Here are some decisions that need to be made, well, it would be nice:

1) Power on both pairs:
This is agreed on in the 802.3af group for the PD.
Do we want to revisit this goal to lower cost, i.e. do we want to pick a single pair to use?

2) Polarity of Power:
We have not voted on this as far as I know.
Do we want to allow only straight cables, for DTE power, in order to lower cost, or allow for the use of crossover cables?

3) Non-linear resistor signature:
Do we want to require that the signature resistor be is series with one or more diodes,
or do we allow a simple resistive signature to be optional?

4) Independence of power and discovery
If we agree that power can be on either pair, then do we want discovery on a given
pair to be independent of power on the other pair? (allows increased power levels, or redundant power)

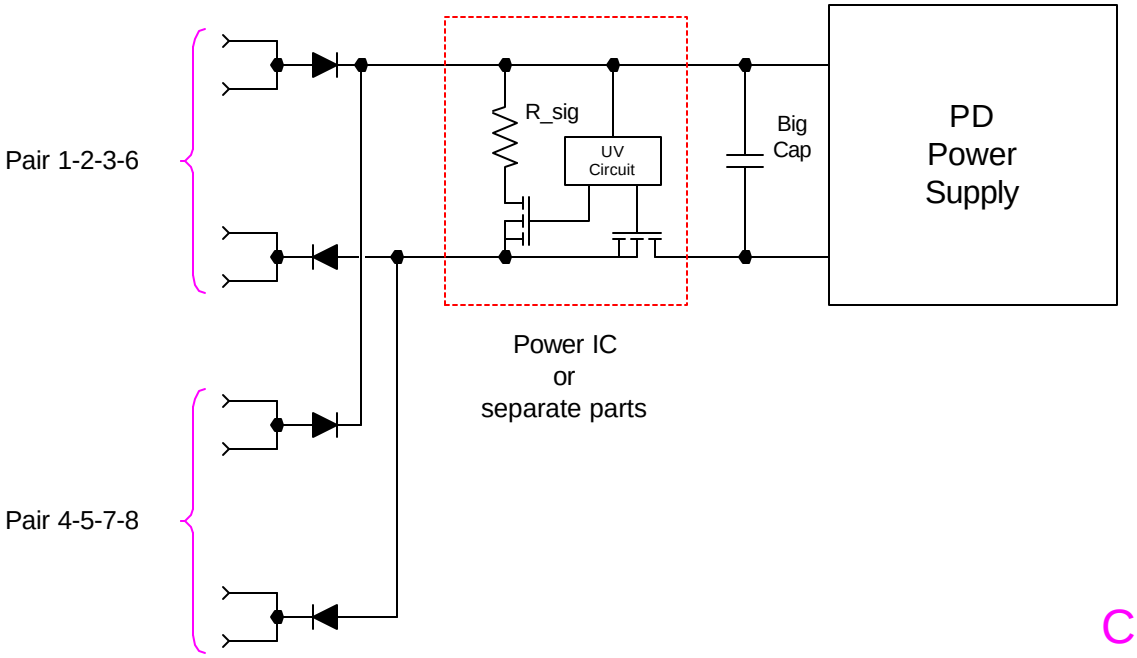
With these questions in mind, I put together some simplified schematics to help illustrate the relative level of complexity involved. Obviously picking one pair set offers the lowest cost, but the following schematics all show the possible use of both pairs.

Least Costly:
Aside from picking a single pair, and only one pair, requiring a fixed polarity for power (no crossover cables) and sharing a signature resistor seems to be the configuration with the lowest relative cost.

Most costly:
The most costly configuration is: power on both pairs, each pair with either power polarity, independent signature resistors that can be discovered independently from power on the other pair.

