MPO Keying Considerations for 802.3db

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IEEE 802.3db 100 Gb/s, 200 Gb/s, and 400 Gb/s Short Reach Fiber Task Force

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Overview

- Evaluate tradeoffs of various 200G VR2/SR2 & 400G VR4/SR4 MPO keying conventions
  - Assumptions
  - Link configurations
  - Tradeoff questions
  - Illustrations of each link configuration
- Summary
- Proposal

Assumptions

- Use parsons_3db_adhoc_01_040121 as starting point:
  - Assume same lane assignment as in Clause 138 for 200G-SR4
  - Assume both PC and APC MPO variants will co-exist

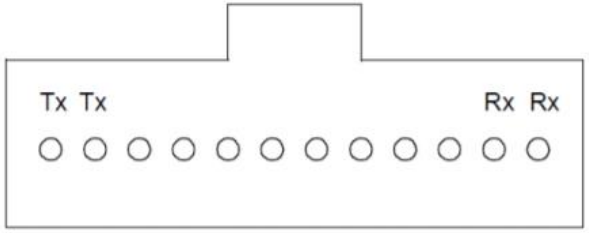


Figure 167–6—Optical lane assignments for 200GBASE-VR2 or 200GBASE-SR2

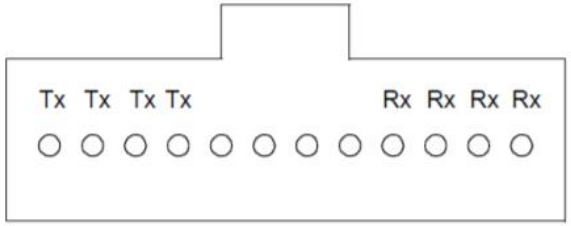


Figure 167–7—Optical lane assignments for 400GBASE-VR4 or 400GBASE-SR4

For two pair and four pair add option for APC

- List two options for MDI
- Option A is for APC
- Option B is PC

parsons_3db_adhoc_01_040121

Possible Link Configurations

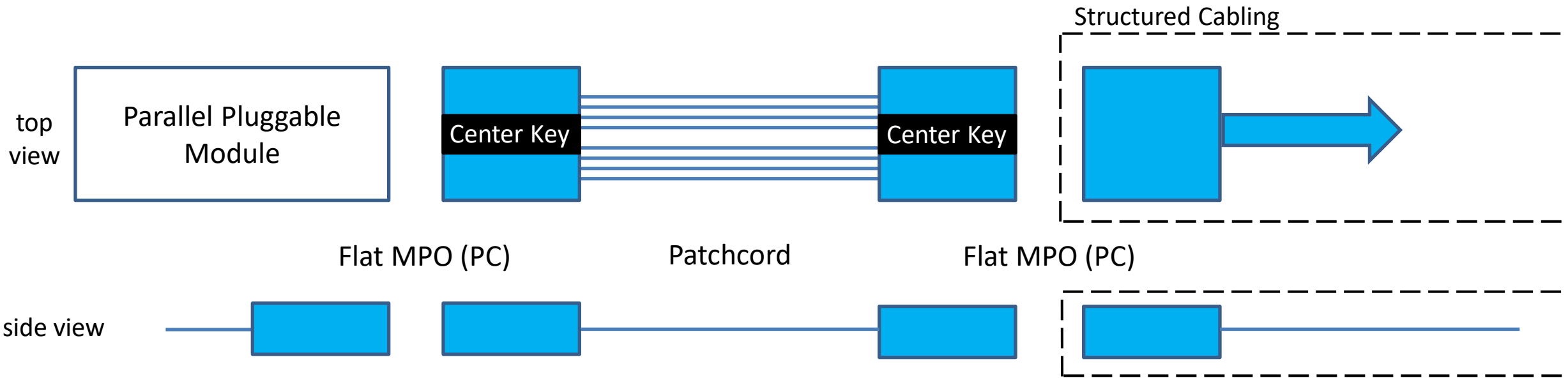
1. Flat module with Flat Structured Cabling. All Center Key.
2. APC module with Flat Structured Cabling. All Center Key.
3. APC module (Offset Key) with Flat Structured Cabling (Center Key).
4. APC module with APC Structured Cabling. All Center Key.
5. APC module with APC Structured Cabling. All Offset Key.

