

Advancing “Ethernet Everywhere” in Next-Generation Networks



Ethernet Switches

Ethernet PHYs

Ethernet Software

Ethernet IP Cores

Power over Ethernet

Timing ICs

Signal Conditioners & Crosspoint Switches

Ethernet & Power over Ethernet (PoE) Solutions

Ethernet is the dominant networking technology for IP traffic in carrier and enterprise networks, and the common denominator in diverse applications such as industrial process control, smart grid energy distribution, intelligent transportation, automotive, and storage.

Microsemi is an innovator in Ethernet technologies with a broad portfolio of Ethernet ICs, systems, software, IP, and ecosystem solutions for carrier, enterprise, and industrial IoT (IIoT) applications.

ICs and Systems: Microsemi's Ethernet solutions portfolio—which includes switches, PHYs, PoE, signal integrity, and timing and synchronization solutions—provides optimized, high-feature architectures for low-power, reliability, and scalability. Microsemi also offers indoor and outdoor PoE midspans/injectors, grandmasters, and network time servers.

Software: Microsemi's comprehensive software choices include IEEE 1588 timing, as well as mature, flexible, and fully supported Ethernet software stacks that reduce development costs and time-to-market.

IP: Microsemi offers a variety of IP technology cores for licensing and design services in process technologies, providing critical building blocks for ASIC or ASSP designs.

Ecosystem: Microsemi's ecosystem offers MEF CE 2.0-certifiable ODM turnkey solutions.

Microsemi Advantages

- Differentiated Ethernet switch silicon and software
- Secure Ethernet PHYs with end-to-end security over any network while preserving network timing
- Industry leader in IEEE 1588 with the most widely deployed PLLs and leading implementation of highest accuracy IEEE 1588v2 timing on Ethernet PHYs and switches
- Leading provider of end-to-end PoE ICs and midspans/injectors since 1999, with the broadest PoE product portfolio for indoor and outdoor deployments, including PoE ICs delivering power (PSE), receiving power (PD), and a wide range of PoE injectors (up to 95 W over a single Category 5/5E/6/6A/7 cable)

- Flexible signal conditioner and crosspoint switch solutions with outstanding channel equalization performance
- Industry's most comprehensive portfolio of SyncE timing devices, providing G.8262 compliance and ultra-low jitter for PHYs up to 100G

Carrier Networking

Microsemi's Ethernet networking portfolio addresses the technical and operational challenges of video bandwidth requirements in carrier networks. It is widely used in mobile access equipment (including base stations, small cells, fiber, and microwave wireless backhaul) and cloud access equipment such as network interface devices (NIDs) and Ethernet access devices (EADs).

Microsemi offers the industry's only service-aware switch architecture and turnkey solution for MEF CE 2.0 Carrier Ethernet equipment and appliances.

Enterprise Networking

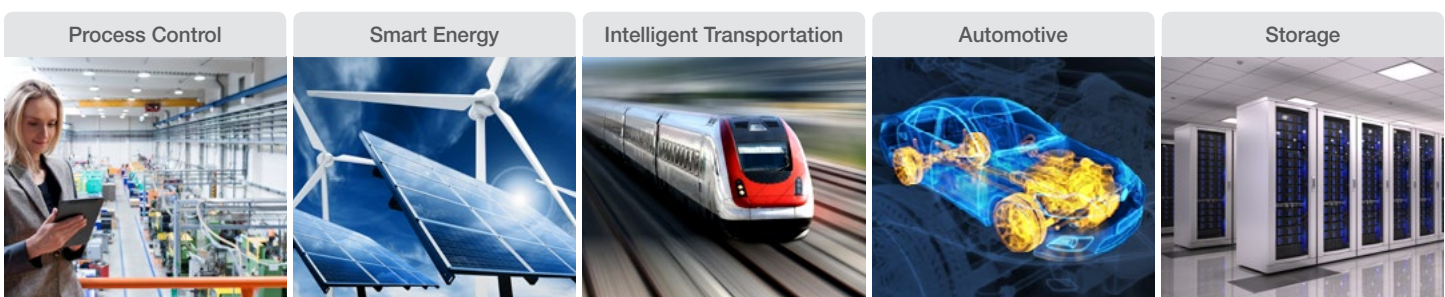
Today's enterprise networks include broadband connections for the communication of voice and data outside the enterprise, and for access to cloud-based services. Microsemi's Ethernet networking portfolio supports enterprise network equipment such as blade server and data center switches and routers, cloud-managed switches, Layer 2 and Layer 3 managed Ethernet switches, high-density routers, HDTV video, storage, WLAN access points, and IP phones.

Microsemi also offers indoor and outdoor PoE midspans and PoE switches for multiple industries, including financial services, education, retail, healthcare, transportation, and government.

Industrial IoT Networking

The vastly higher networking and bandwidth requirements of IIoT networks have made Ethernet the upgrade path for modernizing heterogeneous network architectures.

Microsemi is the only IC, systems, and software provider with a power-optimized, flexible, and reliable industrial Ethernet networking portfolio that supports Ethernet interfaces and fieldbus protocols, and enables reliable and secure IIoT networks with a broad range of industrial Ethernet applications such as industrial process control, smart grid energy distribution, transportation, and automotive.



Ethernet Solutions

Ethernet Switches, PHYs, Software & PoE

With over 300 million Gigabit Ethernet ports shipped, Microsemi is a global leader in Ethernet switch and physical layer IC technology and IP. As networks of all kinds have transitioned to Ethernet, Microsemi has been at the forefront of this transition with a growing portfolio of products with advanced features and efficient architectures that result in low-power, highly reliable performance, and scalability in voice, video, and data transmission.

