HP *ProCurve* Networking

HEWLETT PACKARD

Consensus Proposal

for DTE-Power via MDI

Daniel Dove

HP ProCurve Networks

Invent!

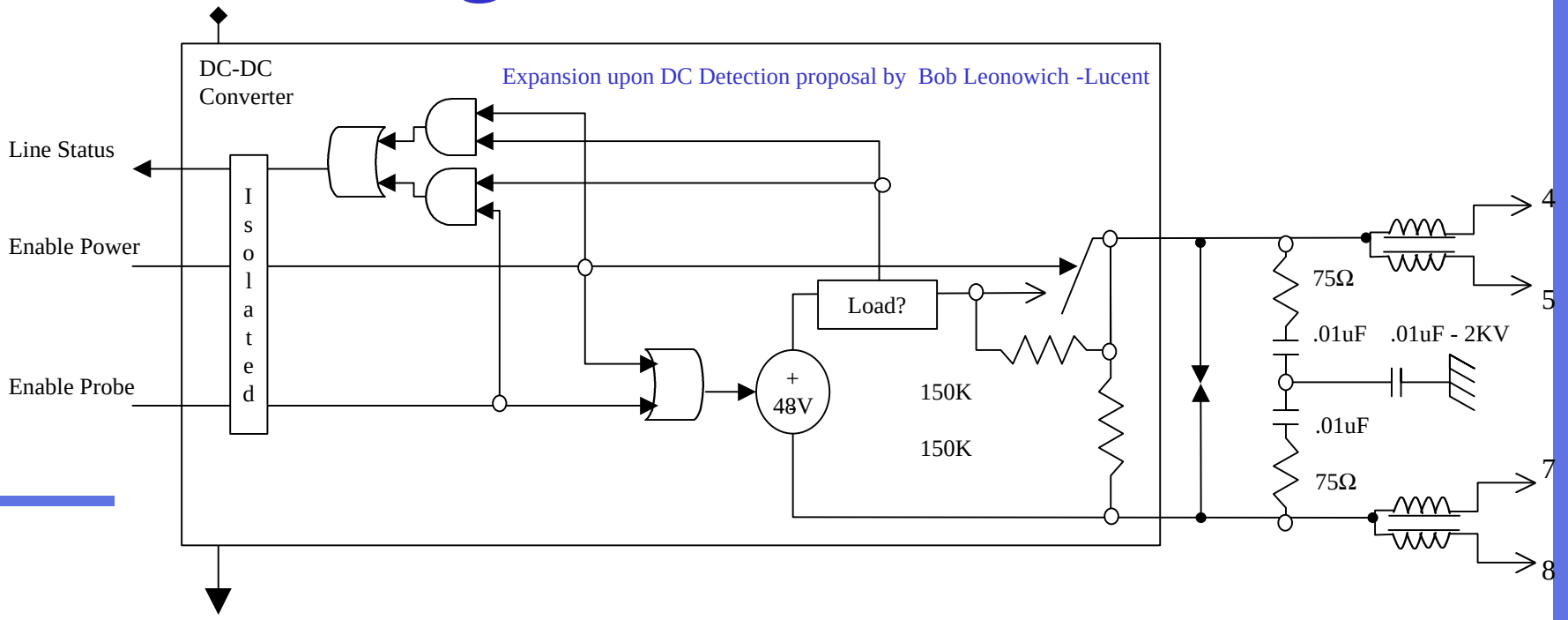
Consensus Proposal Solution Set

HEWLETT PACKARD

⇒ **Single Detection Scheme** for Mid-Span and Switch-End
⇒ **Simple** Protocol (Can be implemented with a shared uController)
⇒ **Safe** selection of 45-78 pairs to minimize impact on 100BASE-T
⇒ **Common-mode Detection** allows easy isolation at Mid-Span without breaking link
⇒ **Low Frequency** Detection Method limits EMC/EMI
  ⇒ Bob Leonowich DC method
  ⇒ Robert Muir adaptation of Dove's Diode method
  ⇒ Amir Lehr DC I/V method
  ⇒ High-Frequency AC termination controls EMC/EMI
⇒ **Mid-Span** is a MUST
  ⇒ Using LC network or high-performance transformers can minimize IL,RL at Mid-Span for robust DSP based 1000BASE-T

Invent!

