Timing solution

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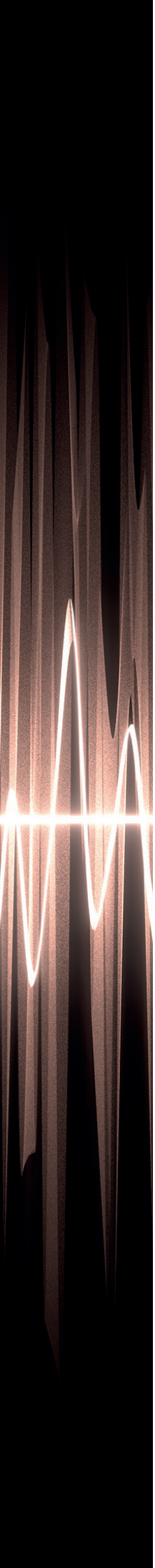
HUBER+SUHNER



Make timing expansion possible

As capacity increases, very low latency as well as precision timing and synchronization are needed to ensure closer coordination between cell sites. Limited power infrastructures, coupled with the complexity and time required to install multiple antennas on structural rooftops, are challenging the network expansion. Working with the leading telecommunications company in North America, HUBER+SUHNER developed a game-changing Direct GPS-over-Fiber solution for telecommunication and data center customers in search of scalable timing infrastructure solutions for outdoor remote antenna applications that provide efficient installation, flexible configurations and no need for power infrastructure at the remote end.

The Direct GPS-over-Fiber portfolio offers fast and easy-to-install solutions for timing infrastructure that are compact with integrated transmitters which reduce hardware costs by taking away the need for multiple GPS antennas, can reach longer distances over fiber optic cabling (GPS-over-Fiber) and eliminates the need for costly remote antenna power infrastructure with a copper-free GPS link that uses fiber optic cabling (Power-over-Fiber) to distribute both power and signal.

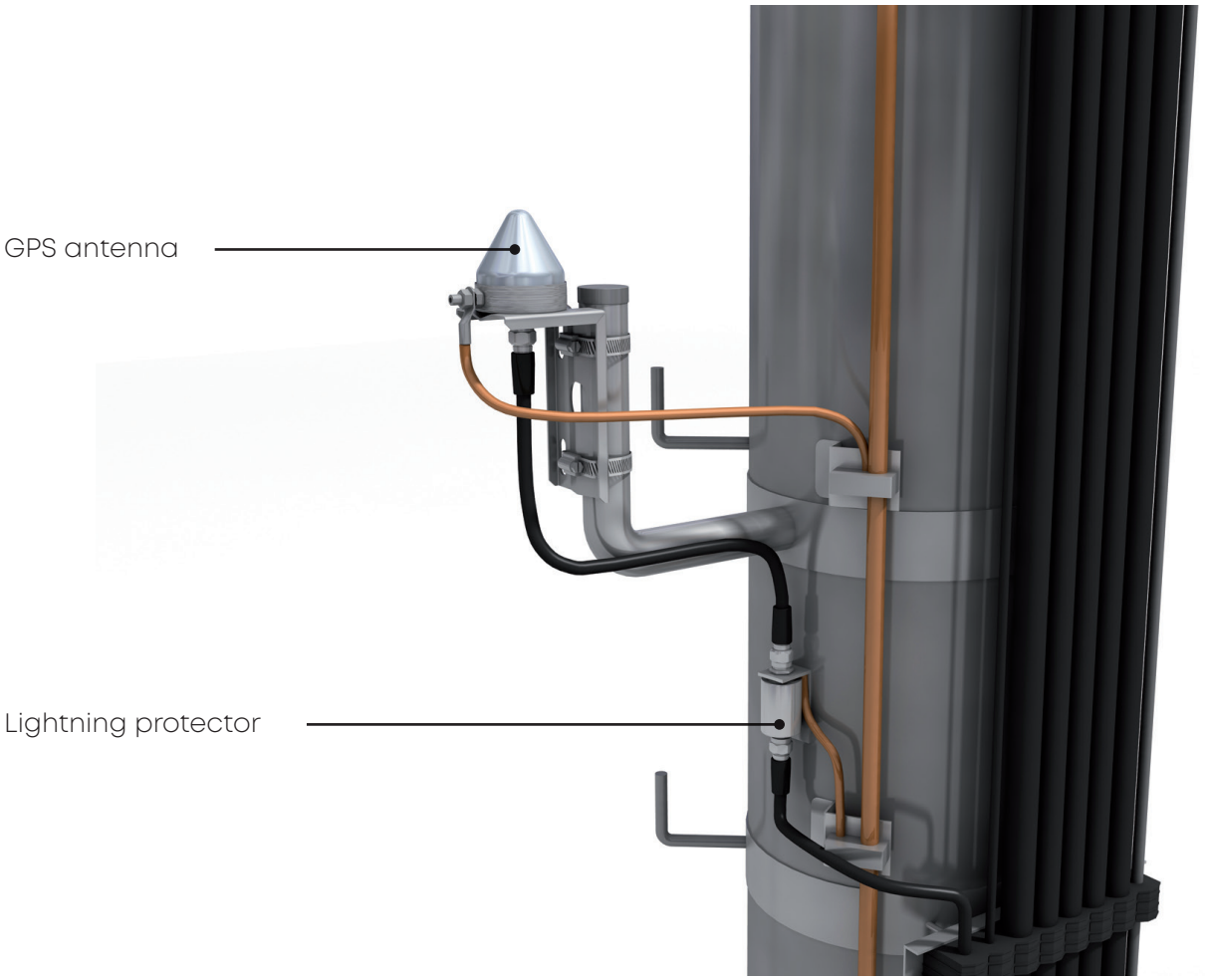
Structure
The compact space-saving design of Direct GPS-over-Fiber dramatically reduces the amount of hardware and equipment needed

Enhance
The ease-of-use benefits of Direct GPS-over-Fiber help free up time for resources to be spent elsewhere.

