



January 2010

Contents

- 1.0 GR1244-Core & GR-253-Core Stratum 3E
- 2.0 GR1244-Core & GR-253-Core Stratum 3
- 3.0 ITU G.813 Option 1
- 4.0 ITU G.813 Option 2 and GR-253-Core SMC (SONET minimum clock)
- 5.0 GR1244-Core Stratum 4 and Stratum 4E
- 6.0 Timing over Packet (ToP) Oscillator Recommendations
 - 6.1 ToP Server Deployments
 - 6.1.1 Timing Card Applications
 - 6.1.2 Line Card Applications
 - 6.2 ToP Client Deployment

This Application Note provides a list of possible oscillators for Zarlink Semiconductor timing devices which include the PDH, SONET/SDH, SyncE (Synchronous Ethernet) and the ToP (Timing over Packet) family of devices. This list has been categorized based on applicable standards.

Where noted below, the oscillators have been tested by Zarlink and found to be suitable for use with Zarlink's digital PLL's. However, as changes in system hardware or software or configuration may affect the overall performance of the oscillator in any customer system. Designers should consult with their oscillator suppliers to satisfy themselves that the oscillator they select will be suitable for their requirements and follow supplier recommendations for support components and layout.

Reference to non-Zarlink supplied products is for Customers' convenience and information only and is not an endorsement or recommendation by Zarlink of such products. Zarlink makes no representation or warranty regarding such products and accepts no responsibility for Customers' selection and use of such products. Customers' use of such products is at Customers' own risk.

1.0 GR1244-Core & GR-253-Core Stratum 3E

GR1244-Core Stratum 3E requirements relevant for crystal oscillators are:

- Long Term Accuracy (20 years): ± 4.6 ppm
- Short Term Stability (24 hours): ± 0.37 ppm
- Frequency Drift Rate: $\pm 1.16 \times 10^{-14}$

Crystal Oscillator Manufacturer	Part Number	Type	Temperature Range [°C]	Comment
CTS (www.ctscorp.com)	1180026-018	OCXO	-40 to +85	Note 1
Rakon http://www.rakon.com/Products/ChipsetReferences/Pages/Telecom.aspx	STP2629LF	OCXO	-40 to +85	Note 1 Note2

Note 1: These oscillators have been tested in the lab by Zarlink.

Note 2: Formerly CMAC.

2.0 GR1244-Core & GR-253-Core Stratum 3

GR1244-Core Stratum 3 requirements relevant for crystal oscillators are:

- Long Term Accuracy (20 years): ± 4.6 ppm
- Short Term Stability (24 hours): ± 0.37 ppm
- Frequency Drift Rate: $\pm 4.63 \times 10^{-13}$

Crystal Oscillator Manufacturer	Part Number	Type	Temperature Range [°C]	Comment
Rakon http://www.rakon.com/Products/ChipsetReferences/Pages/Telecom.aspx	E3179	TCXO	-5 to +80	Note 1 Note 2
Rakon	E3199	TCXO	-40 to +85	Note 1 Note 2
Micro-Crystal (www.microcrystal.com)	OCXOWT-BV3	OCXO	-20 to +70	Note 1
Rakon	E2889	TCXO	-5 to +80	Note 2
CTS	03-42126-008	OCXO	-40 to +85	Note 1
CTS (www.ctscorp.com)	03-42126-007	OCXO	0 to +70	Note 1
MtronPTI (www.mtronpti.com)	M6101S006	TCXO	-40 to +85	
Connor-Winfield (www.conwin.com)	T502-020.00M	TCXO	0 to +70	
Connor-Winfield	T602-020.00M	TCXO	-40 to +85	
Connor-Winfield	T702-020.00M	TCXO	-20 to +70	

Note 1: These oscillators have been tested in the lab by Zarlink.

Note 2: Formerly CMAC.

3.0 ITU G.813 Option 1

ITU G.813 Option 1 requirements relevant for crystal oscillators are:

- Long Term Accuracy (20 years): ± 4.6 ppm
- Short Term Stability (24 hours): ± 4.53 ms

Crystal Oscillator Manufacturer	Part Number	Type	Temperature Range [°C]	Comment
CTS (www.ctscorp.com)	CTS 543LBT20	TCXO	0 to +70	Note 1
Vectron (www.vectron.com)	C2310	TCXO	0 to +50	Note 1
Fordahl (www.fordah.com)	DFA S1-LHZ-AS1001	TCXO	0 to +70	Note 1
Rakon http://www.rakon.com/Products/ChipsetReferences/Pages/Telecom.aspx	E3179	TCXO	-5 to +80	Note 1 Note 2
Rakon	E2791	TCXO	-20 to +70	Note 2
Rakon	E2889	TCXO	-5 to +80	Note 2
Rakon	E3199	TCXO	-40 to +85	Note 1 Note 2
Micro-Crystal (www.microcrystal.com)	OCXOWT-BV3	OCXO	-20 to +70	Note 1
CTS (www.ctscorp.com)	03-42126-008	OCXO	-40 to +85	Note 1
CTS (www.ctscorp.com)	03-42126-007	OCXO	0 to +70	Note 1
MtronPTI (www.mtronpti.com)	M6101S006	TCXO	-40 to +85	
Connor-Winfield (www.conwin.com)	T502-020.00M	TCXO	0 to +70	
Connor-Winfield	T602-020.00M	TCXO	-40 to +85	
Connor-Winfield	T702-020.00M	TCXO	-20 to +70	

Note 1: These oscillators have been tested in the lab by Zarlink.