Key Features

- Faster time-to-production with complete hardware and software solutions
- Ethernet switch solutions with up to 100 Gbps of bandwidth
- Small package footprint designs
- Industrial temperature range operation
- Complete IEEE 1588PTPv2-compliant 1GE and 10GE PHYs with nanosecond time stamping accuracy while performing IEEE 802.1AE 128-/256-bit strong MACsec packet encryption
- Solutions with low-alpha mold compound, improving overall SEU immunity
- PoE PSE and PD ICs for powering indoor and outdoor deployment scenarios

Ethernet Switches

Product	Ports*			PHYs		Interfaces						Ext Temp	SyncE/1588	DPLL	Use Case
	1G	2.5G	10G	10G	1G	SGMII	RGMII	QSGMII	XAUI	SFI/XFI	PCIe				
VSC7511 Ocelot-4um	4				4	•					•	•			Lightly Managed
VSC7512 Ocelot-10um	10	2			4	•		•			•	•			Lightly Managed
VSC7420 SparX-III-10um	10	2			8	•						•			Lightly Managed
VSC7421 SparX-III-17um	17	2			12	•						•			Lightly Managed
VSC7422 SparX-III-25um	25	1			12	•		•				•			Lightly Managed
VSC7424 SparX-III-10	10				8	•									Managed
VSC7414 SparX-III-11	11	2				•					•	•	•		Managed
VSC7425 SparX-III-18	18				12	•		•							Managed
VSC7426 SparX-III-24	24				12			•							Managed
VSC7444 SparX-IV-44	26	16	2	2		•		•	R	•	•	•	•		Managed
VSC7427 SparX-III-26	26				12	•		•							Managed
VSC7442 SparX-IV-52	52					•		•			•	•	•		Managed
VSC7448 SparX-IV-80	52	24	4	4		•		•	R	•	•	•	•		Managed
VSC7449 SparX-IV-90	52	24	4	4		•		•	R	•	•	•	•		Managed
VSC7440 SparX-IV-34	10	6	2	2	2	•				•	•	•	•		Managed
VSC7513 Ocelot-8	8				4	•		•			•	•	•		Managed
VSC7514 Ocelot-10	10	2			4	•		•			•	•	•		Managed
VSC7410 Serval-T	6	2			2	•					•	•	•		Managed
VSC7415 Serval-T	6	2			2	•					•	•	•	•	Managed
VSC7431 E-StaX-III-28	28					•									Stacking
VSC7432 E-StaX-III-48	27	2	2			•			•						Stacking
VSC7434 E-StaX-III-68	29	4	4			•			•						Stacking
VSC7416 Serval Lite	6	2				•					•	•	•		Carrier Ethernet
VSC7430 Serval-TE	6	2			2	•					•	•	•		Carrier Ethernet
VSC7435 Serval-TE	6	2			2	•					•	•	•	•	Carrier Ethernet
VSC7437 Serval-TE10	8	4	2	2	2	•				•	•	•	•	•	Carrier Ethernet
VSC7423 Caracal Lite	7	2			5	•						•	•		Carrier Ethernet
VSC7436 Serval-2 Lite	10	6	2	2	2	•				•	•	•	•		Carrier Ethernet
VSC7428 Caracal-1	11	2			8	•						•	•		Carrier Ethernet
VSC7418 Serval-1	11	2				•					•	•	•		Carrier Ethernet
VSC7438 Serval-2	14	12	2	2		•		•	•	•	•	•	•		Carrier Ethernet
VSC7462 LynX-1	20	10	4			•			•			•	•		Carrier Ethernet
VSC7464 LynX-2	26	16	4	4		•		•	•	•	•	•	•		Carrier Ethernet
VSC7429 Caracal-2	26	2			12	•		•				•	•		Carrier Ethernet
VSC7460 Jaguar-1	31	10	4			•			•			•	•		Carrier Ethernet
VSC7468 Jaguar-2	52	24	4	4		•		•	•	•	•	•	•		Carrier Ethernet
WP3-SPO WP3 SuperLite	6	3				•	•				•	•	•		Carrier Ethernet
WP3SL WP3 SuperLite	6	3				•	•				•	•	•		Carrier Ethernet
WP3 WinPath3	16	6	2			•	•		•		•	•	•		Carrier Ethernet
WP4 WinPath4	24	12	4			•	•	•	•		•	•	•		Carrier Ethernet

Notes: *Denotes maximum ports excluding the NPI port. Shall not surpass the device's max available I/O bandwidth. R denotes both RXAUI and XAUI support. 1G integrated ports support dual media copper or fiber applications. VSC products are Ethernet switches. WP products are network processors.

Ethernet Solutions

Fast Ethernet PHYs

Product	Cu/Fiber Ports	Temp. Min. °C (Ambient)	Temp. Max. °C (Junction)	GMII/MII	RGMII/RMII	SyncE
VSC8530	1/-	-40	125		RGMII/RMII	
VSC8540	1/-	-40	125	MII	RGMII/RMII	•

1G Ethernet PHYs

Product	Cu/Fiber Ports	Temp. Min. °C (Ambient)	Temp. Max. °C (Junction)	Q/SGMII	GMII/MII	RGMII/RMII	SyncE	IEEE 1588	MACsec
VSC8211	1/1	0	100	SGMII	GMII/MII	RGMII			
VSC8221	1/1	0	100	SGMII					
VSC8224	4/4	0	100			RGMII			
VSC8244	4/-	0	100			RGMII			
VSC8501	1/-	-40	125		GMII/MII	RGMII	•		
VSC8502	2/-	-40	125		GMII/MII	RGMII	•		
VSC8504	4/4	-40	125	QSGMII/SGMII			•		
VSC8512	12/4	-40	125	QSGMII/SGMII			•		
VSC8514	4/-	-40	125	QGMII			•		
VSC8522	12/-	-40	125	QGMII					
VSC8531	1/-	-40	125			RGMII/RMII			
VSC8541	1/-	-40	125		GMII/MII	RGMII/RMII	•		
VSC8552	2/2	-40	125	QSGMII/SGMII		RGMII	•		
VSC8562	2/2	-40	125	QSGMII/SGMII			•		•
VSC8564	4/4	-40	125	QSGMII/SGMII			•		•
VSC8572	2/2	-40	125	QSGMII/SGMII		RGMII	•	•	
VSC8574	4/4	-40	125	QSGMII/SGMII			•	•	
VSC8575	4/4	-40	125	QSGMII/SGMII			•	•	
VSC8582	2/2	-40	125	QSGMII/SGMII			•	•	•
VSC8584	4/4	-40	125	QSGMII/SGMII			•	•	•
VSC8658	8/8	0	90	SGMII					
VSC8662	2/2	-40	100	SGMII			•		
VSC8664	4/4	-40	100	SGMII			•		