Consensus Proposal
Single Detection Circuit



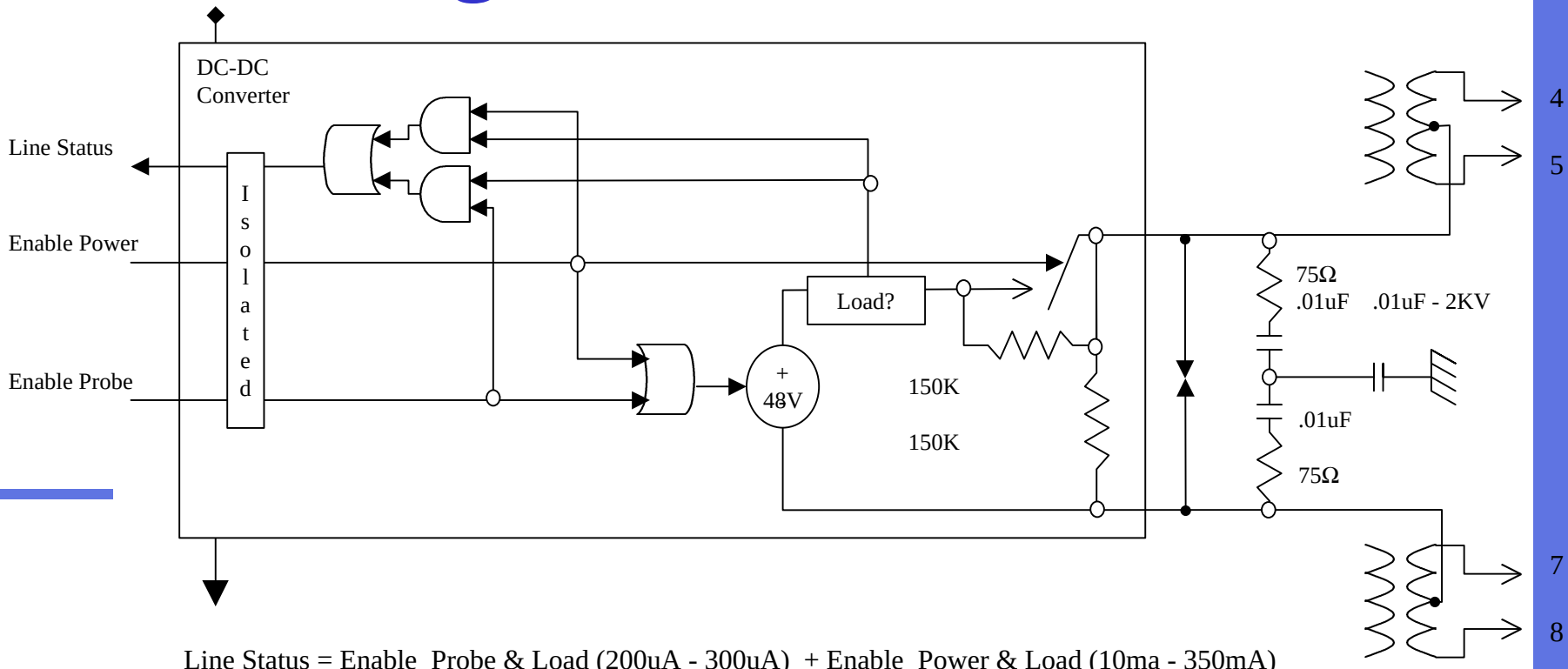
Line Status = Enable_Probe & Load (200uA - 300uA) + Enable_Power & Load (10ma - 350mA)

Isolation of control/status can be implemented via Opto-Isolators(DC) or magnetics(AC) signals

All control/status/logic functionality can be implemented in SOIC low-cost silicon solution

Invent!