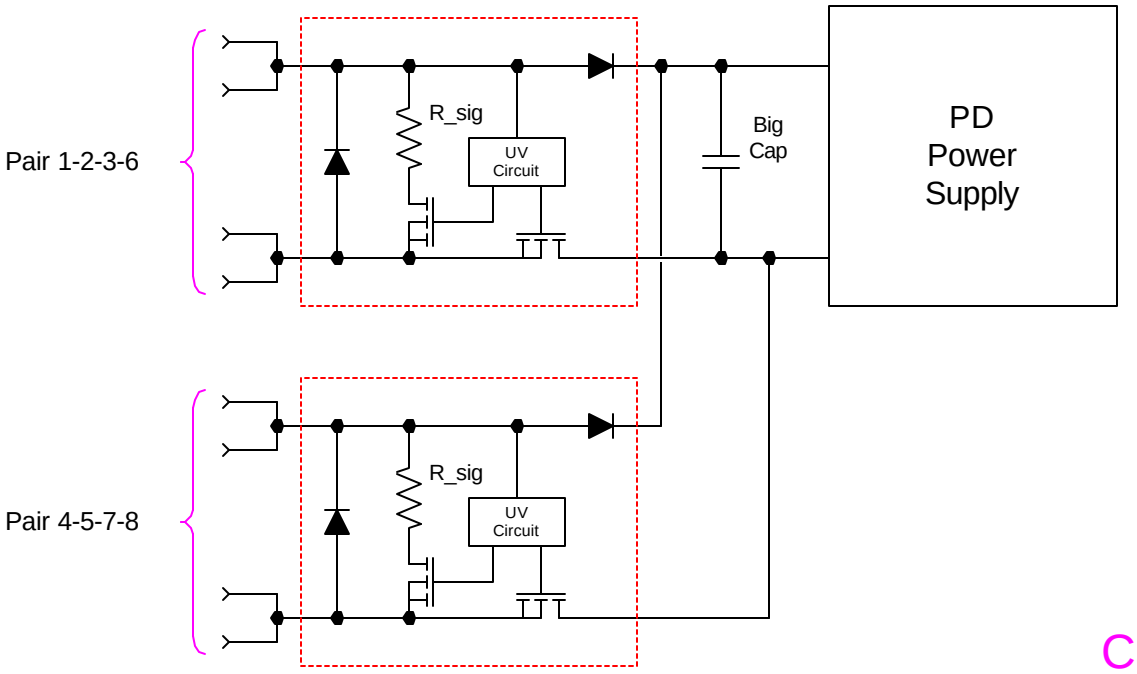
Here is what I would prefer:....
I'd prefer to pick one pair. We could leave the door open to using the other pair for additional power in the future. Other than that, I prefer Case 2, since it potentially has the lowest power loss due to diodes, and who needs those crossover cables anyway.