10G Ethernet PHYs

Product	Ports	Temp. Min. °C (Ambient)	Temp. Max. °C (Junction)	XGMII	XAU1	RXAU1	XFI	SFI	SFI-4	PON Burst Mode	OTN	SyncE	IEEE 1588	MACsec
VSC8257	4	-40	110				•	•				•	•	
VSC8258	4	-40	110				•	•				•	•	•
VSC8479	1	-40	90	•			•		•	•				
VSC8484	4	-40	105		•		•	•				•		
VSC8486	1	-40	95	•	•		•	•				•		
VSC8489	1/2	-40	110		•	•	•	•				•	•	
VSC8490	2	-40	110		•	•	•	•				•	•	•
VSC8491	1	-40	110		•	•	•	•				•	•	•
VSC8492	2	-40	110		•	•	•	•			•	•	•	
VSC8494	4	-40	110		•	•	•	•			•	•	•	
VSC8496	4	-40	110				•	•			•	•	•	

Ethernet Solutions

Ethernet Software

Product		Description	Market	Application	Basic L2	Advanced L2	Protection	IEEE 1588	Carrier Ethernet	iCLI, JSON/RPC, SNMP
eCOS	LINUX									
VSC6810SDK	VSC6818SDK	CEServices	Service Provider	Turnkey	•	•	•	•	•	•
VSC6815SDK	VSC6817SDK	IStaX	Industrial IoT	Turnkey	•	•	•	•		•
VSC6813SDK	VSC6816SDK	SMBStaX	Enterprise	Turnkey	•	•				•
VSC6812SDK	VSC6819SDK	WebStaX	Enterprise	Turnkey	•					
VSC6802API		Unified API		Development						
VSC6803API		Open API		Development						
VSC6811SDK		WebConfig		Turnkey	•					
VSC6825SDK		Unmanaged		Turnkey	•					
VSC6830SDK		Linux BSP		Development						

Ethernet IP Cores

Gigabit Ethernet PHY Cores

Product	IP Type	Type	Process
VSC9901	Gigabit Ethernet PHY Core	Soft Macro	65 nm
VSC9902	Gigabit Ethernet PHY Core	Hard Macro	65 nm
VSC9903	Gigabit Ethernet PHY Core	Hard Macro	65 nm
VSC9906	Gigabit Ethernet PHY Core	Soft Macro	65 nm
VSC9907	Gigabit Ethernet PHY Core	Hard Macro	65 nm
VSC9908	Gigabit Ethernet PHY Core	Hard Macro	40 nm

Gigabit Ethernet Switch Cores

Product	IP Type	Type	Core Detail
VSC9953	Ethernet Switch Core	Soft Macro	13 Gbps
VSC9954	AVB Switch Core Core	Soft Macro	13 Gbps
VSC9958	Ethernet Switch Core	Soft Macro	68 Gbps
VSC9959	TSN Switch Core	Soft Macro	13 Gbps

Power over Ethernet (PoE)

Microsemi has also been a leading provider of PoE midspans/injectors since 1999, offering the broadest range of PoE solutions delivering up to 95 W over a single Category 5/5E/6/6A/7 cable in both indoor and outdoor environments.

Indoor PoE Solutions

Power per Port	Product	Number of Ports	Data Rate	Managed	Input Power	Warranty
15.4 W	PD-3501G/AC	1	1G		AC	1 year
15.4 W	PD-3504G/AC	4	1G		AC	1 year
15.4 W	PD-6506G/AC/M, PD-6512G/AC/M, PD-6524G/AC/M/F	6/12/24	1G	•	AC	Limited lifetime ³
30 W	PDS-EM-8100-25/AC	1	2.5G		AC	1 year
30 W	PD-9001-25GR/AC	1	2.5G		AC	1 year
30 W	PD-9001-10GR/AC	1	10G		AC	1 year
30 W	PD-9001GR/AT/AC	1	1G		AC	1 year
30 W	PD-9004G/AC	4	1G		AC	1 year
30 W	PD-9006G/ACDC/M, PD-9012G/ACDC/M, PD-9024G/ACDC/M/F	6/12/24	1G	•	AC and DC	Limited lifetime ³
30 W	PD-5501G/12-24VDC	1	1G		DC	1 year
30 W	PD-5524G/ACDC/M	24	1G	•	AC and DC	Limited lifetime ³
30 W	PD-9001GR/SP/AC ¹	1	1G		AC	1 year
30 W	PDS-208G/AC ²	10 (8 PoE ports + 2 data uplinks)	1G		AC	3 years
60 W	PD-9501GR/AC	1	1G		AC	1 year
60 W	PD-9501G/24VDC	1	1G		DC	1 year
60 W	PD-9501G/48VDC	1	1G		DC	1 year
60 W	PD-9506G/ACDC/M, PD-9512G/ACDC/M, PD-9524G/ACDC/M	6/12/24	1G	•	AC and DC	Limited lifetime ³
60 W	PD-9501G/SFP/AC	1	1G		AC	1 year
60 W	PD-9501GR/SP/AC ¹	1	1G		AC	1 year
95 W	PD-9601G/AC	1	1G		AC	1 year
95 W	PD-9606G/ACDC/M, PD-9612G/ACDC/M	6/12	1G	•	AC and DC	Limited lifetime ³

¹Includes integrated surge protection.

²Any individual port can operate at up to 72 W.

³Limited lifetime includes a limitation of 16 years warranty on the power supply and ventilator.