Consensus Proposal
Single Detection Circuit



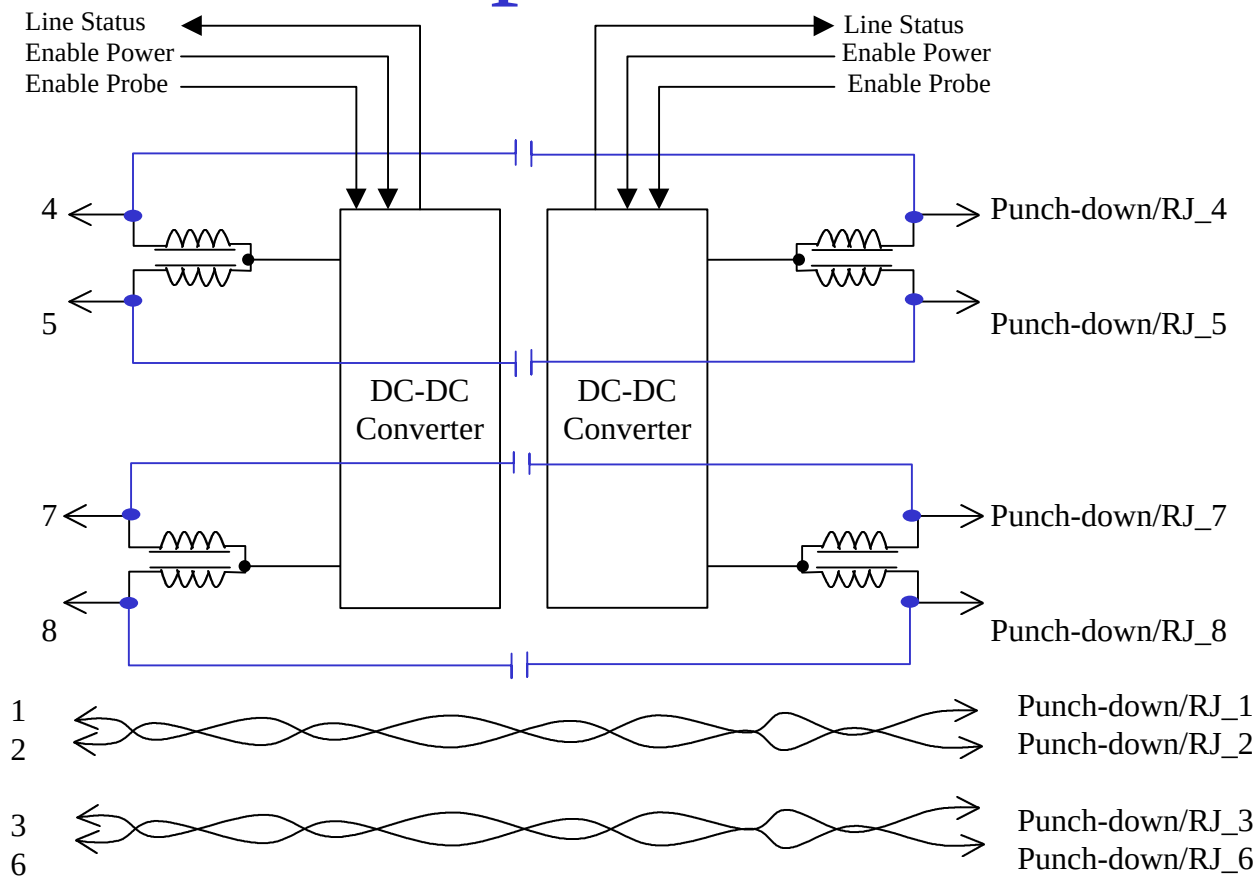
Line Status = Enable_Probe & Load (200uA - 300uA) + Enable_Power & Load (10ma - 350mA)

Isolation of control/status can be implemented via Opto-Isolators(DC) or magnetics(AC) signals

All control/status/logic functionality can be implemented in SOIC low-cost silicon solution

Invent!