DTE Power,
PD Input Topology Choices



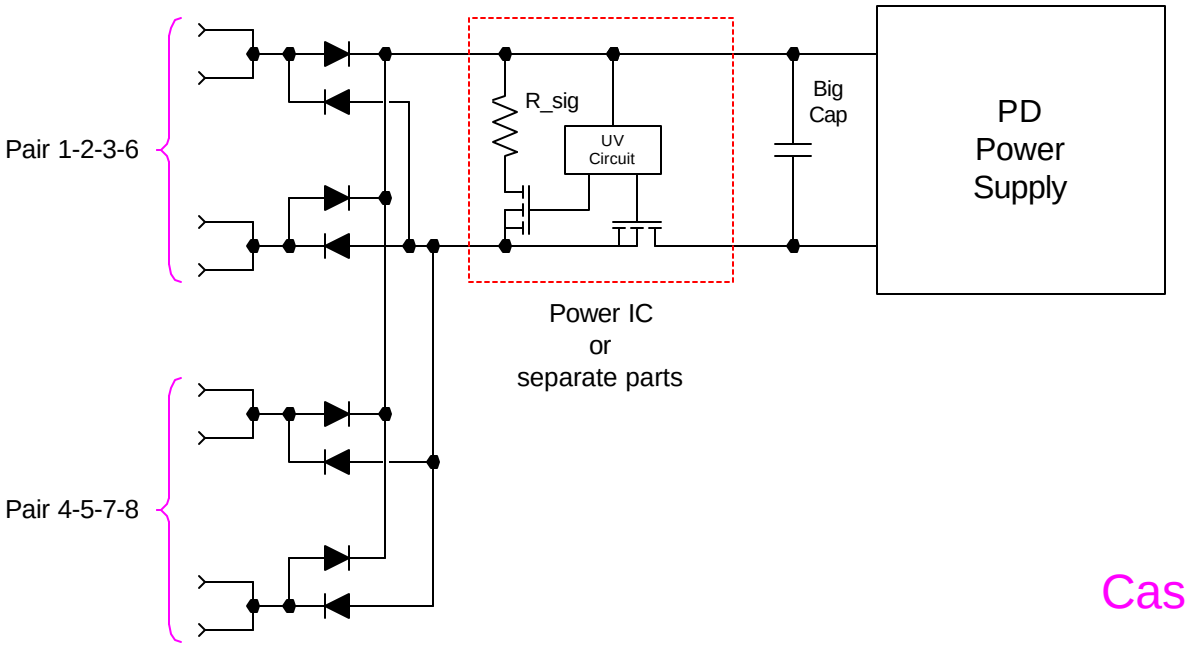
Case 1

Signature is Nonlinear (there is at least one diode in series with R_signature)
Single Polarity on Either Pair (must use a straight through cable)
Discovery on Each Pair is Not Independent of Other Pair



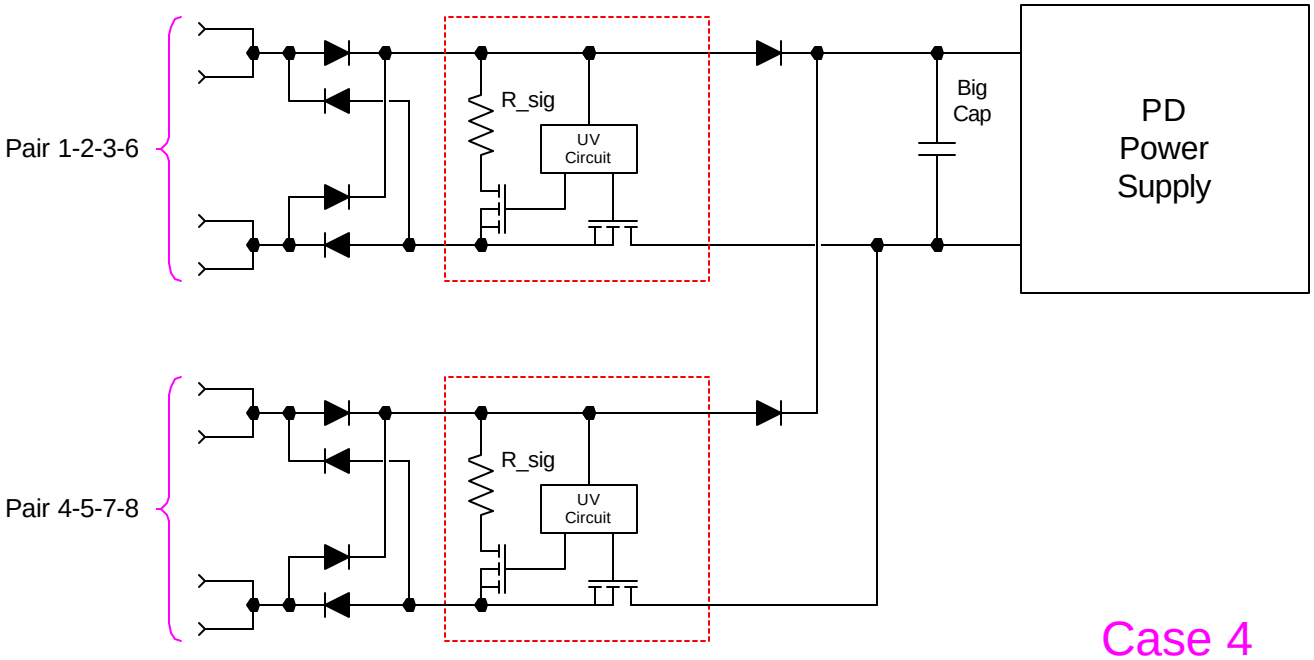
Case 2

Signature is Linear (the signature resistor with the correct polarity)
Single Polarity on Either Pair (must use a straight through cable)
Discovery on Each Pair is Independent of Other Pair



Case 3

Signature is Nonlinear (there is at least one diode in series with R_signature)
Either Power Polarity on Either Pair
Discovery on Each Pair is Not Independent of Other Pair



Case 4

Signature is Nonlinear (there is at least one diode in series with R_signature)
Either Power Polarity on Either Pair
Discovery on Each Pair is Independent of Other Pair