Outdoor PoE Solutions

Watts per Port	Product	Number of Ports	Data Rate	Managed	Input Power	Warranty
30 W/60 W	PDS-104GO/AC/M	5 (1 SFP data input, 4 PoE outputs)	1G	•	AC	3 years
30 W	PD-9001GO-ET/AC	1	1G		AC	5 years
60 W	PD-9501GO-ET/AC	1	1G		AC	5 years
30 W/60 W	PD-9501GO/12 V DC to 24 V DC	1	1G		DC	5 years
30 W/60 W	PD-9501GO/48 V DC	1	1G		DC	5 years
90 W	PD-9601GO/AC	1	1G		AC	5 years
95 W	PD-OUT/SP11	1-port outdoor surge protector	1G			5 years

Ruggedized/Industrial PoE Solutions

Watts per Port	Product	Number of Ports	Data Rate	Input Power	Warranty
30 W	PD-9001GI/DC	1	1G	DC	5 years
60 W	PD-9501GI/DC	1	1G	DC	5 years

Power over Ethernet (PoE)

PoE PD Front-End ICs

Product	IC Type	PoE Type	Standards Supported	Max Power (W)	Max Current (A)	Max Channel Impedance (Ω)
PD70100ILD	Front end	AT/BT Type 1 - 15W	IEEE 802.3	15.4	0.45	0.6
PD70101ILQ	Combo: Front + PWM controller	AT/BT Type 1 - 15W	IEEE 802.3	15.4	0.45	0.6
PD70200ILD	Front end	AT/BT Type 2 - 30W	IEEE 802.3	47	1.2	0.6
PD70201ILQ	Combo: Front + PWM controller	AT/BT Type 2 - 30W	IEEE 802.3	47	1.2	0.6
PD70210ILD/PD70210AILD	Front end	AT/BT Type 2 / PoH - 95W	IEEE 802.3 / POH	95	2	0.3
PD70211ILQ	Combo: Front + PWM controller	AT/BT Type 2 / PoH - 95W	IEEE 802.3 / POH	95	2	0.3
PD70224ILQ	Ideal diode bridge	AT/BT Type 4 / POH - 95W	IEEE 802.3 / POH	95	2	0.76

PoE PSE Managers

Product	Ports ¹	FETs	Sense Resistor	MCU Options	Host I/F Options	Standards Supported
PD69208T4ILQ	8	Internal	Internal	PD69200 Marvell ISSR	I ² C UART SPI	IEEE802.3af 15.4W IEEE802.3at 30W IEEE802.3at 60W PoH 95W IEEE802.3bt 90W ²
PD69204T4ILQ	4	Internal	Internal	PD69200 Marvell ISSR	I ² C UART SPI	IEEE802.3af 15.4W IEEE802.3at 30W IEEE802.3at 60W PoH 95W IEEE802.3bt 90W ²
PD69208MILQ	8	Internal	Internal	PD69200 Marvell ISSR	I ² C UART SPI	IEEE802.3af 15.4W IEEE802.3at 30W IEEE802.3at 60W IEEE802.3bt 60W ²
PD69108ILQ/ PD69108FILQ	8	Internal 0.3ohm	External 0.36ohm	PD39100 PD69100 Marvell ISSR	I ² C UART SPI	IEEE802.3af 15.4W IEEE802.3at 30W IEEE802.3at 60W PoH 95W
PD69104ILQ	4	Internal 0.3ohm	External 0.36ohm	PD39100 PD69100 Marvell ISSR	I ² C UART SPI	IEEE802.3af 15.4W IEEE802.3at 30W IEEE802.3at 60W PoH 95W
PD69104B1ILQ/ PD69104B1FILQ	4	Internal 0.3ohm	External 0.36ohm	Auto Mode	I ² C UART	IEEE802.3af 15.4W IEEE802.3at 30W IEEE802.3at 60W
PD69101ILQ	1	Internal 0.3ohm	External 0.5ohm	Auto Mode	SPI	IEEE802.3af 15.4W IEEE802.3at 30W
PD69012	12	External 0.1ohm	External 0.5ohm	PD69000 Marvell ISSR Auto Mode	I ² C UART SPI	IEEE802.3af 15.4W IEEE802.3at 30W IEEE802.3at 60W
PD69008	8	External 0.1ohm	External 0.5ohm	PD69000 Marvell ISSR Auto Mode	I ² C UART SPI	IEEE802.3af 15.4W IEEE802.3at 30W IEEE802.3at 60W
PD64001H	1	External 0.1ohm	External 2ohm	Auto Mode	none	IEEE802.3af 15.4W IEEE802.3at 30W IEEE802.3at 60W

¹2-pair ports count; Two 2-Pair ports can form a 4-pair Port.

²IEEE802.3bt draft 3.2; Requires firmware upgrade.

Timing ICs

Timing ICs: From the Market Leader in SyncE

Microsemi provides both SyncE alone (with an easy migration path to IEEE 1588) or combined SyncE and IEEE 1588 for frequency and time alignment. The market leader in Synchronous Ethernet timing devices, Microsemi was the

first to introduce Synchronous Ethernet PLLs in 2006. Microsemi now offers the industry's most comprehensive portfolio of SyncE timing devices, providing G.8262 compliance and ultra-low jitter for PHYs up to 100G.

SyncE for Timing Card

Product	Description	DPLLs / NCOs	BW (Hz)	Split XO Feature	Inputs	Input Frequency	Embedded PPS & EPP2S	Diff. Outputs	CMOS Outputs	Output Frequency	Low-Jitter APLLs	GP Clock Gen	Jitter (ps_{RMS})	Pkg Size (mm)
ZL30161	10 GbE Any-Frequency SyncE PLL/NCO	1	0.1 m-1 k		11	1 Hz-750 MHz		6	6	1 Hz-750 MHz	3	0	0.6	13 x 13
ZL30162	10 GbE Any-Frequency Quad SyncE PLL/NCO	4	0.1 m-1 k		11	1 Hz-750 MHz		8	8	1 Hz-750 MHz	4	0	0.6	13 x 13
ZL30163	10 GbE Any-Frequency Dual SyncE PLL/NCO	2	0.1 m-1 k		11	1 Hz-750 MHz		8	8	1 Hz-750 MHz	4	0	0.6	13 x 13
ZL30164	10 GbE Any-Frequency Triple SyncE PLL/NCO	3	0.1 m-1 k		11	1 Hz-750 MHz		8	8	1 Hz-750 MHz	4	0	0.64	13 x 13
ZL30621	10 GbE and above Single SyncE PLL/NCO	1	0.1 m-10		2 D/SE + 1 SE	8 kHz-1250 MHz		3	6	<1 Hz-1035 MHz	1	0	0.25	5 x 10
ZL30622	10 GbE and above Single SyncE PLL/NCO	1	0.1 m-500		2 D/SE + 1 SE	8 kHz-1250 MHz		3	6	<1 Hz-1035 MHz	1	0	0.25	5 x 5
ZL30623	10 GbE and above Dual SyncE PLL/NCO	2	0.1 m-500		4 D/SE + 1 SE	8 kHz-1250 MHz		6	12	<1 Hz-1035 MHz	2	0	0.25	5 x 10
ZL30601	Single Channel Network Synchronizer	1	0.1 m-448	•	5 D/10 SE	0.5 Hz-900 MHz	•	6	14	0.5 Hz-900 MHz	2 or 3	1	0.25	10 x 10
ZL30602	Dual Channel Network Synchronizer	2	0.1 m-448	•	5 D/10 SE	0.5 Hz-900 MHz	•	6	14	0.5 Hz-900 MHz	2 or 3	1	0.25	10 x 10
ZL30603	Triple Channel Network Synchronizer	3	0.1 m-448	•	5 D/10 SE	0.5 Hz-900 MHz	•	6	14	0.5 Hz-900 MHz	2 or 3	1	0.25	10 x 10
ZL30604	Quad Channel Network Synchronizer	4	0.1 m-448	•	5 D/10 SE	0.5 Hz-900 MHz	•	6	14	0.5 Hz-900 MHz	2 or 3	1	0.25	10 x 10