Drive
Direct GPS-over-Fiber optimizes ownership and lifecycle costs leaving more capital and

Timing challenges and limits

As capacity increases, ensuring tighter coordination between cell sites calls for very low latency and precision timing and synchronization. Unfortunately, limited power infrastructures, coupled with the complexity and time required to install multiple antennas on structural rooftops, make network expansion a difficult and expensive venture. Working with the leading telecommunications company in North America, HUBER+SUHNER developed a game-changing Direct GPS-over-Fiber solution that not only enables greater distances between the remote GNSS antenna and receiver, but also reduces the amount of hardware required, thus providing the lowest total cost of ownership.



Traditional GPS infrastructure challenges and limits

- Lack of scalability (max 8 BBUs per antenna)
- Short distance
- Power infrastructure
- Lightning protection

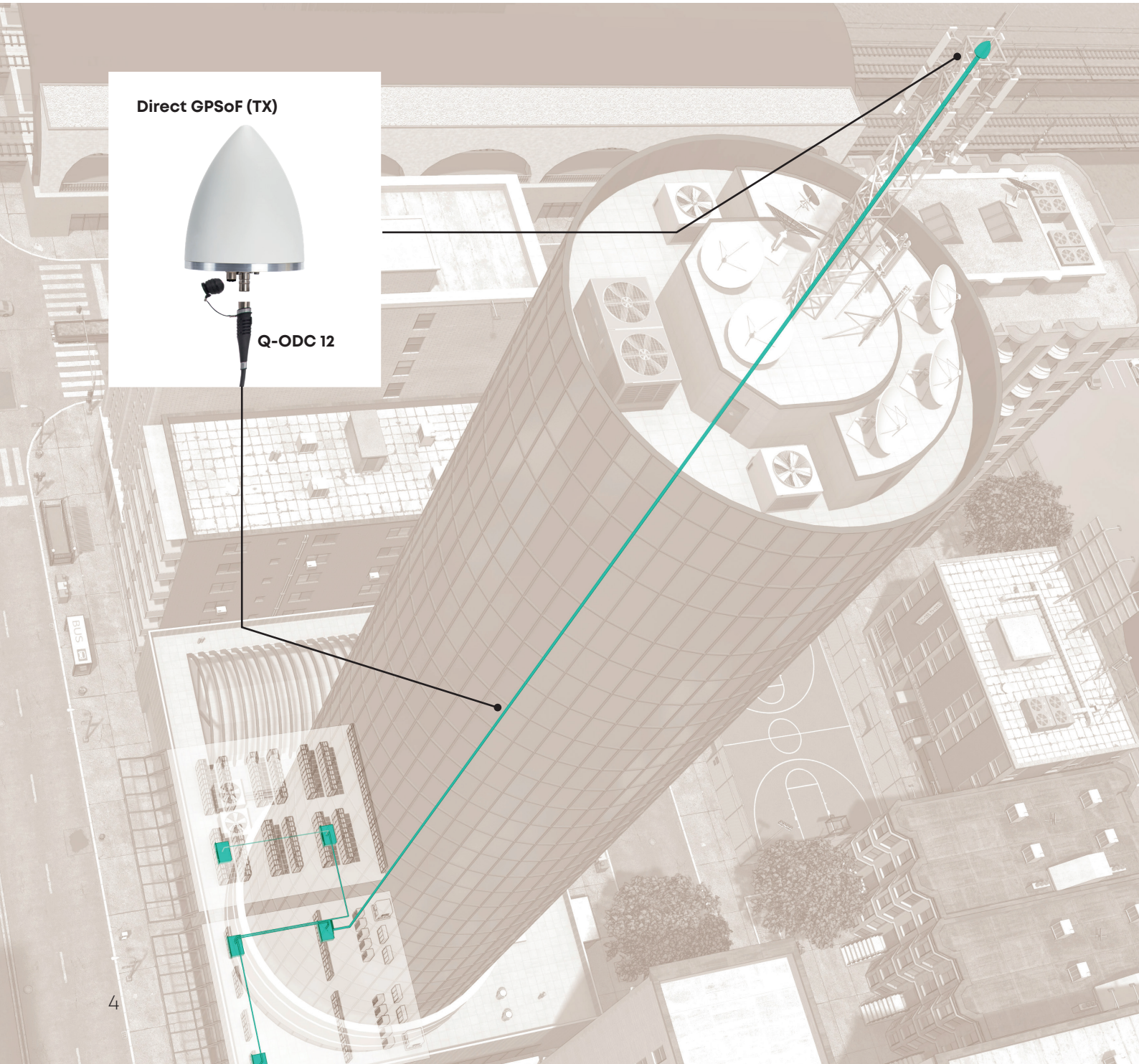
Common GPS infrastructure installed in the field today consists of an active GPS antenna connected by coaxial cable to the receiver system.