	Config 1	Config 2	Config 3	Config 4	Config 5
Module Angle	Flat	APC	APC	APC	APC
Module Key	Center	Center	Offset	Center	Offset
Cable Plant Angle	Flat	Flat	Flat	APC	APC
Cable Plant Key	Center	Center	Center	Center	Offset

Tradeoff Questions

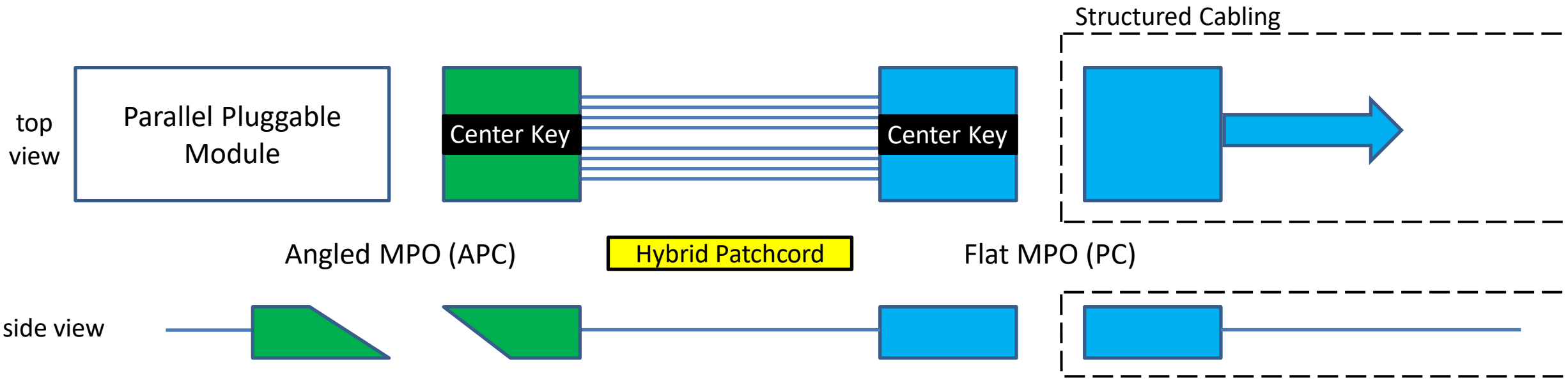
1. Can the existing patchcords be re-used?
2. Can the existing cable plant (aka structured cabling) be re-used?
3. Is a hybrid patchcord required?
   - (i.e. one end is different than the other…and could be plugged in the wrong way)
4. Does MPO key provide a visual indicator for PC vs APC?
   - (i.e. reduce likelihood PC is plugged into APC)
5. Is MPO key different for PC vs APC?
   - (i.e. physically prevent PC plugged into APC)
6. Does the MPO key enable VR2/SR2/VR4/SR4/VR8/SR8 cable plant harmonization?
   - 802.3cm specifies PC, but “market has decided” to use APC (MPO-16 with offset key)
7. Is there “Back Reflection (BR) insurance” in case the MPOs lack physical contact?
   - As previous discussed in 802.3db, APC improves BR performance, which can provide “insurance” in case of poor factory quality, cleanliness, etc.

Config 1: All Flat (PC) Center Key MPOs



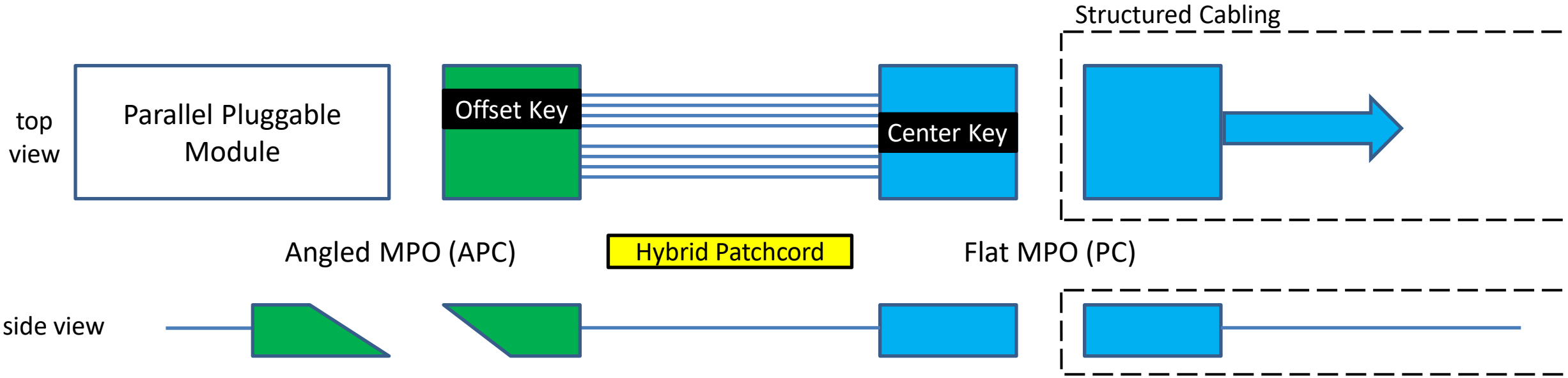
- Re-use cable plant? YES
- Re-use patchcord? YES
- No hybrid patchcord? YES
- Key is visual indicator? YES
- Different MPO key? YES
- Harmonized with SR8? NO
- BR insurance? NO

