HUBER+SUHNER

TRANSCEIVERS

DUPLEX & PARALLEL TRANSCEIVERS

edp Distribution

PRODUCT OVERVIEW

HUBER+SUHNER offers a full range of transceivers that can be used with various types of IT equipment from network cards to switches.

There are two main types of transceivers used in the Data Centre: Duplex or Parallel transceivers. Whilst they are similar in their purpose, they differ in how they transmit data and their suitability for different scenarios.

Choosing the right solution will depend on specific needs. For lower data rates and cost-effectiveness duplex is usually preferred. Where applications require a high-bandwidth and future scalability then parallel is a better option.

This document details the most popular ones used in Data Centre whitespace.

Duplex Transceivers

Duplex transceivers are used in applications requiring single-lane transmission, where a single fibre is used for transmitting data and a separate fibre is used for receiving data.

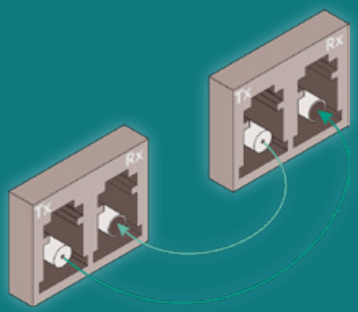
Typically, duplex transceivers support data speeds ranging from10G to 40G. They provide a simple and cost-effective solution requiring fewer fibres, minimising cabling costs and complexity.

However, as speed requirements increase, they offer limited scalability as adding more duplex links requires more fibres which can become unmanageable.

New Technologies like PAM4 modulation are pushing the limits of duplex transceivers, potentially closing the gap in data rates with parallel options.

Duplex Transceiver Lane Assignment

Structured cabling scenarios must assure that Tx and Rx of duplex transceivers on one end are connected to Tx and Rx on the other end.



Lane	Side A	Side B
	Tx A	Rx B
	Rx A	Tx B

SFP+ 10G SR

SFP28 25G SR

SFP28 25G LR

Technical Data			
Data Rate	10G	25G	
Form Factor	SFP+	SFP28	
Distance	550m	100m	2km
Wavelength	850nm		1310nm
Fibre Type	Multi Mode (OM4)		Singlemode (OS2)
Temperature Range	0...+70°C		
Power Budget	4dB	7dB	5.6dB
Modulation and FEC	NRZ		
Physical Interface	LC PC Duplex		LC UPC Duplex
Order Information Cisco Coding	CSM-900A04DC-85	CSM-400A07DC-85	CSS-420A06DC-13
Order Information Juniper Coding	CSM-900A04DJ-85	CSM-400A07DJ-85	CSS-420A06DJ-13

QSFP28 100G CWDM4

QSFP-DD 400G FR4

Technical Data		
Data Rate	100G	400G
Form Factor	QSFP28	QSFP-DD
Distance	2km	
Wavelength	mux /demux 1271nm, 1291nm, 1311nm, 1331nm	
Fibre Type	Singlemode (OS2)	
Temperature Range	0...+70°C	
Power Budget	>5dB	4dB
Modulation and FEC	PAM4	
Physical Interface	LC UPC Duplex	
Order Information Cisco Coding	CQS-901A05DC-13	CQS-100A04DC-13
Order Information Juniper Coding	CQS-901A05DJ-13	CQS-100A04DJ-13

Parallel Transceivers

Parallel transceivers are used for multi-lane transmission, where data is divided into multiple channels and transmitted simultaneously over multiple fibres.

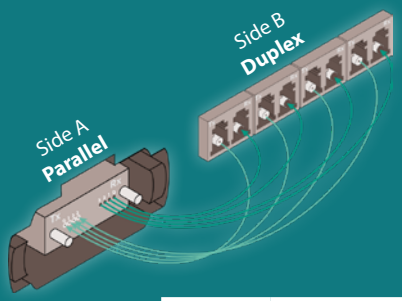
Providing higher speeds and transmits data at higher rates typically 40G to 400G and beyond. This offers higher capacity and is ideal for high-bandwidth applications like cloud computing and AI.

However, parallel networks are more complex requiring more fibres and specialised connectors which increases cost and complexity.

Parallel Transceiver Lane Assignment

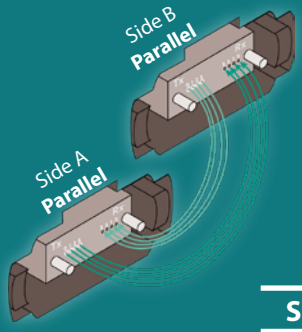
Structured cabling scenarios must assure that Tx and Rx of duplex transceivers on one end are connected to Tx and Rx on the other end.

Parallel to Duplex



	Side A	Side B	
		Transceiver	Tx/Rx
Lane 0	Tx 0	1	Rx
	Rx 0		Tx
Lane 1	Tx 1	2	Rx
	Rx 1		Tx
Lane 2	Tx 2	3	Rx
	Rx 2		Tx
Lane 3	Tx 3	4	Rx
	Rx 3		Tx

Parallel to Parallel



Side A	Side B
Tx 0	Rx 0
Tx 1	Rx 1
Tx 2	Rx 2
Tx 3	Rx 3
Rx 3	Tx 3
Rx 2	Tx 2
Rx 1	Tx 1
Rx 0	Tx 0

Lane 0, Lane 1, Lane 2, Lane 3

QSFP+ 40G SR4

QSFP28 100G SR4

Technical Data		
Data Rate	40G	100G
Form Factor	QSFP+	QSFP28
Distance	150m	
Wavelength	850nm	
Fibre Type	Multi Mode (OM4)	
Temperature Range	0...+70°C	
Parallel Mode	4x 10G SR	4x 25G SR
Power Budget	2dB	
Modulation and FEC	NRZ	
Physical Interface	MPO Flat Polished 8- or 12- Fibre Connector	
Order Information Cisco Coding	CQM-800A04DC-85	CQM-900A04DC-85
Order Information Juniper Coding	CQM-800A04DJ-85	CQM-900A04DJ-85

QSFP28 100G PSM4

QSFP-DD 400G DR4

Technical Data		
Data Rate	100G	400G
Form Factor	QSFP28	QSFP-DD
Distance	2km	500m
Wavelength	1310nm	
Fibre Type	Singlemode (OS2)	
Temperature Range	0...+70°C	
Parallel Mode	4x 25G LR	4x 100G DR
Power Budget	4dB	3dB
Modulation and FEC	PAM4	
Physical Interface	MPO 8° Angled Polished 8- or 12- Fibre Connector	
Order Information Cisco Coding	CQS-906A04DC-13	CQS-102A03DC-13
Order Information Juniper Coding	CQS-906A04DJ-13	CQS-102A03DJ-13

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