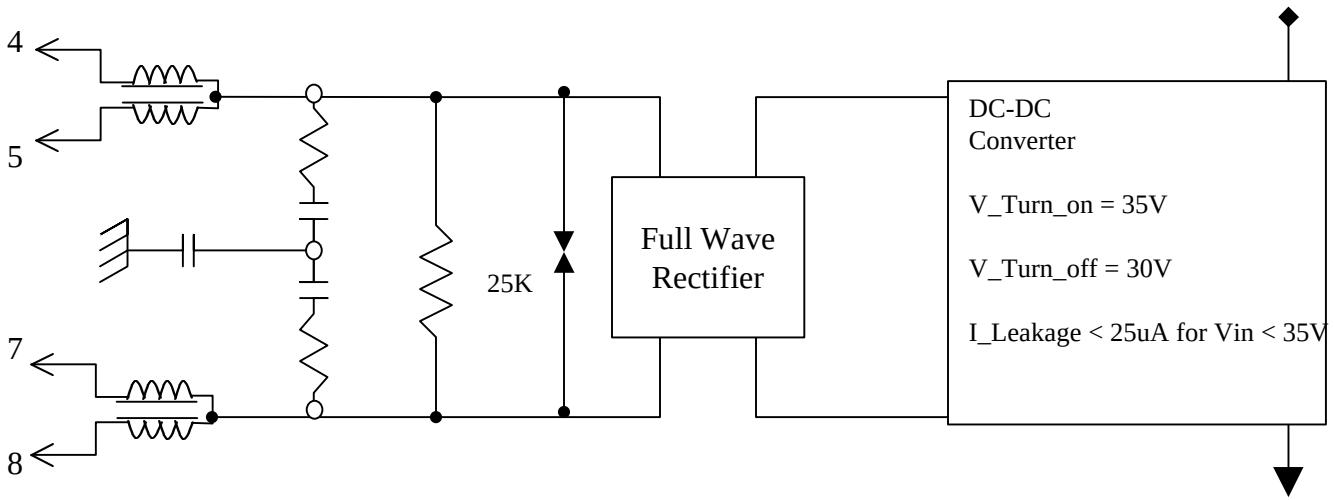
Consensus Proposal
Mid-Span Circuit



Invent!

- Caps can be implemented in parallel to improve frequency range (Low F || High F) for low I/L
- Inductors can be implemented in series to improve frequency range (Low F + High F) for low R/L
- May use high quality transformers instead

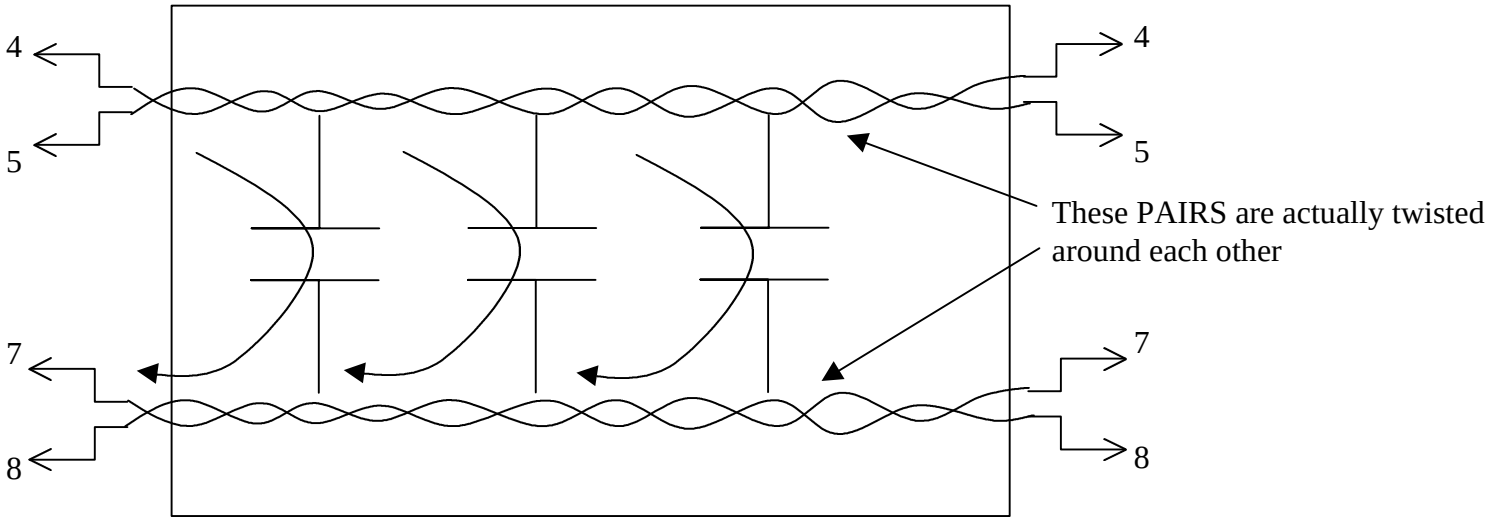
Consensus Proposal
Load Circuit



Invent!