Config 2: Mix of Flat & APC, All Center Key MPOs



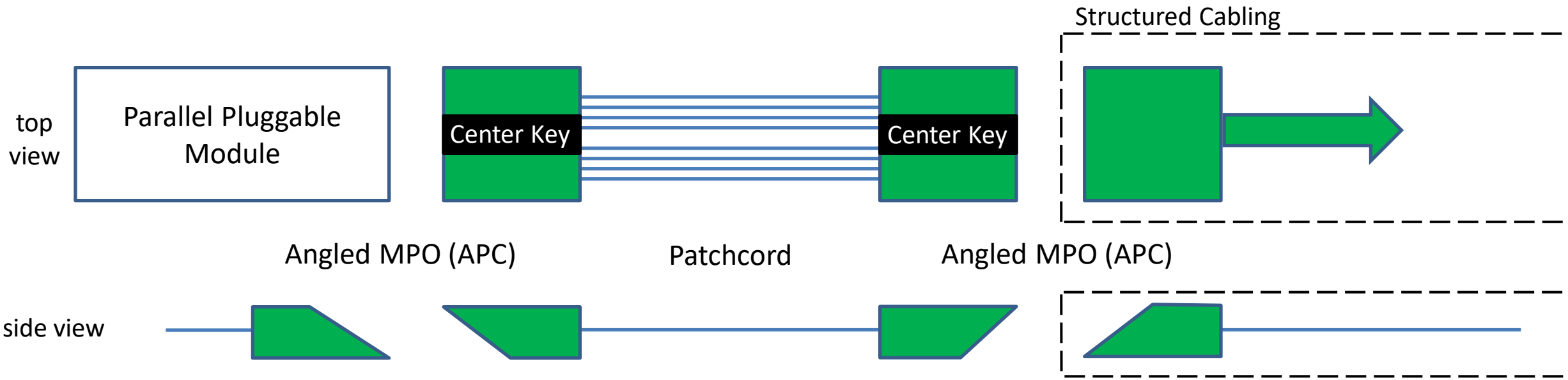
- Re-use cable plant? YES
- Re-use patchcord? NO
- No hybrid patchcord? NO
- Key is visual indicator? NO
- Different MPO key? NO
- Harmonized with SR8? NO
- BR insurance? NO

Config 3: APC Offset Key & Flat Center Key MPOs



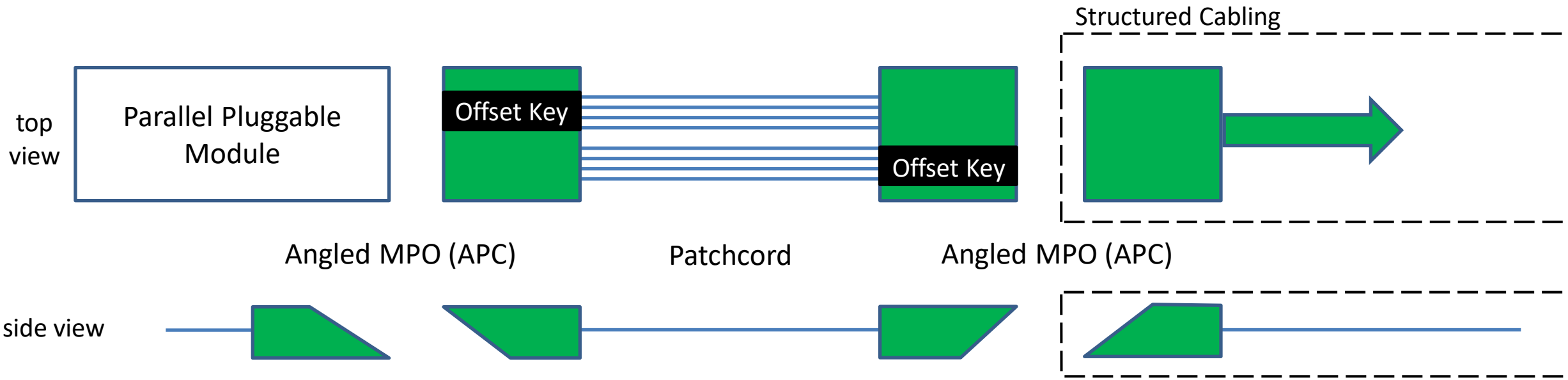
- Re-use cable plant? YES
- Re-use patchcord? NO
- No hybrid patchcord? NO
- Key is visual indicator? YES
- Different MPO key? YES
- Harmonized with SR8? NO
- BR insurance? NO