Use case

Central office and data center

The Direct GPS-over-Fiber portfolio from HUBER+SUHNER is for telecommunication and data center customers in search of scalable timing infrastructure solutions for outdoor remote antenna applications that provide efficient installation, flexible, scalable configurations and no need for power infrastructure at the remote end of the antenna.

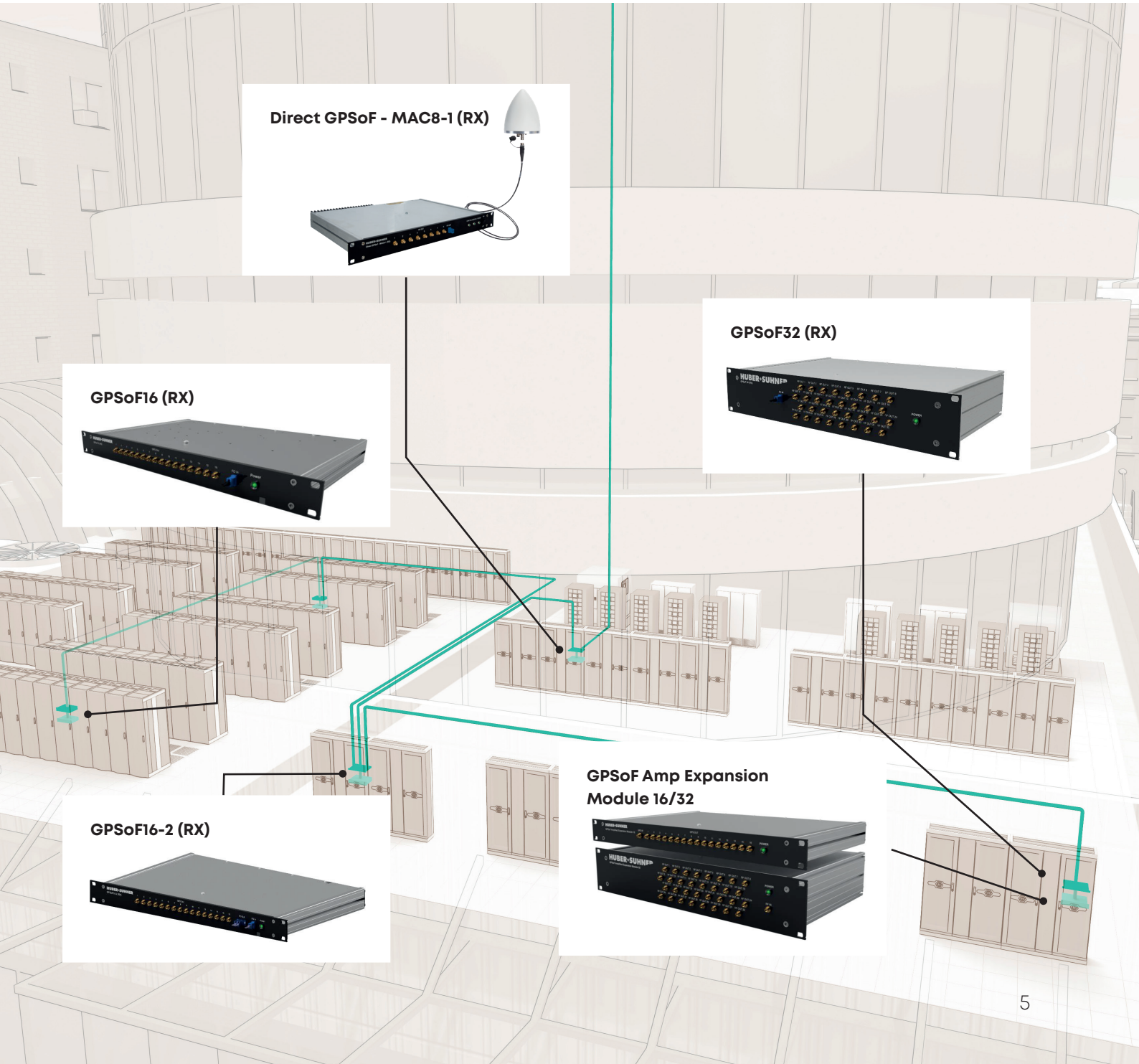
The Direct GPS-over-Fiber portfolio offers fast and easy-to-install solutions for timing infrastructure that are compact with antenna integrated transmitters which reduce hardware costs by taking away the need for multiple GPS antennas, can reach longer distances over fiber optic cabling (GPS-over-Fiber) and eliminates the need for costly remote antenna power infrastructure with a copper-free GPS link that uses fiber optic cabling (Power-over-Fiber) to distribute both power and signal.



Provide unique remote power
The unique 100 % copper-free GPS link utilises Power-over-Fiber technology to distribute both power and signal.

Improve efficiency
The all-in-one solution removes the need for multiple GPS antennas, has automatic reboot functionality and is easy to install with plug-and-play components saving valuable time and resources.

Reduce costs
The combination of reducing the amount of GPS antennas required and the elimination of costly remote antenna power infrastructure ensures low total cost of ownership.



Use case

Enterprise applications

The GPS-over-Fiber portfolio provides efficient and reliable RF to optical signal conversion for enterprise timing applications. Combinable with common GNSS antennas GPSoF enables longer link distances between remote antenna and the reference signal users. This approach ensures that signal data, such as time synchronization into separate, yet connected, systems is always the same. Standard GPSoF systems include both single and multiport solutions; and accommodate both L1 and L2 bands products.

Expand reach
Utilising GPS-over-Fiber technology provides unlimited distribution flexibility and further extends the signal between antenna and receiver over longer distances up to 20 km.