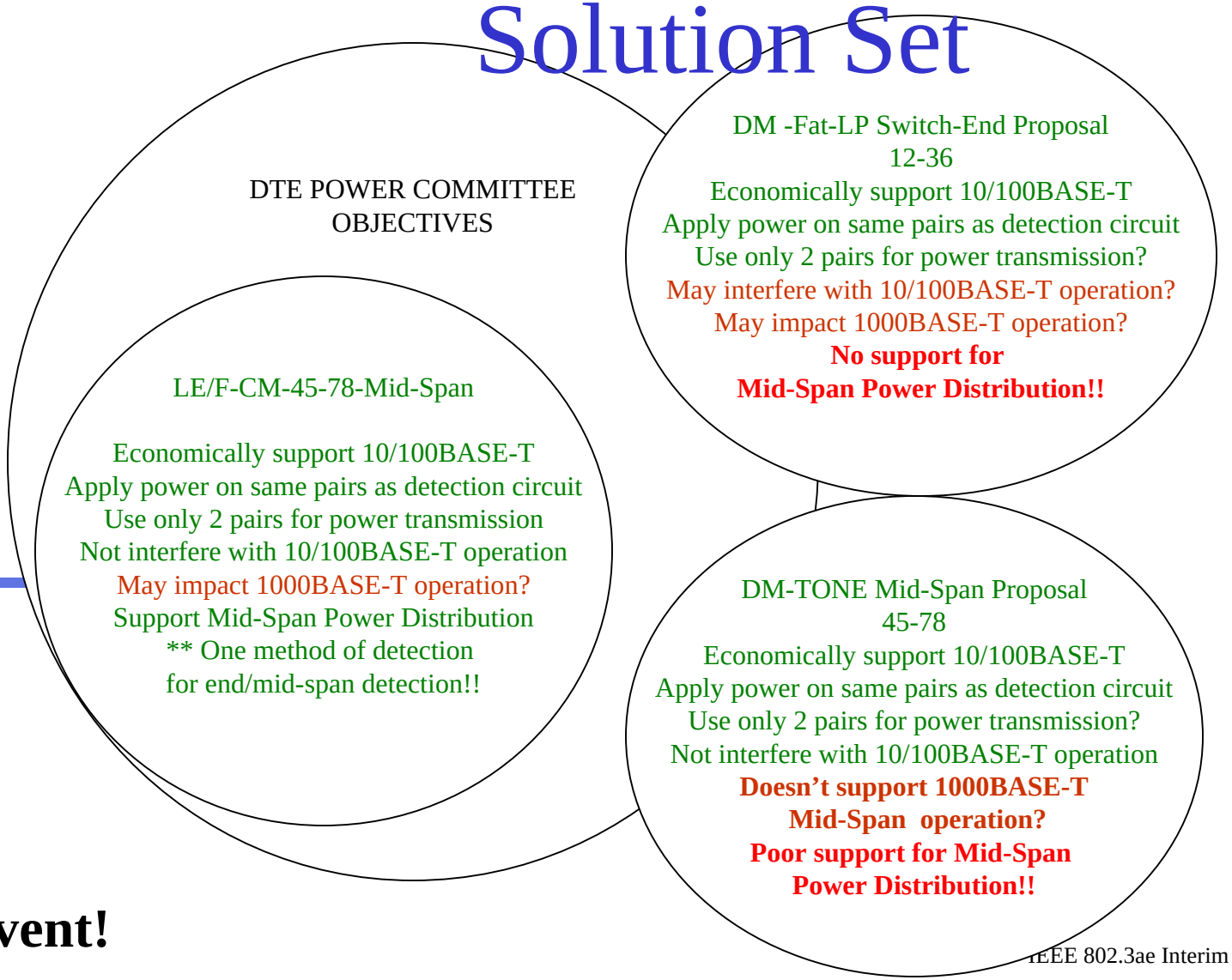
Consensus Proposal Common-Mode Concerns

- For **Low-Frequencies**, coupling between pairs will assist EMC/EMI concerns
- AC Common-Mode termination (~150 Ω) will reduce reflections :ie EMC/EMI



Invent!

Consensus Proposal Solution Set



Invent!

Consensus Proposal Solution Set

⇒ **Single Detection Scheme** for **Mid-Span** and Switch-End
⇒ **Simple** & Low Cost
⇒ **Safe** selection of 45-78 pairs to minimize impact on 100BASE-T
⇒ **Common-mode Detection** allows easy isolation at Mid-Span without breaking link
⇒ **Low Frequency** Detection Method limits EMC/EMI

Invent!