Note 2: Formerly CMAC.

4.0 ITU G.813 Option 2 and GR-253-Core SMC (SONET minimum clock)

ITU G.813 Option 2 and GR-253-Core SMC requirements relevant for crystal oscillators are:

- Long Term Accuracy (20 years): ± 20 ppm
- Short Term Stability (24 hours): ± 4.6 ppm
- Frequency Drift Rate: $\pm 5.8 \times 10^{-12}$

Crystal Oscillator Manufacturer	Part Number	Type	Temperature Range [°C]	Comment
Rakon http://www.rakon.com/Products/ChipsetReferences/Pages/Telecom.aspx	E3179	TCXO	-5 to +80	Note 1 Note 2
Rakon	E3199	TCXO	-40 to +85	Note 1 Note 2
Micro-Crystal (www.microcrystal.com)	OXCOWT-BV3	OCXO	-20 to +70	Note 1
Fordahl (www.fordahl.com)	DFA S1-LHZ-AS1001	TCXO	0 to +70	
Rakon	E2889	TCXO	-5 to +80	Note 2
Rakon	E2791	TCXO	-20 to +70	Note 2
CTS (www.ctscorp.com)	03-42126-008	OCXO	-40 to +85	Note 1
CTS (www.ctscorp.com)	03-42126-007	OCXO	0 to +70	Note 1
MtronPTI (www.mtronpti.com)	M6101S006	TCXO	-40 to +85	
Connor-Winfield (www.conwin.com)	T502-020.00M	TCXO	0 to +70	
Connor-Winfield	T602-020.00M	TCXO	-40 to +85	
Connor-Winfield	T702-020.00M	TCXO	-20 to +70	

Note 1: These oscillators have been tested in the lab by Zarlink.

Note 2: Formerly CMAC.

5.0 GR1244-Core Stratum 4 and Stratum 4E

GR1244-Core Stratum 4 and 4E requirements relevant for crystal oscillators are:

- Long Term Accuracy (20 years): ± 32 ppm

The list below does not contain temperature compensated oscillators such as TCXO-s and OCXO-s. Although these parts meet Stratum 4, they have being excluded from the list due to the higher cost.

Crystal Oscillator Manufacturer	Part Number	Temperature Range [°C]	Comment
Rakon http://www.rakon.com/Products/ChipsetReferences/Pages/Telecom.aspx	20.0 MHz CFPS-74	0 to +70	Note 1 Note 2
Rakon	20.0 MHz CFPS-72A	0 to +70	Note 2
Rakon	20.0 MHz CFPS-72IA	-40 to +85	Note 2
Rakon	20.0 MHz CFPS-73A	0 to +70	Note 2
Rakon	20.0 MHz CFPS-73IA	-40 to +85	Note 2
CTS	405I33C20M0000	-40 to +85	
NDK (www.ndk.com)	C703020-20.000-3.3	0 to +70	Note 1
Micro Crystal (www.microcrystal.com)	MCS02V-B	-40 to +85	Note 1
Fordahl (www.fordahl.com)	DFN S2-LHZ20XB20C	0 to +70	Note 1
Fordahl	DFN S1-LHZ20XB32D	0 to +70	
Fordahl	DFN S2-LHZ20XB32D	0 to +70	
Fordahl	DFN S1-LHZXE32D	-40 to +85	
Fordahl	DFN S2-LHZXE32D	-40 to +85	
NDK	2560TK-20M	0 to +70	
Vectron (www.vectron.com)	VCCI-B3F-20MO	-40 to +85	
Golledge (www.golledge.co.uk)	MA03278	0 to +70	

Note 1: These oscillators have been tested in the lab by Zarlink.

Note 2: Formerly CMAC.

6.0 Timing over Packet (ToP) Oscillator Recommendations

6.1 ToP Server Deployments

6.1.1 Timing Card Applications

For applications where the ToP device will be deployed in a Master Timing Card or any other application where the device is required to act as the ToP server as well as the System synchronizer you should refer to the Application Specific recommendations (i.e. GR-1244-CORE & GR-253-CORE Stratum 3, etc) shown in sections 1.0 to 5.0 of this document.