Future ready
Leveraging a portfolio of comprehensive expansion and receiver modules provides scalability over diverse topologies to address future needs.

Maximise space
The compact transmitter and receiver designs enable efficient installations where space is limited.

GPSoF1 (TX) LC/PC] IP66 AC

GPSoF1 (RX) [LC/PC] L1+L21 SMA 1 LC/UPC

Portfolio overview

GPS-over-Fiber portfolio

GPS-over-Fiber Transmitter (TX) Modules (E/O Conversion)

Item-No	Product Description	# of RF Inputs	# FO outputs	Form factor
85065409	GPSoF1 - 1.5GHz (TX)	1 SMA	1 FC/APC	Din Rail mount
85072905	GPSoF1 - 1.5GHz (TX) L1+L2	1 SMA	1 FC/APC	Din Rail mount
85135572	GPSoF1 (TX) [LC/PC]	1 SMA	1 LC/UPC	Din Rail mount
85145805	GPSoF1 (TX) [LC/PC] IP66 AC	1 SMA	1 LC/UPC	Outdoor enclosure
85145804	GPSoF1 (TX) [LC/PC] IP66 DC	1 SMA	1 LC/UPC	Outdoor enclosure
85139263	GPSoF4 (TX) L1+L2	1 SMA	4 LC/UPC	DIN Rail mount
85154592	GPSoF IP66 Mastmount Kit			Mast mount adapter

GPS-over-Fiber Receiver (RX) Modules (O/E Conversion)

Item-No	Product Description	# of RF Outputs	# FO Inputs	# FO outputs	Form factor
85065397	GPSoF1 - 1.5GHz (RX)	1 SMA	1 FC/APC	-	Din Rail mount
85072906	GPSoF1 - 1.5GHz (RX) L1+L2	1 SMA	1 FC/APC	-	Din Rail mount
85135573	GPSoF1 (RX) [LC/PC] L1+L2	1 SMA	1 LC/UPC	-	Din Rail mount
85065809	GPSoF4 - 1.5GHz (RX)	4 SMA	1 LC/UPC	-	Din Rail mount
85072907	GPSoF4 - 1.5GHz (RX) L1+L2	4 SMA	1 LC/UPC	-	Din Rail mount
85140587	GPSoF4 - 1.5GHz (RX) [LC/PC]	4 SMA	1 LC/UPC	-	Din Rail mount
85134405	GPSoF8 (RX)	8 SMA	1 LC/UPC	-	19" 1 RU
85127335	GPSoF8 - 1.5GHz (RX) L1+L2	8 SMA	1 FC/APC	-	Din Rail mount
85134363	GPSoF16 (RX)	16 SMA	1 LC/UPC	-	19" 1 RU
85145447	GPSoF16-2 (RX)	16 SMA	1 LC/UPC	2 LC/UPC	19" 1 RU
85140926	GPSoF32 (RX)	32 SMA	1 LC/UPC	-	19" 2 RU

Direct GPS-over-Fiber portfolio

Direct GPS-over-Fiber Transmitter (TX) Module (Optical GNSS Antenna)

Item-No	Product Description	FO Interface	Form factor
85077810	Direct GPSoF (TX)	QODC12	Antenna

Direct GPS-over-Fiber Receiver (RX) Modules (O/E Conversion)

Item-No	Product Description	# of RF Inputs	# FO Inputs	# FO outputs	Form factor
85128283	Direct GPSoF - MAC8-1 (RX)	QODC12	8 SMA	1 LC/UPC	19" 1 RU

Direct GPS-over-Fiber KITS

Item-No	Product Description (SAP View)	Kit Includes
85134673	Direct GPSoF - MAC8-1 Link	85128283 + 85077810

Additional modules

Direct GPS-over-Fiber RF Expansion Modules (RF GNSS Splitters)

Item-No	Product Description	# RF Inputs	# RF Outputs	Form Factor
85128403	GPSoF Amp Expansion Module 16	1 SMA	16 SMA	19" 1RU
85128404	GPSoF Amp Expansion Module 32	1 SMA	16 SMA	19" 2RU

GPS-over-Fiber Power Unit

Item-No	Product Description	Power Input	Power Output	Form Factor
85152769	Direct GPSoF DC/DC Converter	2× -48VDC	2x 12VDC	19" 1RU

Cables overview

Fiber optic cables Q-ODC-12 Riser rated

Item-No	Product Description	Length (ft)	length (m)
85115099	MA12_QOP3_QOP3_A270R_15.2_BB	50	15.25
85115100	MA12_QOP3_QOP3_A270R_30.5_BB	100	30.5
85115101	MA12_QOP3_QOP3_A270R_45.7_BB	150	45.75
85115102	MA12_QOP3_QOP3_A270R_61.0_BB	200	61
85115103	MA12_QOP3_QOP3_A270R_76.2_BB	250	76.25
85115104	MA12_QOP3_QOP3_A270R_91.4_BB	300	91.5
85115105	MA12_QOP3_QOP3_A270R_107_BB	350	106.75
85115106	MA12_QOP3_QOP3_A270R_122_BB	400	122
85115107	MA12_QOP3_QOP3_A270R_137.2_BB	450	137.25
85142046	MA12_QOP3_QOP3_A270R_152.4_BB	500	152.5
85142047	MA12_QOP3_QOP3_A270R_183_BB	600	183
85142048	MA12_QOP3_QOP3_A270R_213.4_BB	700	213.5
85142049	MA12_QOP3_QOP3_A270R_244_BB	800	244
85159918	MA12_QOP3_QOP3_A270R_274.3_BB	900	274.5
85159919	MA12_QOP3_QOP3_A270R_305_BB	1000	305

