Communications

OTN
Multi-Service OTN Muxponder/Mapper

Ethernet Transport
Ethernet over PDH
Ethernet over SONET/SDH

SONET/SDH
Multi-Ch/Multi-Rate Framer+Serdes
Mappers + Framers
Transceivers/CDR

PDH
E1 LIUs
T1/E1/J1 LIUs
Framer + LIUs Combos
BITS Solutions
T3/E3 LIUs
T3/E3 Framers
T3/E3 Combos
T/E Timing ICs
T/E WAN Clocks

2011

www.exar.com

COMMUNICATIONS

Why Exar?

With over 40 years of mixed-signal design expertise, world-class product reliability and field support, Exar stays focused on leveraging its strengths to solve your design challenges. Innovative and leading edge design techniques are applied throughout Exar's T/E/J and SONET/SDH product portfolio. With recent acquisitions of industry proven technology, Exar has state-of-the-art Carrier Ethernet Transport and OTN products. This brochure highlights some of the key product offerings. The complete list of products and full details (such as Product Briefs, Product Data sheets and Applications notes) are readily available from www.exar.com.

Exar Product Applications

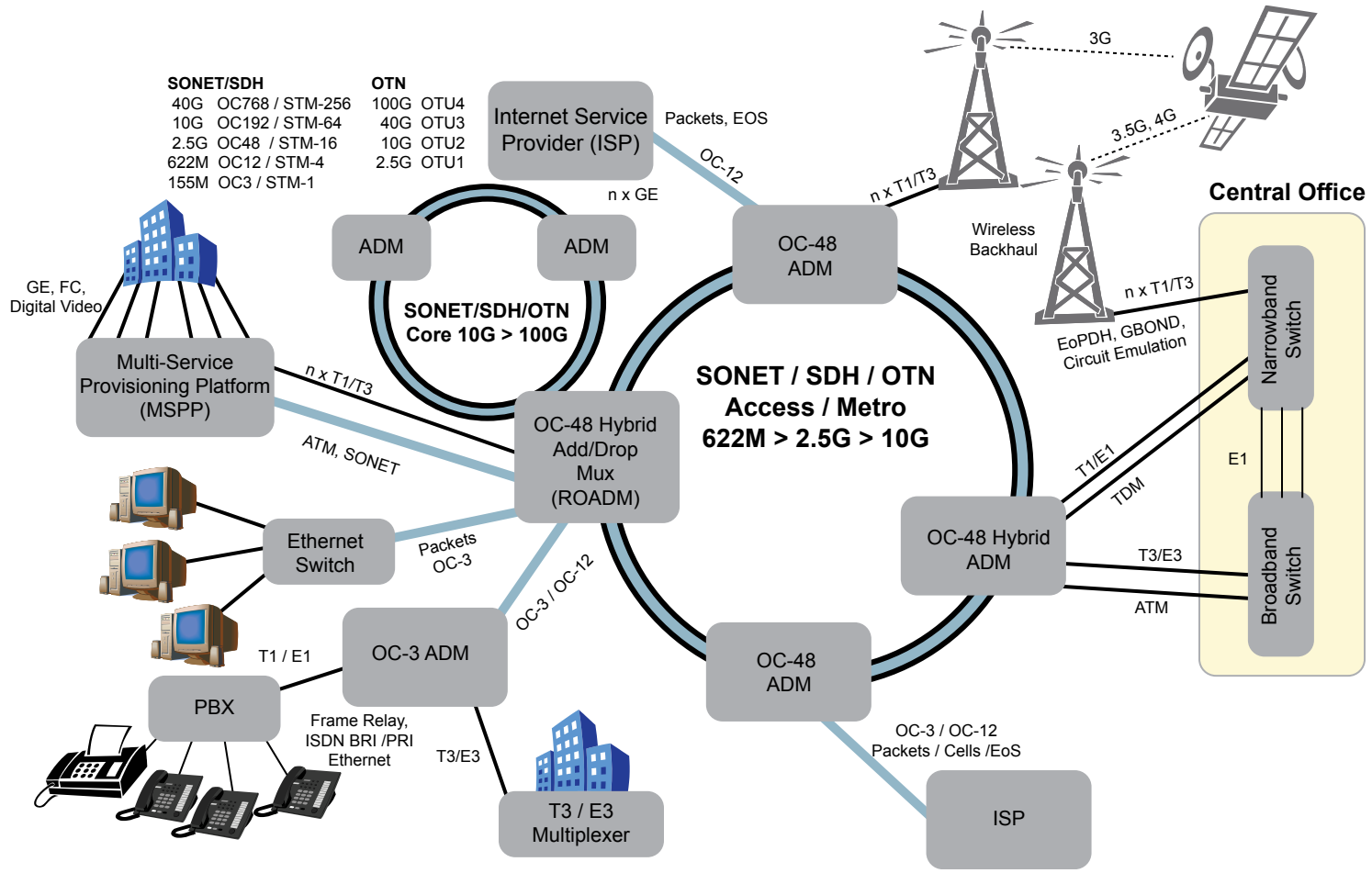
Exar's products fits in all major sections of the network as depicted in figure below:

- Access T1/T3 Muxes and Concentrators
- Wireless Base Stations
- Multi-Service Provisioning Platforms (MSPP)
- DSLAMs
- Ethernet Switches and WAN Routers
- Optical Switches, ADM, SONET / P-OTS/OTN

Green Statement

Exar is committed for energy efficient products and provides lead-free package options.

Today's Access Control and Wide Area Network (WAN) Architecture



OTN Network Product Families

Why Exar?

Exar's OTN (Optical Transport Network) product family targets ROADM (Reconfigurable Optical Add-Drop Multiplexer) and P-OTS (Packet Optical Transport System) platforms. These OTN products encompass a wide variety of multiplexing, mapping and switching capabilities for 10, 40 and 100 Gbps applications.

Scalable with ODU0 Granularity

The DWDM (Dense Wave Division Multiplexing) transport network is evolving to support OTN switching and grooming making the ability to support fine-grained services (e.g. GE) paramount. Exar's unique device architecture enables high density solutions supporting ODU0 granularity scaling from 10 Gbps to 100 Gbps applications.

Multi-service Mapping

In multi-service muxponder applications mapping capabilities with full performance monitoring is provided for a wide variety of client services. These include Ethernet, SAN, SONET/SDH and Digital Video. Mapping layers can optionally include GFP encapsulation and intermediate SONET/SDH mappings to provide compatibility with existing networks comprising of separate MSPP/MSTP and DWDM network elements.

Standards based

Products are designed and verified to meet international standards specifications including all of the latest additions to ITU-T G.709 v3 such as ODU0, ODUflex, and GMP mappings. To further strengthen multi-vendor interoperability support for multiple FEC algorithms is also included.

Software Support

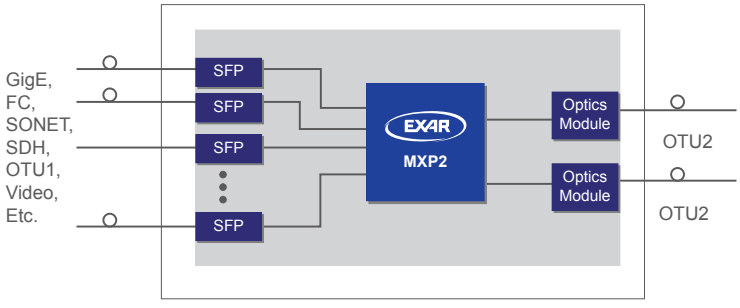
These complex, high integration devices demand a complete and robust device management software solution. A complete set of API (Application Programming Interface) calls enable provisioning, monitoring and management of mapped and switched services. Being more than just device drivers, the provided device management software substantially decreases time and effort spent on design, integration and verification of these devices into carrier class network elements.

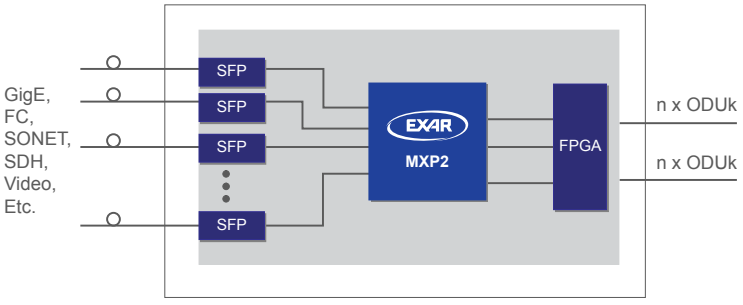
Applications of OTN products

Exar's world-class OTN solutions are ideal for a wide variety of markets and applications:

- Access Aggregation platforms
- Metro and Core DWDM platforms (ROADMs, P-OTS)
- Multi-Service Provisioning Platforms (MSPP)

Muxponder Application Diagrams





OTN				
Name	Description	Data Rates	Protocols	Client Interface
MXP2	Multi-Service OTN Muxponder/Mapper	10G/20G	OTN, SONET/SDH, GFP, FEC, GMP	Ethernet/SAN/Video/SONET/SDH

Ethernet Transport Network Product Families

Why Exar?