SyncE for Line Card

Product	Description	DPLLs	BW (Hz)	Inputs	Input Frequency	Embedded PPS	Outputs (Diff/CMOS)	Output Frequency	Low-Jitter APLLs/GP Clock Gen	Jitter (ps_{RMS})	Pkg Size (mm)
ZL30151	10 GbE and above Single SyncE PLL	1	1-500	2 D/SE + 1 SE	1 kHz-650 MHz		0-3/0-6	<1 Hz-650 MHz	1/0	0.25	5 x 5
ZL30160	Any-Frequency Quad CH SyncEPLL/NCO - 1GBE	4	14-896	4D/SE	1 kHz-750 MHz		4-12	1 kHz-750 MHz	2/2	0.7	11 x 11
ZL30165	10 GbE Any-Frequency Quad SyncE PLL/NCO	4 or (4 NCO)	5-896	8 D/SE	1 kHz-750 MHz		8/8	1 kHz-750 MHz	4/0	0.63	13 x 13
ZL30166	10 GbE Any-Frequency Triple SyncE PLL/NCO	3 or (3 NCO)	5-896	9 D/SE + 2 SE	1 kHz-750 MHz		8/8	1 kHz-750 MHz	4/0	0.63	13 x 13
ZL30167	10 GbE Any-Frequency Dual SyncE PLL/NCO	2 or (2 NCO)	5-896	9 D/SE + 2 SE	1 kHz-750 MHz		8/8	1 kHz-750 MHz	4/0	0.63	13 x 13
ZL30611	SyncE Line Card	1 or (1 NCO)	14-448	5 D/10 SE	1 kHz-900 MHz	•	6/14	0.5 Hz-650 MHz	3/1	0.25	10 x 10
ZL30612	Dual SyncE Line Card	2 or (2 NCO)	14-448	5 D/10 SE	1 kHz-900 MHz	•	6/14	0.5 Hz-650 MHz	3/1	0.25	10 x 10
ZL30614	Quad SyncE Line Card	4 or (4 NCO)	14-448	5 D/10 SE	1 kHz-900 MHz	•	6/14	0.5 Hz-650 MHz	3/1	0.25	10 x 10

Timing ICs

IEEE 1588 PLL

IEEE 1588 is a protocol-based synchronization mechanism useful for existing unaware networks where frequency syntonization is required. When coupled with physical layer technologies such as Synchronous Ethernet, IEEE 1588 can

also provide robust time alignment. Microsemi offers the industry's most comprehensive and cost effective IEEE 1588 solution with a range of products offering ultra-low jitter for PHYs up to 100G and IEEE 1588 profiles.

IEEE 1588 for Timing Cards

Product	Description	DPLLs	BW (Hz)	Split XO Feature	Inputs	Input Frequency	Embedded PPS & EPP2S	Diff. Outputs	CMOS Outputs	Output Frequency	Low-Jitter APLLs	GP Clock Gen	Jitter (ps _{RMS})	Pkg Size (mm)
ZL30361	Single Channel Combined IEEE 1588 ToP & SyncE Device	1 NCO	0.1–896		11	1 Hz–750 MHz		6	6	1 Hz–750 MHz	3	0	0.6	13 × 13
ZL30362	Quad Channel Combined IEEE 1588 ToP & SyncE Device	4 NCO	0.1–896		11	1 Hz–750 MHz		8	8	1 Hz–750 MHz	4	0	0.6	13 × 13
ZL30363	Dual Channel Combined IEEE 1588 ToP & SyncE Device	2 NCO	0.1–896		11	1 Hz–750 MHz		8	8	1 Hz–750 MHz	4	0	0.6	13 × 13
ZL30364	Triple Channel Combined IEEE 1588 ToP & SyncE Device	3 NCO	0.1–896		11	1 Hz–750 MHz		8	8	1 Hz–750 MHz	4	0	0.64	13 × 13
ZL30721	Single Channel Combined IEEE 1588 ToP & SyncE Device	1 NCO	0.1–10		2 D/SE + 1 SE	8 kHz–1250 MHz		3	6	<1 Hz–1035 MHz	1	0	0.25	5 × 10
ZL30722	Single Channel Combined IEEE 1588 ToP & SyncE Device	1 NCO	0.1–500		2 D/SE + 1 SE	8 kHz–1250 MHz		3	6	<1 Hz–1035 MHz	1	0	0.25	5 × 5
ZL30723	Dual Channel Combined IEEE 1588 ToP & SyncE Device	2 NCO	0.1–500		4 D/SE + 1 SE	8 kHz–1250 MHz		6	12	<1 Hz–1035 MHz	2	0	0.25	5 × 10
ZL30701	Single Channel IEEE 1588 Synchronizer	1 or (1 NCO)	0.1 m–448	•	5 D/10 SE	0.5 Hz–900 MHz	•	6	14	0.5 Hz–900 MHz	2 or 3	1	0.25	10 × 10
ZL30702	Dual Channel IEEE 1588 Synchronizer	2 or (2 NCO)	0.1 m–448	•	5 D/10 SE	0.5 Hz–900 MHz	•	6	14	0.5 Hz–900 MHz	2 or 3	1	0.25	10 × 10
ZL30703	Triple Channel IEEE 1588 Synchronizer	3 or (3 NCO)	0.1 m–448	•	5 D/10 SE	0.5 Hz–900 MHz	•	6	14	0.5 Hz–900 MHz	2 or 3	1	0.25	10 × 10
ZL30704	Quad Channel IEEE 1588 Synchronizer	4 or (4 NCO)	0.1 m–448	•	5 D/10 SE	0.5 Hz–900 MHz	•	6	14	0.5 Hz–900 MHz	2 or 3	1	0.25	10 × 10