RF cable assemblies

Item-No	Product Description	Interface	Length (ft)	Length (m)
85134446	LIS-C5-11SMA-11SMA-00305-55	SMA (m)	1	0.3
85134447	LIS-C5-11SMA-11SMA-00610-55	SMA (m)	2	0.6
85134454	LIS-C5-11SMA-11SMA-00914-55	SMA (m)	3	0.9
85134452	LIS-C5-11SMA-11SMA-01829-55	SMA (m)	6	1.8
85134450	LIS-C5-11SMA-11SMA-03658-55	SMA (m)	12	3.7
85134449	LIS-C5-11SMA-11SMA-04572-55	SMA (m)	18	5.5

Direct GPS-over-Fiber – MAC 8-1 Link G3

Features

- Uses fiber optic cable to distribute both power and signal.
- Allows for greater distance of up to 7 km between antenna and receiver system.
- Less hardware due to the antenna integrated GPS-over-Fiber transmitter in addition to a portfolio of various expansion and receiver modules allows futureproof scalability of timing infrastructure and eliminates the need for multiple GPS antennas on the roof.
- NEBS Level 3 carrier grade

External document

Electrical Data

Parameters			Value			Remarks
			min.	typ.	max.	
GNSS band				L1		
Equivalent active antenna preamplifier gain		dB		25		optical path loss not included
Gain flatness		dB		< 2		
Noise figure		dB		6.5		
VSWR (RF output)				< 1.8		
Time delay[1]		ns		45		optical path delay not included
Supply voltage	receiver	VDC	+8	+12	+48	1.2 A typ. at 12V
Temperature range	operating	°C	-5	+55		antenna: - 20 .. +70 °C
	storage	°C	-40	+75		
Module weight		kg	2.5			receiver (indoor unit)
Module dimensions – transmitter		mm	160 height, 120 diameter			
Module dimensions – receiver		mm	482.6 × 286 × 43.65			19" 1RU
RF connector (output)			8x SMA female			

1 Total link time delay calculation Total delay [ns] = time delay TX [ns]+ time delay RX [ns]+ Time delay single mode fiber 1310nm [ns/m] * link length [m]. Example 100m link delay = 45ns + 100m * 4.9 ns/m = 535 ns

Optical Data

Parameters		Value			Remarks
All specifications at 25 °C case temperature unless otherwise specified		min.	typ.	max.	
Laser class		4			
Fiber optic connector (input)		Q-ODC-12			
Fiber optic connector (output)		LC/UPC			
Fiber		standard single mode 9/125 um			
Optical power in fiber – signal	mW	2			
Optical power in fiber – power	mW	500			
Side mode suppression ratio	dB	30	40		

Order Information

Item Description	Item Number
Direct GPSoF - MAC8-1 KIT (RX+TX)	85134673
Direct GPSoF (TX)	85077810
Direct GPSoF - MAC8-1 (RX)	85128283

GPSoF32 (RX)

Features

- Optical to RF signal conversion with 32 RF outputs
- For GPS, Galileo, Glonass, BeiDou, IRNSS, QZSS and other GNSS systems
- Efficient low loss reference signal distribution (time and location)
- NEBS Level 3 carrier grade

External document

Electrical Data

Parameters			Value			Remarks
			min.	typ.	max.	
GNSS band			L1+L2			
Gain (link with TX)		dB		25		optical path loss not included
Gain flatness		dB		< 2		
Noise figure (link with TX)		dB		6		optical path loss not included
VSWR (RF output)			< 1.5			
Time Delay (link with TX)[1]		ns		55		optical path delay not included
Supply voltage	VDC	+ 10	+ 12	+ 12.5	<0.3 A	1.2 A typ. at 12V
Temperature range	operating	°C	-5		+ 55	
	storage	°C	-40		+ 85	
RF output impedance		ohm	50			
Module weight		kg / lbs	3 / 6.6			
Dimensions		mm / inches	285 × 430 × 88 / 11.2 × 19 × 3.5			19" 2RU
RF connector (output)			8x SMA female			

1 Total link time delay calculation Total delay [ns] = time delay TX [ns]+ time delay RX [ns]+ Time delay single mode fiber 1310nm [ns/m] * link length [m]. Example 100m link delay = 45ns + 100m * 4.9 ns/m = 535 ns

Optical Data

Parameters		Value			Remarks
All specifications at 25 °C case temperature unless otherwise specified		min.	typ.	max.	
Fiber optic connectors		LC/UPC			
Fiber		standard single mode 9/125 um			
Input optical power	mW			5	
Side mode suppression ratio	dB	30	40		

Order Information

Item Description	Item Number
GPSoF32 (RX)	85140926

GPSoF16-2 (RX)

Features

- For GPS, Galileo, Glonass, BeiDou, IRNSS, QZSS and other GNSS systems
- No external control circuits required
- Analog signal to optical convert and back
- NEBS Level 3 carrier grade

