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LOW POWER 100GBE MODULES

Scott Kipp

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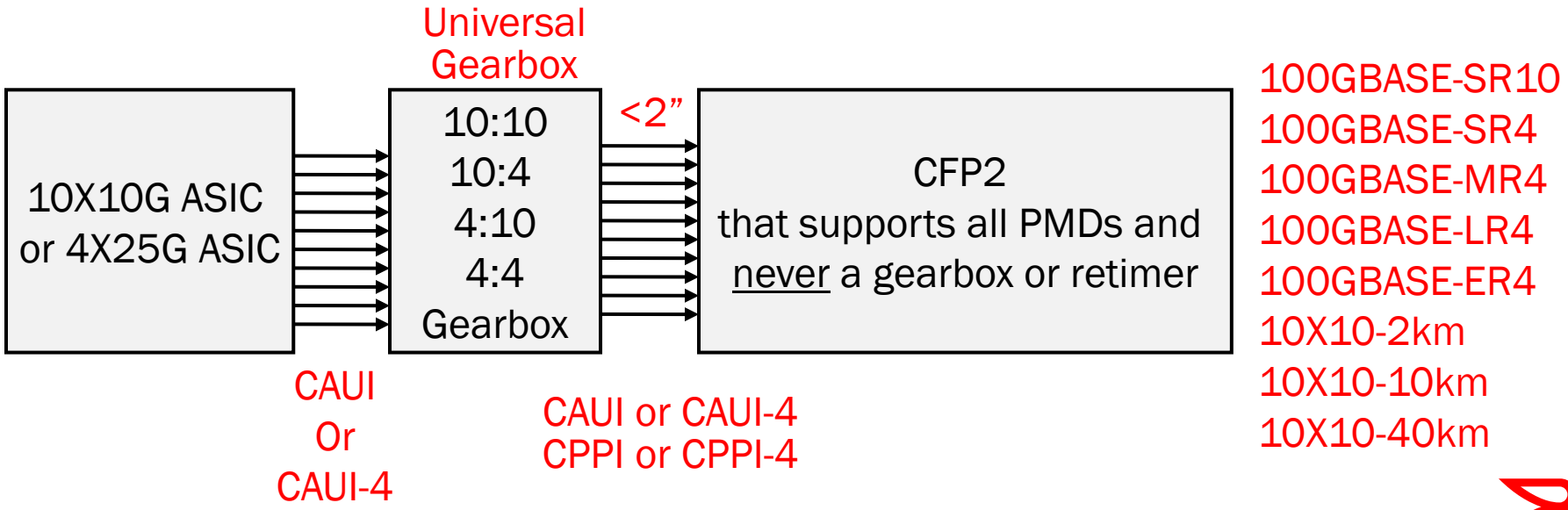
Power Consumption in Modules

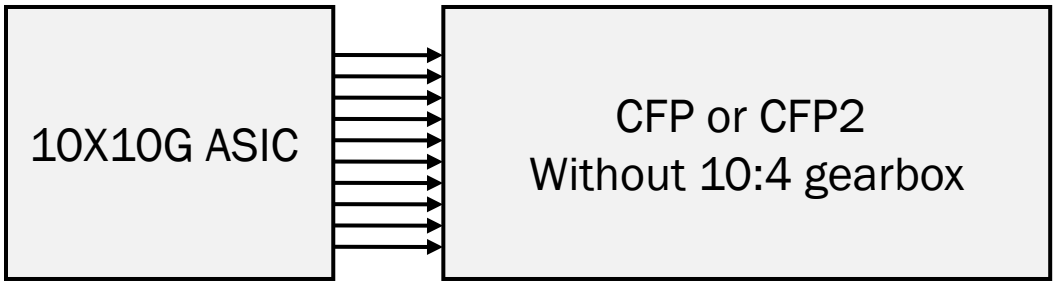
- Module size is determined by the size of the components and/or the power they consume
- To reduce module size the power needs to be reduced
- This presentations looks at removing two power consuming devices in modules
  - Gearboxes
    - 100GBASE-LR4 CFP modules use a 10:4 gearbox
    - Support for SR10 with the new 4X25G interface will require another gearbox in the module
  - Retimers
    - If the retimer/gearbox is close enough to the module, they might not be needed

Universal Gearboxes

- Several gearboxes are coming onto the market that convert CAUI or CAUI-4 into CAUI, CAUI-4, CPPI and possibly CPPI-4
- The gearboxes have a bypass mode so that all electrical interfaces can be supported and it acts like a retimer
- These can minimize power in the module because no gearbox or retimer is ever needed

