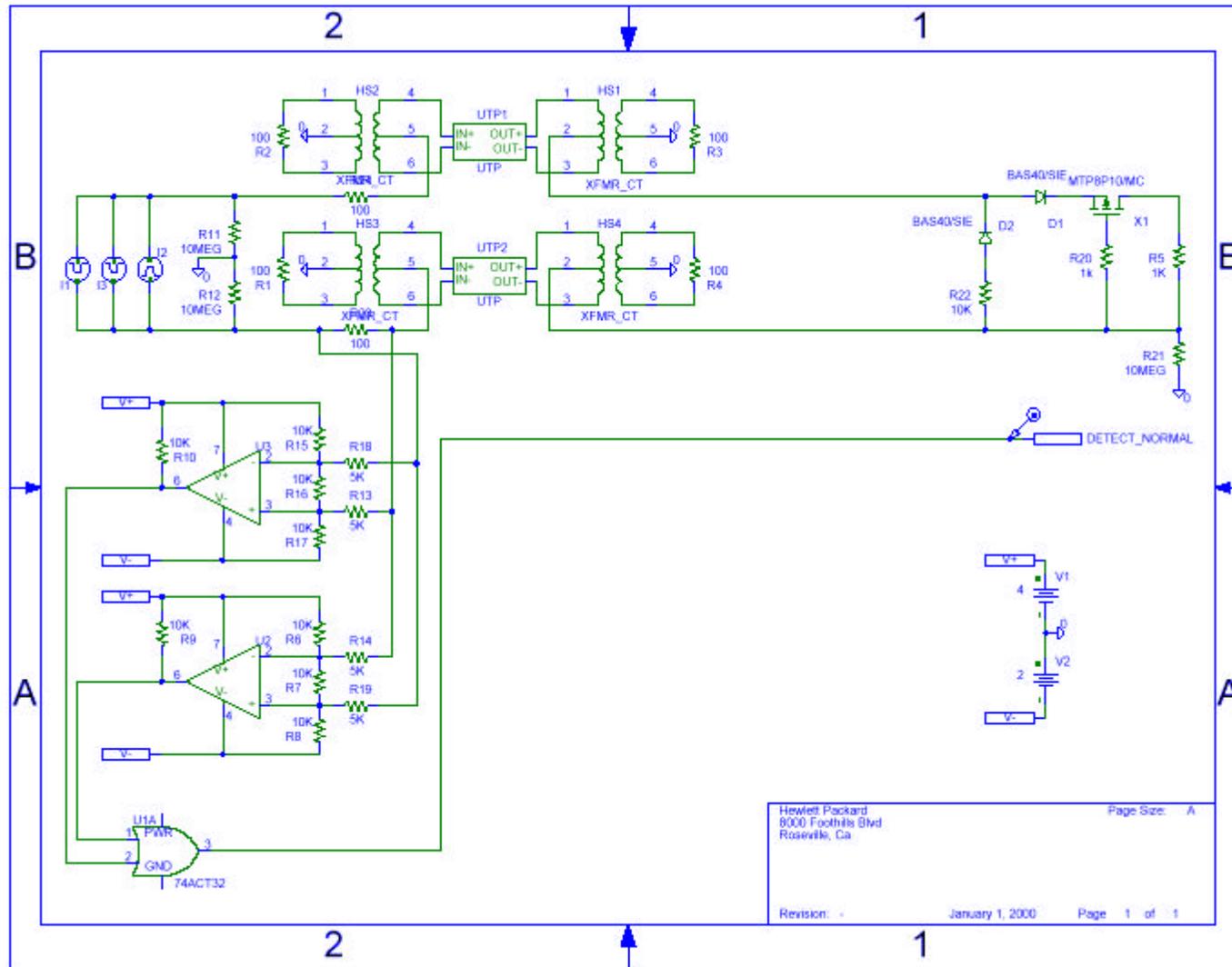
Shorted Pairs



Simulation Results - DC Distribution



AC Distribution - Current detect method



Conclusions

- Diode detection will work with the various termination implementations in the installed base.
- Diode detection allows low cost μ Controller based detection.
- Diode detection allows mid-span insertion.
- Simplifies Customer upgrade path... works with existing equipment.
- Can be designed to support detection of conflict with other distributor.
- Pairs 4-5,7-8 should be used to minimize impact on 10/100T
- Works with AC or DC power insertion.