6.1.2 Line Card Applications

For ToP servers on a linecard or in any application where the ToP server is locked to the necessary standards compliant system clocks, there is no need to use a compensated oscillator in order to provide a stable holdover clock and low wander generation. Therefore, for devices that are performing only the ToP server function, and not the system synchronization function, you can refer to the GR1244-Core Stratum 4 and Stratum 4E recommendations shown in section 5.0 of this document.

6.2 ToP Client Deployment

For ToP clients performing the ToP clock recovery, the short term stability is the most relevant specification for the crystal oscillator. An oscillator with good short term stability is required. Zarlink recommends using an oscillator (TCXO or OCXO) that meets the Stratum 3 (or better) short term stability.

This list contains oscillators with the highest level of behaviour suitable for 1588 applications. Zarlink's G.8261 test report can be made available upon request and indicates the possible level of clock recovery with similar oscillators.

Crystal Oscillator Manufacturer	Part Number	Type	Temperature Range [°C]	Comment
CTS (www.ctscorp.com)	1190100-003	OCXO	-40 to +85	
	1180026-018	OCXO	-40 to +85	
Rakon http://www.rakon.com/Products/ChipsetReferences/Pages/Telecom.aspx	STP2629LF	OCXO	-40 to +85	Note 1
Vectron (www.vectron.com)	C4550A2-0275	OCXO	-40 to +85	Note 2

Note 1: Formerly CMAC.

Note 2: Part number available to Zarlink customers only.

This list contains oscillators with enhanced behaviour suitable for 1588 applications. Zarlink's G.8261 test report can be made available upon request and indicates the possible level of clock recovery with similar oscillators.

Crystal Oscillator Manufacturer	Part Number	Type	Temperature Range [°C]	Comment
Vectron	C4400B1-0018-B	OCXO	-40 to +85	

This list contains oscillators with the minimal level of behaviour suitable for 1588 applications. Zarlink's G.8261 test report can be made available upon request and indicates the possible level of clock recovery with similar oscillators.

Crystal Oscillator Manufacturer	Part Number	Type	Temperature Range [°C]	Comment
Rakon	P5389LF	OC-TCXO	-10 to +70	Note 1
Rakon	E3179	TCXO	-5 to +80	Note 1
Rakon	E3199	TCXO	-40 to +85	Note 1
Rakon	E4845LF	TCXO	-40 to +85	Note 1

Note 1: Formerly CMAC.

This list contains oscillators with behaviour that should be suitable for frequency accuracy or traffic performance masks.

Crystal Oscillator Manufacturer	Part Number	Type	Temperature Range [°C]	Comment
CTS	03-42126-008	OCXO	-40 to +85	
CTS	03-42126-007	OCXO	0 to +70	
CTS	114	OCXO	-40 to +85	
Micro-Crystal (www.microcrystal.com)	OCXOWT-BV3	TCXO	-20 to +70	
Rakon	E2889	TCXO	-5 to +80	Note 1

Note 1: Formerly CMAC.



**For more information about all Zarlink products
visit our Web Site at
www.zarlink.com**

Information relating to products and services furnished herein by Zarlink Semiconductor Inc. or its subsidiaries (collectively "Zarlink") is believed to be reliable. However, Zarlink assumes no liability for errors that may appear in this publication, or for liability otherwise arising from the application or use of any such information, product or service or for any infringement of patents or other intellectual property rights owned by third parties which may result from such application or use. Neither the supply of such information or purchase of product or service conveys any license, either express or implied, under patents or other intellectual property rights owned by Zarlink or licensed from third parties by Zarlink, whatsoever. Purchasers of products are also hereby notified that the use of product in certain ways or in combination with Zarlink, or non-Zarlink furnished goods or services may infringe patents or other intellectual property rights owned by Zarlink.

This publication is issued to provide information only and (unless agreed by Zarlink in writing) may not be used, applied or reproduced for any purpose nor form part of any order or contract nor to be regarded as a representation relating to the products or services concerned. The products, their specifications, services and other information appearing in this publication are subject to change by Zarlink without notice. No warranty or guarantee express or implied is made regarding the capability, performance or suitability of any product or service. Information concerning possible methods of use is provided as a guide only and does not constitute any guarantee that such methods of use will be satisfactory in a specific piece of equipment. It is the user's responsibility to fully determine the performance and suitability of any equipment using such information and to ensure that any publication or data used is up to date and has not been superseded. Manufacturing does not necessarily include testing of all functions or parameters. These products are not suitable for use in any medical products whose failure to perform may result in significant injury or death to the user. All products and materials are sold and services provided subject to Zarlink's conditions of sale which are available on request.

Purchase of Zarlink's I²C components conveys a license under the Philips I²C Patent rights to use these components in an I²C System, provided that the system conforms to the I²C Standard Specification as defined by Philips.

Zarlink, ZL, the Zarlink Semiconductor logo and the Legerity logo and combinations thereof, VoiceEdge, VoicePort, SLAC, ISLIC, ISLAC and VoicePath are trademarks of Zarlink Semiconductor Inc.

TECHNICAL DOCUMENTATION - NOT FOR RESALE