External document

Electrical Data

Parameters			Value			Remarks
			min.	typ.	max.	
GNSS band		L1+L2				
Gain (link with TX)		dB		11		optical path loss not included
Gain flatness		dB		< 2		
Noise figure (link with TX)		dB		8		optical path loss not included
VSWR (RF output)			< 2			
Time delay (link with TX) [1]		ns		80		optical path delay not included
Supply voltage		VDC	+ 10	+ 12	+ 35	<0.2 A
Temperature range	operating	°C	-5		+ 55	
	storage	°C	-40		+ 85	
RF output impedance		Ohm	50			
Module weight		kg / lbs	2.2 / 4.85			
Dimensions		mm / inches	285 × 430 × 44 / 11.2 × 19 × 1.75			19" 1RU

1 Total link time delay calculation Total delay [ns] = time delay TX [ns]+ time delay RX [ns]+ Time delay single mode fiber 1310nm [ns/m] * link length [m]. Example 100m link delay = 45ns + 100m * 4.9 ns/m = 535 ns

Optical Data

Parameters		Value			Remarks
All specifications at 25 °C case temperature unless otherwise specified		min.	typ.	max.	
Fiber optic connectors		LC/UPC			other connectors possible
Fiber		standard single mode 9/125 um			
Optical input power	mW			5	
Side mode suppression ratio	dB	30	40		

Order Information

Item Description	Item Number
GPSoF16-2 (RX)	85145447

GPSoF16 (RX)

Features

- Optical to RF signal conversion with 16 RF outputs
- For GPS, Galileo, Glonass, BeiDou, IRNSS, QZSS and other GNSS systems
- Efficient low loss reference signal distribution (time and location)
- NEBS Level 3 carrier grade

External document

Electrical Data

Parameters			Value			Remarks
			min.	typ.	max.	
GNSS band				L1+L2		
Gain (link with TX)		dB		18		optical path loss not included
Gain flatness		dB		< 2		
Noise figure (link with TX)		dB		6.5		optical path loss not included
VSWR (RF output)			< 2			
Time delay (link with TX)		ns		55		optical path delay not included
Supply voltage		VDC	+ 10	+ 12	+ 35	<0.2 A
Temperature range operating	°C	-5		+ 55		
storage	°C	-40		+ 85		
RF output impedance		ohm	50			
Module weight		kg / lbs	2.2 / 4.85			
Dimensions		mm / inches	285 × 430 × 44 / 11.2 x 19 × 1.75			19" 1 RU
RF connectors			16 (SMA female)			

1 Total link time delay calculation Total delay [ns] = time delay TX [ns]+ time delay RX [ns]+ Time delay single mode fiber 1310nm [ns/m] * link length [m]. Example 100m link delay = 45ns + 100m * 4.9 ns/m = 535 ns

Optical Data

Parameters		Value			Remarks
All specifications at 25 °C case temperature unless otherwise specified		min.	typ.	max.	
Fiber optic connectors		LC/UPC			other connectors available
Fiber		standard single mode 9/125 um			
Optical input power	mW			5	
Side mode suppression ratio	dB	30	40		

Order Information

Item Description	Item Number
GPSoF16 (RX)	85134363

GPSoF8 (RX)

Features

- Optical to RF signal conversion with 8 RF outputs
- For GPS, Galileo, Glonass, BeiDou, IRNSS, QZSS and other GNSS systems
- Efficient low loss reference signal distribution (time and location)
- NEBS Level 3 carrier grade

External document

Electrical Data

Parameters			Value			Remarks
			min.	typ.	max.	
GNSS band				L1+L2		
Gain (link with TX)		dB		25		optical path loss not included
Gain flatness		dB		< 2		
Noise figure (link with TX)				6		optical path loss not included
VSWR (RF output)				< 2		
Time delay (link with TX) [1]		ns		55		optical path delay not included
Supply voltage		VDC	+ 10	+ 12	+ 35	<0.1 A
Temperature range operating	°C		-5		+ 55	
	storage	°C	-40		+ 85	
RF output impedance		ohm				
Module weight		kg / lbs				
Dimensions		mm / inches	285 × 430 × 44 / 11.2 × 19 × 1.75			19" 1 RU
RF connectors			SMA female			

1 Total link time delay calculation Total delay [ns] = time delay TX [ns]+ time delay RX [ns]+ Time delay single mode fiber 1310nm [ns/m] * link length [m]. Example 100m link delay = 45ns + 100m * 4.9 ns/m = 535 ns

Optical Data

Parameters		Value			Remarks
All specifications at 25 °C case temperature unless otherwise specified		min.	typ.	max.	
Fiber optic connectors		LC/UPC			other connectors available
Fiber		standard single mode 9/125 um			
Optical input power	mW			5	
Side mode suppression ratio	dB	30	40		

Order Information

Item Description	Item Number
GPSoF8 (RX)	85134405

GPSoF Amp Expansion Module 16/32

Features

- 1 to 16 RF splitting for GNSS
- 1 to 32 RF splitting for GNSS
- Compatible with all HUBER+SUHNER GPSoF RX modules
- NEBS Level 3 carrier grade

External document

Electrical Data

Parameters			Value			Remarks
			min.	typ.	max.	
Frequency range				L1+L2		
Loss GPSoF Expansion Module 16		dB		0		
Loss GPSoF Expansion Module 32		dB		0		
Noise figure		dB		10		
Max. input at 1 dB compression		dBm		+3		
Max. input power for no damage		dBm		+13		
VSWR (input and output)				< 1.4		
Time Delay [1]		ns		55		
Power Supply		VDC		+12		(2W)
Temperature range	Operating	°C	- 5		+ 55	
	Storage	°C	- 40		+ 85	
RF input impedance		ohm	50			
Module weight – Indoor		kg / lbs	3.0 / 6.6			
Module dimensions – Indoor		mm / inches	306 × 481 × 88 / 12 × 19 × 3.5			
RF Inputs (connector)			1 (SMA female)			Alternative connectors available
RF Outputs (connector)			16 (SMA female)			Alternative connectors available
RF Inputs (connector)			2 (SMA female)			Alternative connectors available
RF Outputs (connector)			32 (SMA female)			Alternative connectors available

