

# Synchronous Ethernet (SyncE) Products

Synchronous Ethernet (SyncE) is a physical layer (PHY)-based synchronization implementation for packet networks requiring frequency synchronization. Microsemi provides standalone SyncE with an easy migration path to IEEE 1588, or combined SyncE and IEEE 1588 for both frequency and time alignment.

The market leader in SyncE timing devices, Microsemi was the first to introduce SyncE 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 10G PHYs.

Highly-integrated, feature-rich SyncE products from Microsemi allow manufacturers to create cost-effective network equipment designs that support accurate end-to-end transmission of voice, video, and data over wired and wireless networks.

## Applications

- Core routers, edge routers, Carrier Ethernet switches—timing cards and line cards, which support up to 100 Gbps interfaces, line rate converters, and carrier-grade timing cards, SONET/SDH, Fibre Channel, XAUI, SyncE, OTN, 10 GBASE-R, and 10 GBASE-W
- Broadband equipment including PON, DSLAM, and RT-DSLAM
- Wireless backhaul—integrated basestation reference clock for air interface for GSM, WCDMA, LTE and WiMAX macro, micro or femtocells, edge router, or access aggregation nodes

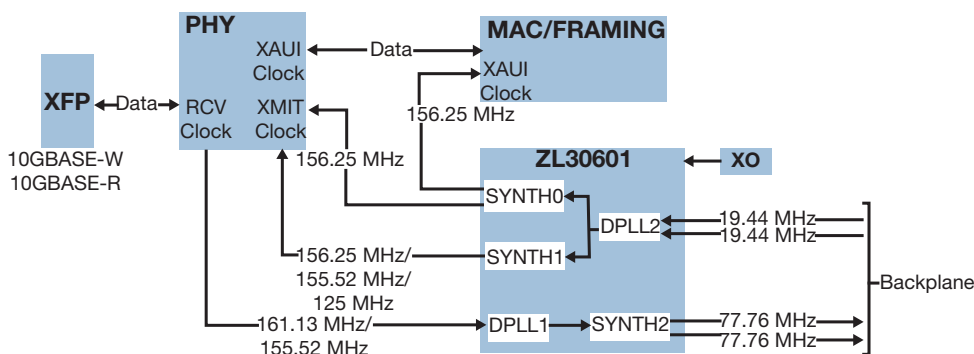
## Timing Card Product Features

- Compliance with ITU-T G.8262, G.8262.1, G.813, G.781, G.8261, G.823, and G.824
- Telcordia GR-1244 and GR-253 Stratum 3
- Low bandwidth loop filter from 0.1 mHz to 1 kHz
- Hitless reference switching, up to 11 input references
- Holdover accuracy better than <0.1 ppb
- Accept and generate any frequency from 1 Hz to 1250 MHz

## Line Card Product Line Features

- Ultra low jitter (as low as <250 fs RMS for line cards up to 100G)
- Loop filter from 14 Hz to 896 Hz
- Hitless reference switching between up to 8 input references
- Frequency translation and jitter attenuation of any frequency between 1 Hz and 1035 MHz
- Numerically controlled oscillator (NCO) capability

### 10G Carrier SyncE Card with Recovered Clock Rate Translation



## SyncE Product Chart

	ZL30150	ZL30151	ZL30611 ZL30612 ZL30614	ZL30142 ZL30143	ZL30153 ZL30154	ZL30161 ZL30162 ZL30163 ZL30164	ZL30621 ZL30622 ZL30623	ZL30601 ZL30602 ZL30603 ZL30604
<b>Application</b>	Line card	Line card	Line card	Central timing	Central timing	Central timing	Pizza box	Central timing
<b>PLL channels</b>	2	1	1, 2, and 4	1 and 2	1 and 2	1, 2, 3, and 4	1 and 2	1, 2, 3, and 4
<b>Inputs</b>	4	3	10	9	8	11	3 and 6	10
<b>Ref inputs</b>	No	No	Yes	Yes	No	Yes	No	Yes
<b>Outputs</b>	20	3	14	9	12 and 20	12 and 16	3 and 6	14
<b>Output jitter</b>	700 fs	350 fs	250 fs	1 ps	700 fs	700 fs	350 fs	250 fs

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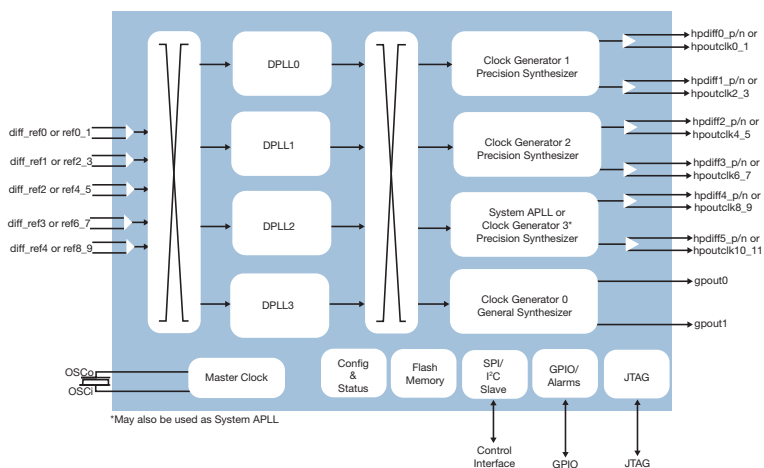
## ZL30604 Synchronous Ethernet System Synchronizer

- Three programmable ultra-low jitter synthesizers generate any frequency from 0.5 Hz to 900 MHz
- Maximum jitter less than 250 fs in 12 KHz to 20 MHz band meets jitter of 10G/40G and 100G PHYs
- One programmable general purpose synthesizer generates any clock from 0.5 Hz to 180 MHz.
- 6 differential (CML) or 12 single ended (CMOS) ultra-low jitter outputs plus two general purpose outputs
- Accepts up to 10 LVPECL/LVDS/HCSL/LVCMOS inputs
- Any input reference can be fed with clock, sync (frame pulse), clock /sync pair, or clock modulated with sync pulse (embedded pps—ePPS and embedded pp2s—ePP2S)
- Automatic hitless reference switching and digital holdover on reference fail with initial holdover accuracy better than 10 ppb
- Up to four programmable digital PLLs/NCOs with loop bandwidth from 14 Hz to 448 Hz synchronize to any clock rate from 1 KHz to 900 MHz and to clock plus sync pulse (0.5 Hz and up)

## ZL30622 Synchronous Ethernet System Synchronizer

- Fully compliant to ITU-T G.813/G.8262 compliance (options 1 and 2)
- Programmable bandwidth, 0.1 Hz to 500 Hz
- Hitless reference switching
- High-resolution holdover averaging
- Digitally controlled phase adjustment
- Three inputs (two differential/CMOS, one CMOS) with frequencies from 8 kHz to 1250 MHz (8 kHz to 300 MHz for CMOS)
- Any output frequency from <1 Hz to 1035 MHz
- Output jitter as low as 0.25 ps RMS (12 kHz–20 MHz integration band)
- Automatic self-configuration at power-up from internal EEPROM; up to four configurations pin-selectable
- Telecom timing cards for SONET/SDH, SyncE, wireless base stations and other systems

**ZL30604 Block Diagram**



**ZL30622 Block Diagram**

