Microsemi's Clock Translators for Optical Transport Networks

Optical transport network (OTN) has emerged as the physical layer interface protocol of choice enabling carriers to bridge the transition from circuit-switched to internet protocol (IP) legacy transmission of voice over optical fiber or packet-switched transmission of data over optical fiber. Due to the variety of services and provisions, the OTN timing solutions must be flexible and easily programmable to support multiple unique and independent channel frequencies.

Microsemi® offers the widest portfolio of single-chip devices delivering "any frequency, any port, all the time" performance for OTN.

For OTN equipment, Microsemi phase locked loops (PLLs) are used for the following line card timing:

- Clock rate translation from line to client rates
- One PLL path per client port
- Clock rate programmability per client port

OTN Requirements

- Multiple clock frequencies are required to support multiple services.
- Dynamic rate conversion is required for forward error correction (FEC)
- OTN requires a similar feature-set of digital phase lock loop (DPLL) for SONET/SDH.
- Independent timing paths are needed to support to transmit and receive multiple services.
- Stringent low jitter generation requirements

Product Solutions

- Single-chip solutions compliant to the telecom timing standards
- Meeting OTN multi-service requirements
- Highly-integrated to support multiple OTN frequencies and channels
- Output Jitter 0.25 ps RMS

Features

Highly-integrated and programmable solution provides translation from any input reference frequency to any output clock frequency with jitter performance for interfaces 10G, 40G, and 100G coherent.

The single, dual, and quad channel devices with independent digital PLLs accept and generate any frequency from 1 kHz to 1.25 GHz to support any communication service over optical networks.
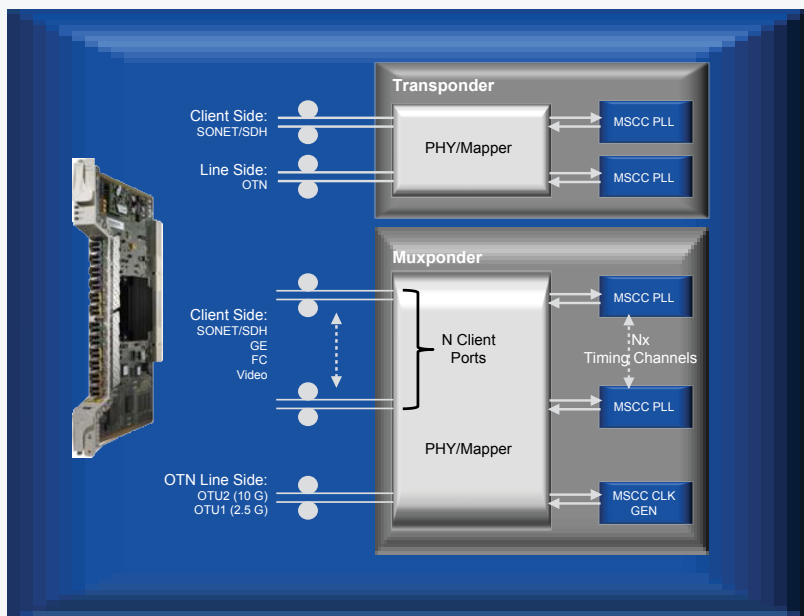

Figure 1. Transponder and Muxponder Applications

Microsemi.

Featured Products

ZL30169: 3-Input, 3-Output Clock Translator for OTN

- Any input frequency from 1 KHz to 1.25 GHz
- Continuous input clock quality monitoring
- Hitless reference switching on loss of input
- Programmable bandwidth: 14 Hz to 500 Hz
- Output jitter typically 0.16 ps RMS APLL-only
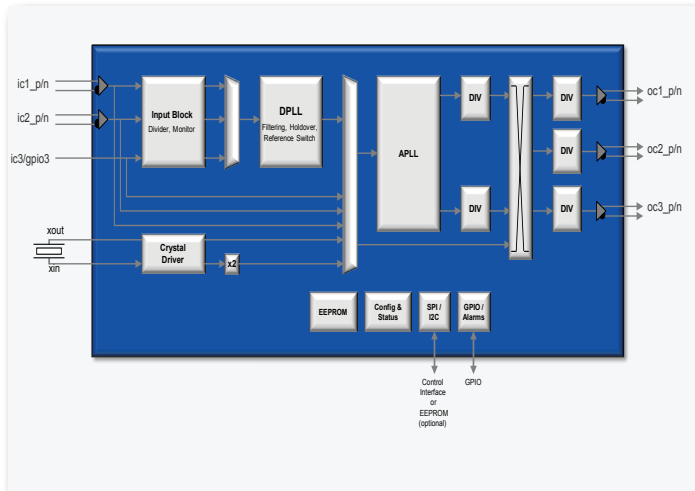- Output jitter for other modes 0.25 ps RMS
- Small package: 5 x 5 mm

ZL30165: Quad Channel Precision Clock Translator

- Four independent clock channels
- Four programmable digital PLLs/numerically controlled oscillators (NCOs)
- Low power: < 2W with four channels on
- Programmable bandwidth: 5 Hz to 896 Hz
- Automatic hitless reference switching and digital holdover on reference fail
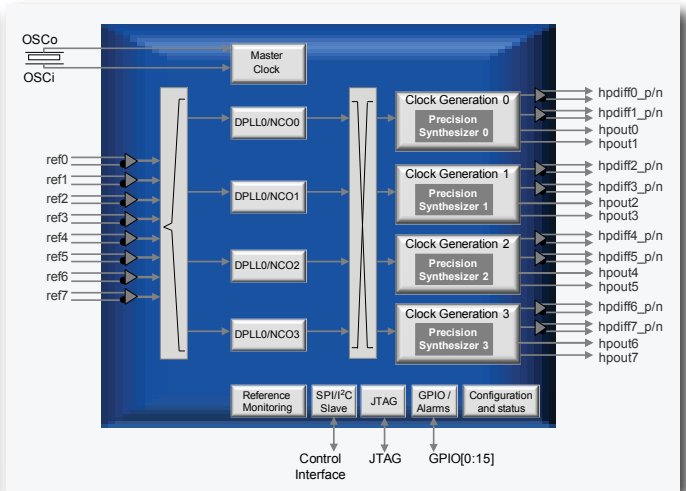- Easy Configuration: Field programmable via SPI/ I2C interface

Figure 2. ZL30169 Block Diagram

Figure 3. ZL30165 Block Diagram

OTN Product Chart

Products	ZL30152GGG2	ZL30153GGG2	ZL30157GGG2	MAX24705/MAX24710	ZL30160GGG2	ZL30165GGG2	ZL30166GGG2	ZL30167GGG2	ZL30169LGG1	ZL30169LGG1
Number of PLL	1	2	2	1	4	4	3	2	4	1
Number of Synthesizers	1 High Precision	2 High Precision	1 High Precision 1 General	2 High Precision	2 High Precision 2 General	4 High Precision	4 High Precision Frame Sync feature	4 High Precision Frame Sync feature	4 High Precision Buffer fill feature	1 High Precision
Clocks	1 kHz – 750 MHz	1 kHz – 750 MHz	1 kHz – 750 MHz	2 kHz – 750 MHz	1 kHz – 750 MHz	1 kHz – 750 MHz	1 kHz – 750 MHz	1 kHz – 750 MHz	1 kHz – 750 MHz	1 kHz – 750 MHz

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