1 Total link time delay calculation Total delay [ns] = time delay TX [ns]+ time delay RX [ns]+ Time delay single mode fiber 1310nm [ns/m] * link length [m]. Example 100m link delay = 45ns + 100m * 4.9 ns/m = 535 ns

Order Information

Item Description	Item Number
GPSoF Expansion Module 16	85128403
GPSoF Expansion Module 32	85128404

DC/DC Converter

Features

- 18-75VDC to 12VDC converter designed to power HUBER+SUHNER GPS-over-Fiber and Direct GPS-over-Fiber.
- Allows for stable power infrastructure of up to two GPS-over-Fiber products.
- 2 input ports for redundancy support.
- NEBS Level 3 carrier grade

External document

Electrical Data

Parameters		Value			Remarks
		min.	typ.	max.	
Input					
Voltage	VDC	18	48	75	
DC Current	A			0.8	At nominal voltage
Inrush Current	A			20	At nominal voltage
Efficiency	%		90		
Number of inputs			2		
Output					
Voltage	VDC		12		
Current range	A	0		2.5	
Rated power	W		30		
Ripple & noise	mVp-p			60	
Voltage tolerance	%		±2		
Line regulation	%		±0.3		
Load regulation	%		±0.3		
Setup rise time	ms			120	85ms at full load
Number of outputs			2		
General Specifications					
Working humidity	%	5		95	RH (non condensing)
Operating temperature	°C	-40		+55	No derating
Storage temperature	°C	-40		+85	
Temperature coefficient					±0.03%/°C (0-50°C)
Mechanical					
Housing material					Aluminium
Input interface					Screw terminal connector
Output interface					Cable 2m + 3 pole connector included)
Cable					2 pieces 2m (3× 0.75mm²)

DC/DC Converter

Compatible Modules:

Item-no	Description
85128283	Direct GPSoF - MAC8-1 (RX)
85134405	GPSoF8 (RX)
85134363	GPSoF16 (RX)
85145447	GPSoF16-2 (RX)
85140926	GPSoF32 (RX)
85128403	GPSoF Amp Expansion Module 16
85128404	GPSoF Amp Expansion Module 32

Order Information

Item Description	Item Number
Direct GPSoF DC/DC Converter	85152769

GPSoF1

Features

- For GPS, Galileo, Glonass, BeiDou, IRNSS, QZSS and other GNSS systems
- No external control circuits required
- Efficient analog signal to optical convert and back

External document

Electrical Data

Parameters		Value			Remarks
		min.	typ.	max.	
GNSS band			L1+L2		L1 only versions available see order information
Gain	dB	4	7	10	
Gain flatness	dB		< 2		
Noise figure	dB		14		
Max. input at 1 dB compression	dBm		-20		
Max. input power for no damage	dBm		+15		
VSWR (input and output)			< 1.8		
Time delay TX1	ns		5.4		
Time delay RX1	ns		5.4		
Time delay single mode fiber (1310nm)1	ns/m		4.9		
Supply voltage VS (Transmitter)	VDC	+ 12	+ 12	+ 15	Max. 170 mA
Supply voltage VS (Receiver)	VDC	+ 12	+ 12	+ 15	Max. 100 mA
Supply voltage VS (Transmitter 85145805)	VAC	100		240	5m cable, end open
Supply voltage VS (Transmitter 85145804)	VDC	18	48	75	5m cable, end open
Temperature range operating	°C	- 5		+ 55	
Temperature range storage	°C	- 40		+ 85	
RF input impedance	Ohm	50			
Module weight	kg / lbs	0.27 / 0.6			Transmitter and Receiver
Module dimensions	mm / inches	90 × 95 × 23 / 3.5 × 3.7 × 0.9			Transmitter and Receiver
RF connectors		SMA female			

1 Total link time delay calculation Total delay [ns] = time delay TX [ns]+ time delay RX [ns]+ Time delay single mode fiber 1310nm [ns/m] * link length [m]. Example 100m link delay = 45ns + 100m * 4.9 ns/m = 535 ns

Order Information

Item Description	Item Number
GPSoF1 (TX) [LC/PC L1+L2]	85135572
GPSoF1 (RX) [LC/PC L1+L2]	85135573
GPSoF1 - 1.5 GHz (TX) [FC/APC L1 only]	85065409
GPSoF1 - 1.5 GHz (RX) [FC/APC L1 only]	85065397
GPSoF1 - 1.5 GHz (TX) [FC/APC L1+L2]	85072905
GPSoF1 - 1.5 GHz (RX) [FC/APC L1+L2]	85072906
GPSoF1 (TX) [LC/PC] IP66 AC	85145805
GPSoF1 (TX) [LC/PC] IP66 DC	85145804
GPSoF IP66 Mastmount Kit	85154592

GPSoF4 (RX)

Features

- Optical to RF signal conversion with 4 RF outputs
- For GPS, Galileo, Glonass, BeiDou, IRNSS, QZSS
- and other GNSS systems
- Efficient low loss reference signal distribution (time and location)