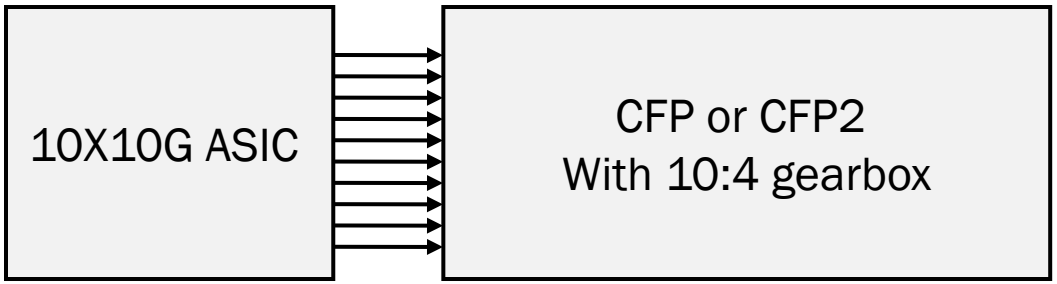


10X10G ASIC Possible Configurations



CAUI
Or CPPI

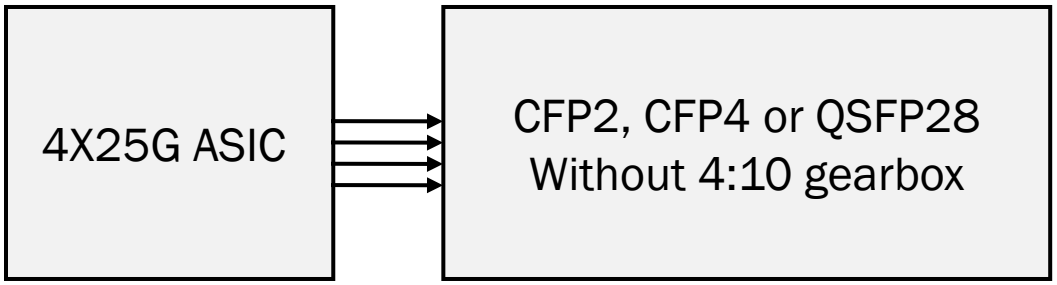
100GBASE-SR10
10X10-2km
10X10-10km
10X10-40km



CAUI
Or CPPI

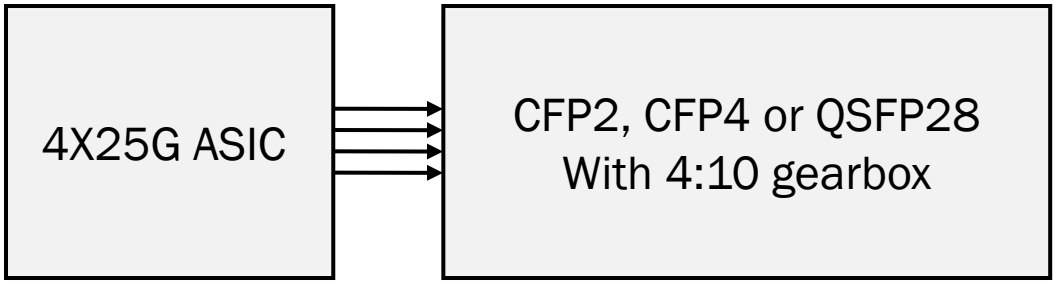
100GBASE-SR4
100GBASE-MR4
100GBASE-LR4
100GBASE-ER4

4X25G ASIC Possible Configurations



CAUI-4
Or
CPPI-4

100GBASE-SR4
100GBASE-MR4
100GBASE-LR4
100GBASE-ER4



CAUI-4
Or
CPPI-4

CFP4 will be challenging to cool the module with a gearbox

100GBASE-SR10
10X10-2km
10X10-10km
10X10-40km

Comparison of Channels and Gearboxes

ASIC Technology	Gearbox	Supported Optics	Comment
10X10G ASIC	None	4	Limited forward compatibility
10X10G ASIC	10:4	4	High Power
10X10G ASIC	Universal	All	Low Power
4X25G ASIC	None	4	Limited backward compatibility
4X25G ASIC	4:10	4	High Power – probably not in CFP4 or QSFP28
4X25G ASIC	Universal	All	Low Power

Summary

- If the PMD matches the ASIC electrical interface, the gearbox only acts like a retimer, but is more costly
- When CFP4 or QSFP28 begins being deployed, support of the 10X10G interfaces becomes problematic because a 4:10 Gearbox in the module may consume too much power
- The study group should consider defining the unretimed CPPI-4 interface for implementations where a Universal Gearbox is within 2” of the module connector
  - This could be challenging since little VCSEL data is available
  - Standardization could be done in the SFF Committee

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Thank You