Consensus Proposal

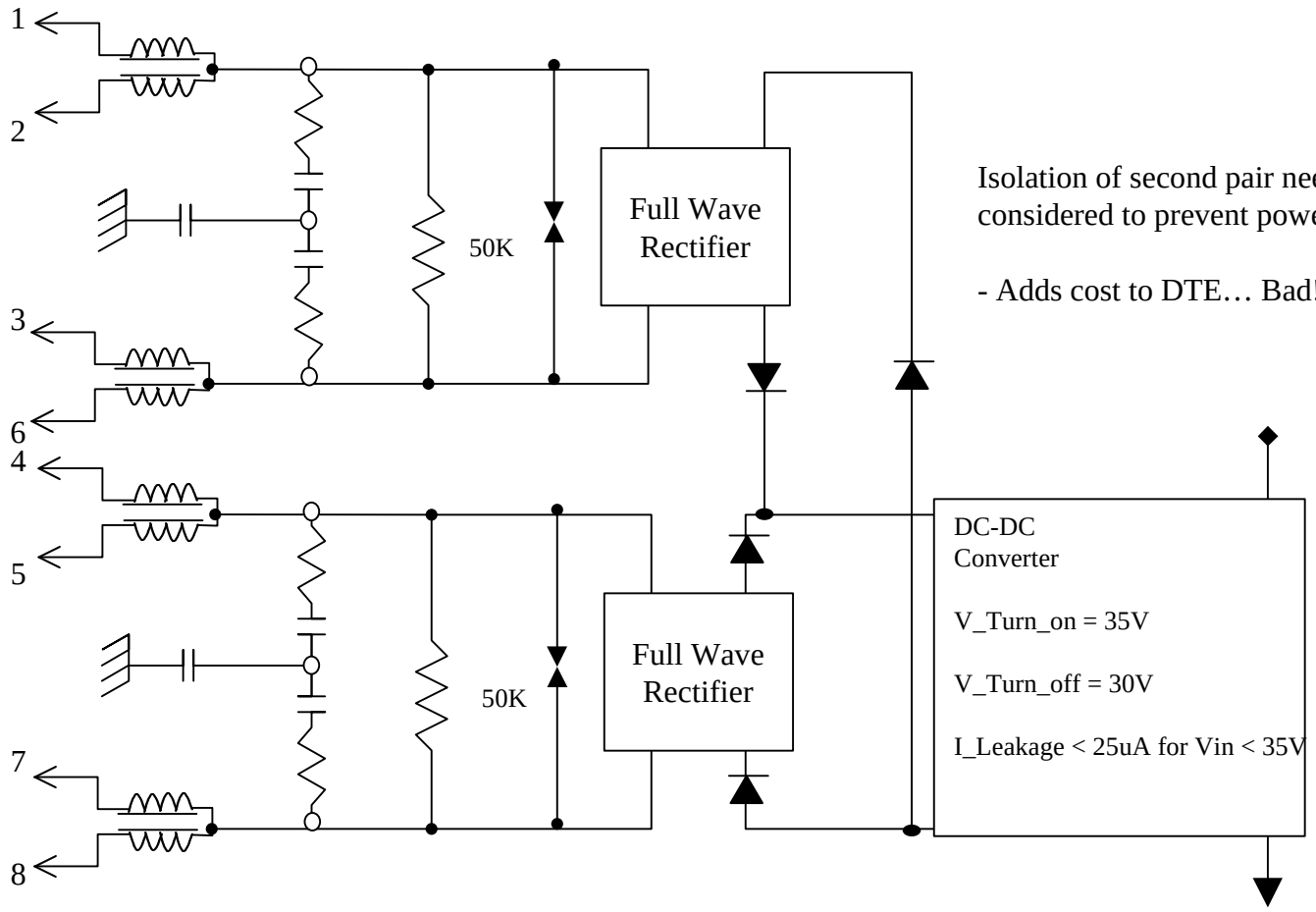
Possible Compromise Alternatives

⇒ **Single Detection Scheme** for **Mid-Span** and Switch-End
⇒ **Simple** & Low Cost
⇒ **Safe** selection of 45-78 pairs to minimize impact on 100BASE-T
⇒ **Common-mode Detection** allows easy isolation at Mid-Span without breaking link
⇒ **Low Frequency** Detection Method limits EMC/EMI

BUT:
⇒ Make accomodation in DTE for detection & receiving power via 12,36 pairs
⇒ Leave transmission of power via 12-36 for future study
⇒ Possible that we may only allow Switch-End distribution on 12-36

Invent!

Consensus Proposal
Compromise Load Circuit



Isolation of second pair needs to be considered to prevent power feedback

- Adds cost to DTE… Bad!

Invent!