External document

Electrical Data

Parameters		Value			Remarks
		min.	typ.	max.	
GNSS band			L1+L2		
Gain	dB	4	7	10	
Gain flatness	dB		3		
Noise figure	dB		15		
Spurious-free dynamic range	dB $Hz^{2/3}$		80		
Max. input at 1 dB compression	dBm		-15		
Max. input power for no damage	dBm		+15		
VSWR (input and output)	dB		< 1.8		
OIP3	dBm		+ 7		
Time Delay1	ns		55		
Supply voltage VS (Transmitter)	VDC	+ 12	+ 12	+ 15	<150 mA
Supply voltage VS (Receiver)	VDC	+ 12	+ 12	+ 15	<100 mA
Temperature range (OTR) Operating	°C	- 5		+ 55	
Temperature range (OTR) Storage	°C	- 40		+ 85	
RF input impedance	ohm	50			
Mass receiver	Kg / lbs	0.48 / 1.1			
Dimensions receiver	mm / inches	109 × 88 × 27 / 4.3 × 3.5 × 1.1			
RF connectors		SMA female			

1 Total link time delay calculation Total delay [ns] = time delay TX [ns]+ time delay RX [ns]+ Time delay single mode fiber 1310nm [ns/m] * link length [m]. Example 100m link delay = 45ns + 100m * 4.9 ns/m = 535 ns

Optical Data

Parameters		Value			Remarks
All specifications at 25 °C case temperature unless otherwise specified		min.	typ.	max.	
Fiber optic connectors		LC/PC			
Fiber		Single mode fiber 9/125 um			
Optical power in fiber	mW	6	8	10	
Side mode suppression ratio	dB	30	40		

Order Information

Item Description	Item Number
GPSoF4 - 1.5GHz (RX) [LC/PC]	85140587

GPSoF8 (RX)

Features

- Optical to RF signal conversion with 8 RF outputs
- For GPS, Galileo, Glonass, BeiDou, IRNSS, QZSS and other GNSS systems
- Efficient low loss reference signal distribution (time and location)

External document

Electrical Data

Parameters		Value			Remarks
		min.	typ.	max.	
GNSS Band			L1+L2		
Gain (link with TX)	dB		25		optical path loss not included
Gain flatness	dB		< 2		
Noise figure (link with TX)	dB		6		optical path loss not included
VSWR (RF output)			< 2		
Time delay (link with TX) 1	ns		45		optical path delay not included
Supply voltage	VDC	+ 10	+ 12	+ 35	<0.1 A
Temperature range operating	°C	-5		+ 55	
storage	°C	-40		+ 85	
RF output impedance	ohm	50			
Module weight	kg / lbs	1.8 / 4.0			
Dimensions	mm / inches	109 × 88 × 27 / 4.3 × 3.5 × 1.1			
RF connectors		SMA female			

1 Total link time delay calculation Total delay [ns] = time delay TX [ns]+ time delay RX [ns]+ Time delay single mode fiber 1310nm [ns/m] * link length [m]. Example 100m link delay = 45ns + 100m * 4.9 ns/m = 535 ns

Optical Data

Parameters		Value			Remarks
All specifications at 25 °C case temperature unless otherwise specified		min.	typ.	max.	
Fiber optic connectors		FC/APC			
Fiber		standard single mode 9/125 um			
Optical input power	mW			5	
Side mode suppression ratio	dB	30	40		

Order Information

Item Description	Item Number
GPSoF8 - 1.5GHz (RX) L1+L2	85127335

GPSoF4 (TX) L1+L2

Features

- RF to optical signal conversion with 4 FO outputs
- For GPS, Galileo, Glonass, BeiDou, IRNSS, QZSS and other GNSS systems
- Efficient low loss reference signal distribution (time and location)

External document

Electrical Data

Parameters		Value			Remarks
		min.	typ.	max.	
GNSS band	MHz		L1+L2		
Gain	dB	4	7	10	
Gain flatness	dB		< 2		
Noise figure	dB		14		
Spurious-free dynamic range	dB Hz [2'3]		100		
Max. input at 1 dB compression	dBm		-20		
Max. input power for no damage	dBm		+15		
VSWR (input and output)	dB		< 2		
OIP3	dBm		+ 7		
Time Delay [1]	ns		55		
Supply voltage VS (Transmitter)	VDC	+ 12	+ 12	+ 15	
Temperature range (OTR) Operating	°C	-5		+ 55	
Temperature range (OTR) Storage	°C	-40		+ 85	
RF input impedance	ohm	50			
Module weight	kg / lbs	1.7 / 3.7			
Dimensions	mm / inches	285 × 430 × 44 / 11.2 × 19 × 1.75			
RF connectors		SMA female			

1 Total link time delay calculation Total delay [ns] = time delay TX [ns]+ time delay RX [ns]+ Time delay single mode fiber 1310nm [ns/m] * link length [m]. Example 100m link delay = 45ns + 100m * 4.9 ns/m = 535 ns

Optical Data

Parameters		Value			Remarks
All specifications at 25 °C case temperature unless otherwise specified		min.	typ.	max.	
Fiber optic connectors		FC/APC			other connectors on request
Fiber		Single mode fiber 9/125 um			
Optical power in fiber	mW	6	8	10	
Side mode suppression ratio	dB	30	40		

Order Information

Item Description	Item Number
GPSoF4 (TX) L1+L2	85139263

Connecting – today and beyond

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