IEEE 1588 for Line Cards

Product	Description	DPLLs	BW (Hz)	Inputs	Input Frequency	Diff. Outputs	CMOS Outputs	Output Frequency	Low-Jitter APLLs	GP Clock Gen	Jitter (ps _{RMS})	Pkg Size (mm)
ZL30347	10 GbE Any Frequency Stratum 2/3E/3 DPLL	1	0.5 m–400	2 D/SE	Nx8k, SyncE	2	6	N × 8K, SDH, SyncE	1-Int-N	2	1.0	9 × 9
ZL30365	Quad Channel Combined IEEE 1588 ToP and SyncE Device	4 NCO	5–890	8 D/SE	1 Hz–750 MHz	8	8	<1 Hz–750 MHz	4	0	0.65	13 × 13
ZL30367	Dual Channel Combined IEEE 1588 ToP and SyncE Device	2 NCO	5–890	9 D/SE+2 SE	1 Hz–750 MHz	6	6	<1 Hz–750 MHz	3	0	0.65	13 × 13

Timing ICs

Clock Management

Microsemi's clock management portfolio includes devices for clock synthesis, frequency conversion, jitter attenuation, and fanout buffers to reduce bill of material costs and board space requirements,

improve performance reliability, and simplify design complexity. Key features include industry-leading ultra-low jitter, high integration, wide frequency range, and highly programmable outputs.

Clock Synthesis Devices

Product	Independent Output Freq. Families	Inputs	Crystal Input Freq. Range	Xtal Osc. or CMOS Input Freq. Range	Diff Input Freq. Range	Typical Jitter (fs _{RMS})	NCO (ppb)	Outputs Diff/CMOS	Output Freq. Range	NV Memory	Host Bus	Pkg Size (mm)
MAX24405	2	1 XTAL/SE, 3 D/SE	25 M–52 M	9.72 M–160 M	9.72 M–750 M	2	1801	0-5/0–10	<1 Hz–750 M	Ext EE	SPI	10 × 10
MAX24505	2	1 XTAL/SE, 3 D/SE	25 M–52 M	9.72 M–160 M	9.72 M–750 M	2	1801	0-5/0–10	<1 Hz–750 M	Int EE	SPI	10 × 10
MAX24410	2	1 XTAL/SE, 3 D/SE	25 M–52 M	9.72 M–160 M	9.72 M–750 M	2	1801	0-10/0–20	<1 Hz–750 M	Ext EE	SPI	10 × 10
MAX24510	2	1 XTAL/SE, 3 D/SE	25 M–52 M	9.72 M–160 M	9.72 M–750 M	2	1801	0-10/0–20	<1 Hz–750 M	Int EE	SPI	10 × 10
ZL30250	1	1 XTAL/SE, 3 D/SE	25 M–60 M	9.72 M–300 M	9.72 M–1250 M	160 ¹	0.01	0–3/0–6	<1 Hz–1035 M ²	Ext EE ³	SPI/I2C	5 × 5
ZL30251	1	1 XTAL/SE, 3 D/SE	25 M–60 M	9.72 M–300 M	9.72 M–1250 M	160 ¹	0.01	0–3/0–6	<1 Hz–1035 M ²	Int EE ³	SPI/I2C	5 × 5
ZL30260	2	1 XTAL/SE, 3D/SE	25 M–60 M	9.72 M–300 M	9.72 M–1250 M	170 ¹	0.01	0–6/0–12	1 Hz–1035 M ²	Ext EE ⁴	SPI/I2C	8 × 8
ZL30261	2	1 XTAL/SE, 3 D/SE	25 M–60 M	9.72 M–300 M	9.72 M–1250 M	170 ¹	0.01	0–6/0–12	1 Hz–1035 M ²	Int EE ⁴	SPI/I2C	8 × 8
ZL30262	2	1 XTAL/SE, 3 D/SE	25 M–60 M	9.72 M–300 M	9.72 M–1250 M	170 ¹	0.01	0–10/0–20	1 Hz–1035 M ²	Ext EE ⁴	SPI/I2C	8 × 8
ZL30263	2	1 XTAL/SE, 3 D/SE	25 M–60 M	9.72 M–300 M	9.72 M–1250 M	170 ¹	0.01	0–10/0–20	1 Hz–1035 M ²	Int EE ⁴	SPI/I2C	8 × 8
ZL30264	4	1 XTAL/SE, 3 D/SE	25 M–60 M	9.72 M–300 M	9.72 M–1250 M	170 ¹	0.01	0–6/0–12	1 Hz–1035 M ²	Ext EE ⁴	SPI/I2C	8 × 8
ZL30265	4	1 XTAL/SE, 3 D/SE	25 M–60 M	9.72 M–300 M	9.72 M–1250 M	170 ¹	0.01	0–6/0–12	1 Hz–1035 M ²	Int EE ⁴	SPI/I2C	8 × 8
ZL30266	4	1 XTAL/SE, 3 D/SE	25 M–60 M	9.72 M–300 M	9.72 M–1250 M	170 ¹	0.01	0–10/0–20	1 Hz–1035 M ²	Ext EE ⁴	SPI/I2C	8 × 8
ZL30267	4	1 XTAL/SE, 3 D/SE	25 M–60 M	9.72 M–300 M	9.72 M–1250 M	170 ¹	0.01	0–10/0–20	1 Hz–1035 M ²	Int EE ⁴	SPI/I2C	8 × 8