Config 4: All APC Center Key MPOs



- Re-use cable plant? NO
- Re-use patchcord? NO
- No hybrid patchcord? YES
- Key is visual indicator? NO
- Different MPO key? NO
- Harmonized with SR8? NO
- BR insurance? YES

Config 5: All APC Offset Key MPOs



- Re-use cable plant? NO
- Re-use patchcord? NO
- No hybrid patchcord? YES
- Key is visual indicator? YES
- Different MPO key? YES
- Harmonized with SR8? YES
- BR insurance? YES

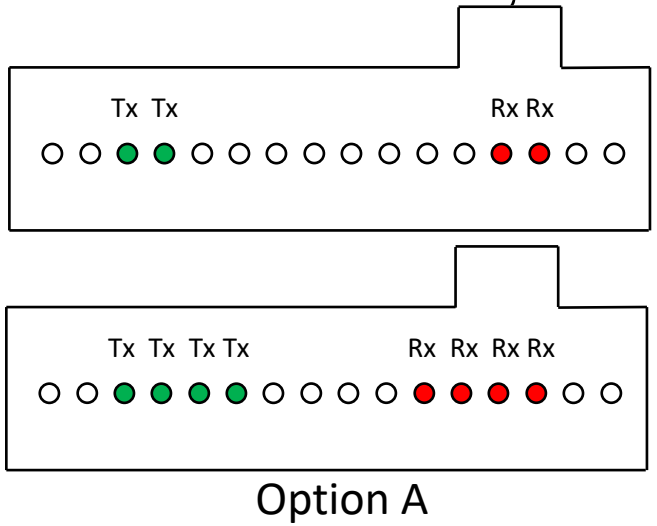
Tradeoff Summary

	1	2	3	4	5
Re-use Cable Plant?	✓	✓	✓		
Re-use Patchcord?	✓				
Prevents hybrid Patchcord?	✓			✓	✓
MPO key is visual indicator of PC vs APC?	✓		✓		✓
MPO key physically prevents wrong patchcord?	✓		✓		✓
Harmonized with SR8?					✓
BR Insurance?				✓	✓

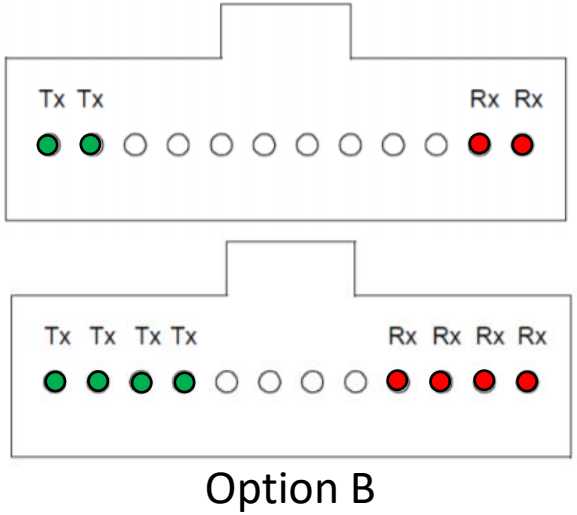
- Config 1: Best for those who have good quality MPO supply chain and do not want to replace existing patchcords & cable plant (Brownfield applications).
- Config 3: Best for those who are OK with replacing patchcords, but prefer not to replace existing cable plant (Brownfield applications).
- Config 5: Best for those who prefer to have the BR insurance and are OK with replacing existing fiber plant and/or Greenfield applications. Harmonizes with SR8 cable plant (future-proof).

Proposal

- Adopt Parsons definition of two 200G VR2/SR2 options and two 400G VR4/SR4 MDI options:
  - Option A = APC (angled) MPO-16 with Offset Key
  - Option B = PC (flat) MPO-12 with Center Key
  - Both options maintain existing IEC/TIA key convention
- Adopt common lane assignment to allow same ribbon inside module
  - Similar to existing parallel modules, unused fibers can be stubs to minimize/eliminate cost, cable diameter, and cable weight increase



Option A



Option B

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THANK YOU