

# Tomahawk4 based 100Tb Ethernet DDC

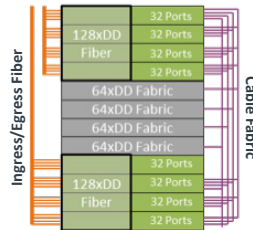
## Tomahawk4 DDC : New Era of Connectivity

The release of Broadcom’s 25.6Tb Tomahawk4 in 2020 combined with the migration to standards based Distributed, Disaggregated Chassis (DDC) promises a new era of cloud and service provider connectivity solutions that support Network Operating System (NOS) software choice, avoid vendor lock-in and allow rapid solutions tailoring to specific application needs.

Traditional Chassis



Distributed, Disaggregated Chassis



### Solving the DDC CLOS Challenge

A chassis uses a backplane to build a CLOS network. A DDC uses standards-based 400G cables to build a CLOS network – but legacy interconnect solutions don’t deliver. Optics power is too high for this application – resulting in a CLOS fabric that consumes almost as much power as the Tomahawk4 systems. But what about DACs?

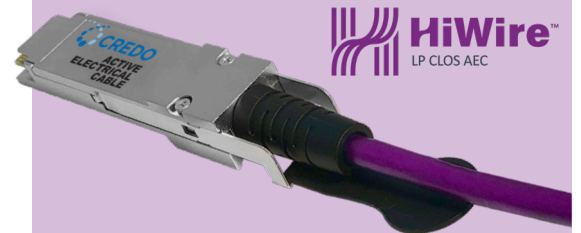
### DACs : Broken Connectors and Broken Dreams

DACs promise a low power and low cost solution to DDC CLOS Connectivity, but at 400G DACs have gotten too fat and too stiff to reliably route at these densities. The result is broken connectors, intermittent signal integrity issues at failed rollouts.

### HiWire LP CLOS AECs

Introducing HiWire LP CLOS AECs – specifically designed for DDC applications – with 75% less power than optics and 75% less volume than DACs.

## HiWire LP CLOS AEC



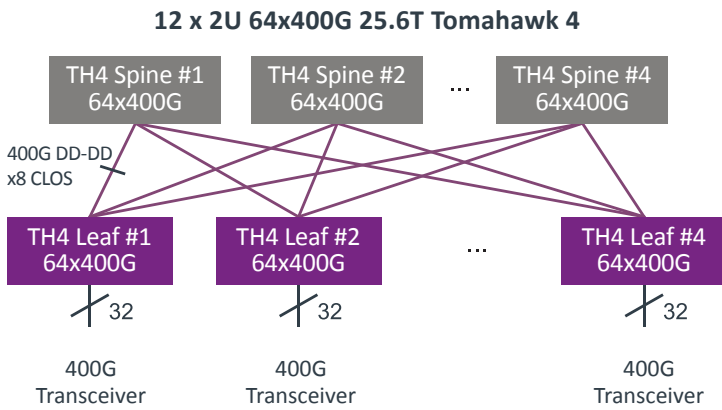
Credo HiWire LP CLOS Active Electrical Cables (AEC) are specifically designed for high density in-rack or HPC rack-to-rack interconnect to support CLOS architectures.

With 75% less power than optical solutions and 75% less volume than DACs, these AECs enable CLOS cabling densities up to 500 cables per rack.

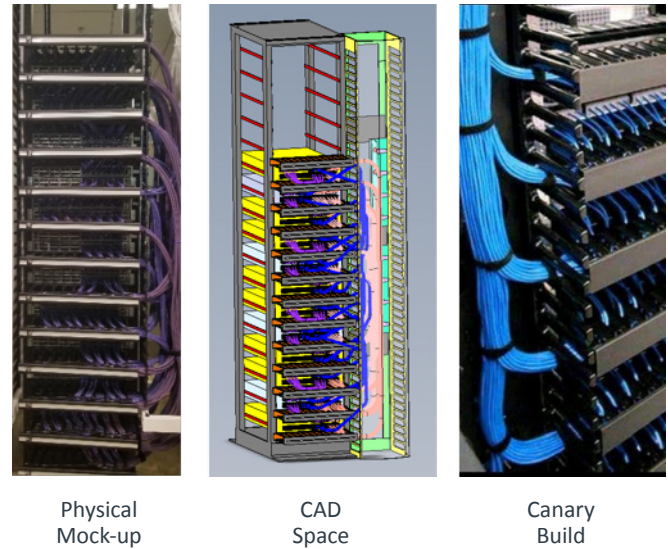
## Key Parameters

<b>Lengths</b>	0.5m – 3.0m	
	0.2m granularity	
<b>Cu Gauge</b>	34 / 32 AWG	
<b>Cable Diameter</b>	6mm / 8mm	
<b>Modulation</b>	PAM4 ⇌ PAM4	
<b>Connectors</b>	<b>A-Side</b>	<b>B-Side</b>
	QSFP56-DD	QSFP56-DD
<b>Link Speeds</b>	28G / 56G	
<b>Power</b>	4.5W per end	
<b>BER</b>	Pre-FEC BER 1e <sup>-8</sup>	
	Post-FEC BER < 10 <sup>-15</sup>	

**100Tb Tomahawk 4 DDC**



**100Tb TH4 Switch Rack – Rollout Stages**



**Switch and Transceiver Power Budget**

Item	Power	Count	Total Power
25.6T Switch	600W	12	7.2kW
DR4	11W → 9W	256	2.8kW → 2.3kW
Total Without CLOS			10kW → 9.5kW

**CLOS Options**

AOC	2x11W	256	5.6kW
HiWire LP CLOS AEC	2x4.5W	256	2.3kW

**Tomahawk4 based DDCs are about Power Savings**

Increasing port speeds to 400G and beyond are meeting static rack power and cooling budgets at cloud and service provider facilities. At these large installations, Tomahawk4 is not about Radix, but about power – it is significantly lower power than two Tomahawk3 based switches.

Credo’s HiWire LP CLOS AECs are crucial to enabling Tomahawk4 based DDC – as they reduce CLOS power by up to 75% compared to optical and prevent the failed rollouts of DAC enabling reliable, deterministic CLOS routing densities of up to 300 cables per rack.

**HiWire CLOS AECs Enable Tomahawk4 DDC**

Credo’s HiWire LP CLOS AECs are thin, low power, deterministic Active Electrical Cables (AECs) specifically designed for DDC CLOS applications:

- 75% less power consumption than optical solutions
- Up to 75% less space than DACs
- Deterministic  $1e^{-8}$  pre-FEC BER performance
- 10-year service life

Using HiWire LP CLOS AECs in a DDC

- Routing densities of up to 300 cables per rack
- Improved reliability with MTBF >10 million hours
- Lower power consumption than chassis

For more information please visit [www.credosemi.com/hiwire](http://www.credosemi.com/hiwire) or email [hiwire@credosemi.com](mailto:hiwire@credosemi.com).