Gen 1-4 PCIe Clock Generators

Product	Independent Output Freq. Families	Inputs	Crystal Input Freq. Range	Xtal Osc. or CMOS Input Freq. Range	Low-Jitter APLLs	Typical Jitter (fs _{RMS})	Default Output Configurations	Output Freq. Range	Host Bus	Supply Voltage	Pkg Size (mm)
ZL30281	1	1 XTAL	25 M	25 M	1	160	4	25 M, 100 M	SPI/I2C	3.3 + 1.8	10 × 10
ZL30282	2	1 XTAL	50 M	50 M	1	160	8	25 M, 75 M, 100 M	SPI/I2C	Note ₅	10 × 10

Rate Conversion/Jitter Attenuation Devices

Product	Independent Output Freq. Families	Inputs	Crystal Input Freq. Range	XTAL Osc. or CMOS Input Freq. Range	Diff Input Freq. Range	Typical Jitter (fs _{RMS})	DPLL Features: Ref. Switching/ Holdover/ Bandwidth	NCO (ppb)	Outputs Diff/CMOS	Output Freq. Range	NV Memory	Host Bus	Pkg Size (mm)
MAX24605	2	1 XTAL/SE, 3 D/SE	25 M–52 M	2 KHz–160 M	2 KHz–750 M	180 ¹	Glitchless/ Digital Hold/ 4 Hz–400 Hz	<0.001	0–5/0–10	<1 Hz–750 M	Ext EE	SPI	10 × 10
MAX24610	2	1 XTAL/SE, 3 D/SE	25 M–52 M	2 KHz–160 M	2 KHz–750 M	180 ¹	Glitchless/ Digital Hold/ 4 Hz–400 Hz	<0.001	0–10/0–20	<1 Hz–750 M	Ext EE	SPI	10 × 10
ZL30252	1	1 XTAL/SE, 3 D/SE	25 M–60 M	1 kHz–300 M	1 kHz–1250 M	160 ¹	Glitchless/ Digital Hold/ 14 Hz–500 Hz	0.01	0–3/0–6	<1 Hz–1035 M ²	Ext EE ³	SPI/I2C	5 × 5
ZL30253	1	1 XTAL/SE, 3 D/SE	25 M–60 M	1 kHz–300 M	1 kHz–1250 M	160 ¹	Glitchless/ Digital Hold/ 14 Hz–500 Hz	0.01	0–3/0–6	<1 Hz–1035 M ²	Int EE ³	SPI/I2C	5 × 5
ZL30254	1	1 XTAL, 2 SE	49.152 MHz	8 kHz or 25 MHz		<1 ps	Glitchless/ Digital Hold/ 25 Hz		2/0	125 MHz or 156.25 MHz		None	5 × 5
ZL30255	2	2 XTAL/SE, 6 D/SE	25 M–60 M	1 kHz–300 M	1 kHz–1250 M	160 ¹	Glitchless/ Digital Hold/ 14 Hz–500 Hz	0.01	0–6/0–12	<1 Hz–1035 M ²	Int EE ³	SPI/I2C	5 × 10
ZL30159	1	1 XTAL, 1 D	20 M or 24.578 M	1 Hz–177.5 M	1 Hz–750 M	<1000			0 / 2	1 Hz–177.5 M		SPI/I2C	9 × 9

Abbreviation Key:

D = Differential
Int EE = Internal EEPROM

³ Up to four configurations (pin-selectable)

SE = Single-ended (CMOS)
Supply Voltage = 3.3 & 1.8

⁴ up to eight configurations (pin-selectable)

NCO = Numerically controlled oscillator
¹ Integer-mode APLL-only operation

² 2.5 V only, 3.3 V only, 1.8 V & 2.5 V, 1.8 V & 3.3 V

Ext EE = External EEPROM
² Spread spectrum capable

Timing ICs

Microsemi miSmartBuffer™ family provides 3-, 6-, or 10-output programmable fanout buffers with multi-format I/Os and per-output dividers. Applications include clock

signal fanout, format conversion, frequency division, and skew adjustment in a wide variety of equipment types.

Precision Differential miSmartBuffers

Product	Input Type	Input Freq.	Crystal Driver	Diff Outputs LVPECL/LVDS/HCSL	CMOS Outputs	Output Banks	Divider Value	Per-output Enable	Per-output Phase Adjust	OE Control	Host Bus	Internal Memory	Operating Temp. (°C)	Pkg	Pkg Size (mm)
ZL40230	2 Diff/LVCMOS + Crystal	<1.6 GHz 250 MHz	•	10 LVPECL/LVDS/HCSL	1 LVC-MOS	2	1 to 8 for LVCMOS	•	N/A	SW per output/ HW per bank	SPI	N/A	-40 to 85	CFN-48	7 x 7
ZL40235				5 LVPECL/LVDS/HCSL										CFN-40	6 x 6
ZL40240				N/A	10 LVC-MOS	1	N/A							CFN-32	6 x 6
ZL40250	3 Diff/LVCMOS + Crystal	<1 GHz	•	0-6	0-12	6	32-bit	•	Per output by GPIO	SPI/I2C	ROM EEPROM ROM EEPROM	-40 to 85	QFN-56	8 x 8	
ZL40251				0-10	0-20										
ZL40252						0-3 400 mV/ 800 mV CML									0-6
ZL40253				QFN-32	5 x 5										
ZL40255															

miClockBuffers

Product	Input Type	Input Freq.	Crystal Driver	Diff Outputs LVPECL/LVDS/HCSL	CMOS Outputs	Output Banks	Divider Value	OE Control	Operating Temp. (°C)	Pkg	Pkg Size (mm)
ZL40231	2 Diff/LVCMOS + Crystal	<1.6 GHz	•	10 LVPECL/LVDS/HCSL	1 LVCMOS	2	1 to 8 for LVCMOS	Per bank	-40 to 85	QFN-48	7 x 7
ZL40234				4 LVPECL/LVDS/HCSL							
ZL40241		<200 MHz	N/A	10 LVCMOS	QFN-32	5 x 5					
ZL40260		<1.6 GHz	N/A	10 LVPECL			0				

Precision Differential Fanout Buffers

Product	Output Type	Inputs	Outputs	Input Termination	Switching	750 MHz Additive Jitter (fs _{RMS} , typ)	Input Type	Input Coupling	Operating Frequency	Power Supply (V)	Operating Temp. (°C)	Pkg	Pkg Size (mm)				
ZL40200	LVPECL	1	2	External	Simple	30-40	LVPECL LVDS HCSL CML	DC or AC	Up to 750 MHz	2.5 or 3.3	-40 to 85	QFN-16	3 x 3				
ZL40201			Internal														
ZL40202			4	External													
ZL40203			Internal														
ZL40204			6	External													
ZL40205			Internal														
ZL40206			8	External													
ZL40207			Internal														
ZL40224		2	6	External	Glitch Free	106-121						QFN-32	5 x 5				
ZL40208				Internal													
ZL40209				8										External			
ZL40210				Internal													
ZL40211			1	2	External									Simple	78-138	QFN-16	3 x 3
ZL40212					Internal												
ZL40213				4	External												
ZL40214				Internal													
ZL40215	2	6	External	Glitch Free	165-194	QFN-32	5 x 5										
ZL40216			Internal														
ZL40217			8					External									
ZL40218			Internal														
ZL40219		8	6	External				Simple	78-138	QFN-32	5 x 5						
ZL40220				Internal													
ZL40221			8	6								External					
ZL40222				Internal													
ZL40223	8	External															

Signal Conditioners & Crosspoint Switches

The Ultimate in Flexibility & Performance

Microsemi offers a wide range of signal conditioner and crosspoint switch ICs across a range of port speeds, channel counts, and practical feature sets for a wide variety of Ethernet, SDI, HDMI, PCIe, SAS/SATA, and other standards-based or proprietary applications. Microsemi products deliver many industry-leading features such as very low jitter as well as autonomous equalization for demanding backplane, module host, and high port count Layer 1 switching applications. Microsemi's low-power, multi-protocol family of signal integrity devices includes both redrivers and retimers, and delivers the ultimate in flexibility and performance.

Key Features

- Data rates up to 16 Gbps
- Per channel adaptive input equalization and gain adjustment
- Per channel output multi-tap de-emphasis and drive level adjustment
- Power-saving green mode options including ability to power down unused ports

Product	Ports	Device Type	Temp. Min. °C (Ambient)	Temp. Max. °C (Junction)	Max Data Rate
VSC7109	Dual 2x2	Redriver	-40	110	3.5 Gbps
VSC7110	Dual 2x2	Redriver	-40	110	6.5 Gbps
VSC7111	Dual 2x2	Redriver	-40	110	11.5 Gbps
VSC7113	Dual 2x2	Redriver	-40	110	10.3 Gbps
VSC7223	4	Retimer	-40	90	16 Gbps
VSC7224	4	Retimer	-40	110	12.5 Gbps
VSC7227	12	Retimer	-40	100	14.5 Gbps
VSC8247	4	Retimer	0	95	11.3 Gbps
VSC8248	4 (bidirectional)	Retimer	0	95	11.3 Gbps
VSC3303	4x4	Redriver	-40	110	8.5 Gbps
VSC3304	4x4	Redriver	-40	100	8.5 Gbps
VSC3308	8x8	Redriver	-40	100	11.5 Gbps
VSC3312	12x12	Redriver	-30	110	8.5 Gbps
VSC3316	16x16	Redriver	-40	100	11.5 Gbps
VSC3340	40x40	Redriver	-40	100	6.5 Gbps

Why Choose Microsemi for Ethernet Networking?

Microsemi has extensive systems understanding and Ethernet networking expertise, solving general industry needs and our customers' specific challenges for over 30 years. With our industry-leading product portfolio of semiconductors, systems, software, IP, and ecosystem solutions, Microsemi solutions are engineered to help you design, deploy, or manage your Ethernet-based networks.

Contact your local Microsemi sales office today to find the right technologies and solutions for your Ethernet networking needs.



Microsemi Corporate Headquarters
One Enterprise, Aliso Viejo, CA 92656 USA
Within the USA: +1 (800) 713-4113
Outside the USA: +1 (949) 380-6100
Fax: +1 (949) 215-4996
Email: sales.support@microsemi.com
www.microsemi.com

Microsemi Corporation (Nasdaq: MSCC) offers a comprehensive portfolio of semiconductor and system solutions for aerospace & defense, communications, data center and industrial markets. Products include high-performance and radiation-hardened analog mixed-signal integrated circuits, FPGAs, SoCs and ASICs; power management products; timing and synchronization devices and precise time solutions, setting the world's standard for time; voice processing devices; RF solutions; discrete components; enterprise storage and communication solutions, security technologies and scalable anti-tamper products; Ethernet solutions; Power-over-Ethernet ICs and midspans; as well as custom design capabilities and services. Microsemi is headquartered in Aliso Viejo, California and has approximately 4,800 employees globally. Learn more at www.microsemi.com.

Microsemi makes no warranty, representation, or guarantee regarding the information contained herein or the suitability of its products and services for any particular purpose, nor does Microsemi assume any liability whatsoever arising out of the application or use of any product or circuit. The products sold hereunder and any other products sold by Microsemi have been subject to limited testing and should not be used in conjunction with mission-critical equipment or applications. Any performance specifications are believed to be reliable but are not verified, and Buyer must conduct and complete all performance and other testing of the products, alone and together with, or installed in, any end-products. Buyer shall not rely on any data and performance specifications or parameters provided by Microsemi. It is the Buyer's responsibility to independently determine suitability of any products and to test and verify the same. The information provided by Microsemi hereunder is provided "as is, where is" and with all faults, and the entire risk associated with such information is entirely with the Buyer. Microsemi does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other IP rights, whether with regard to such information itself or anything described by such information. Information provided in this document is proprietary to Microsemi, and Microsemi reserves the right to make any changes to the information in this document or to any products and services at any time without notice.

©2016 Microsemi Corporation. All rights reserved. Microsemi and the Microsemi logo are registered trademarks of Microsemi Corporation. All other trademarks and service marks are the property of their respective owners.