EXAR has a broad product portfolio of Ethernet over SONET (EoS) and Ethernet of PDH (EoPDH) solutions suitable for a wide range of transport platforms from Customer Premise Equipment (CPE) to Add Drop Multiplexers (ADMs), Multi Service Provisioning Platforms (MSPP) and Multi Service Transport Platforms (MSTP). In addition to complex, multi-protocol solutions, EXAR also offers cost, space and power optimized solutions for Media and Protocol conversion.

Flexible Architecture Support

Ethernet transport in carrier's SONET/SDH and PDH networks involves many types of equipment each with their own physical and functional characteristics. All of EXAR's Carrier Ethernet Transport products support GFP or HDLC encapsulation, Virtual Concatenation (VCAT) of PDH links or High and Low Order SONET/SDH paths, and Link Capacity Adjustment Scheme (LCAS) for member failure protection and group bandwidth management. Along with these common features, different products support various client ports, channel counts, network interfaces and network protection architectures enabling optimum suitability for all applications.

Client Interfaces

All Ethernet transport products feature E/FE and GE xMII interfaces for direct connection to external PHYs along with integrated Ethernet MACs for frame delineation and statistics gathering. Higher channel count products also have a channelized SPI-3 packet interface for increased density and generic packet protocol support. In addition to data clients, EXAR's Multi-service products enable the evolution from PDH to Ethernet services by including both types of clients simultaneously. These products have integrated T1/E1 and T3/E3 ports.

Network Protection

Standard SONT/SDH and PDH protection mechanisms are supported by the complete line of EXAR transport solutions. Multiple network interfaces enable linear or ring 1+1, 1:1 or 0:2 operation. Additionally, integrated LCAS allows for VCAT member failure protection and restoration.

Standards Based

Standards based operation is a requirement for complex carrier equipment solutions such as EoS and EoPDH. EXAR's product line is verified to comply with all appropriate Telecordia and ITU Recommendations.

Software Support

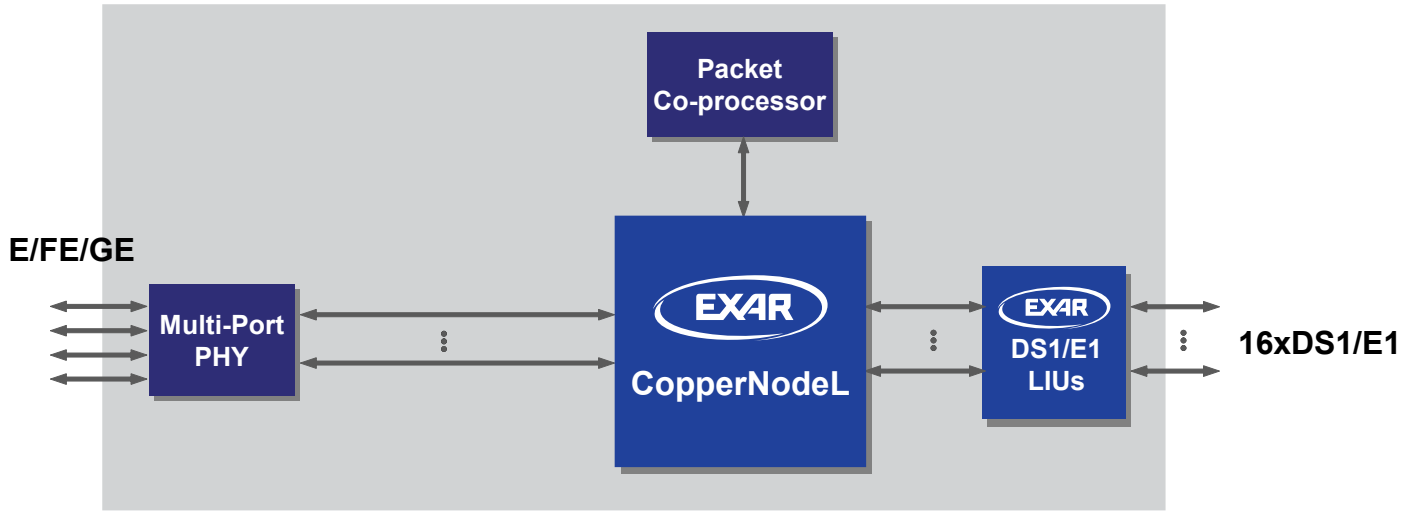
These complex, high integration devices demand a complete and robust device management software solution. A complete set of API (Application Programming Interface) calls enable provisioning, monitoring and management of mapped and switched services. Being more than just device drivers, the provided device management software substantially decreases time and effort spent on design, integration and verification of these devices into carrier class network elements.

Applications of Carrier Ethernet Transport products

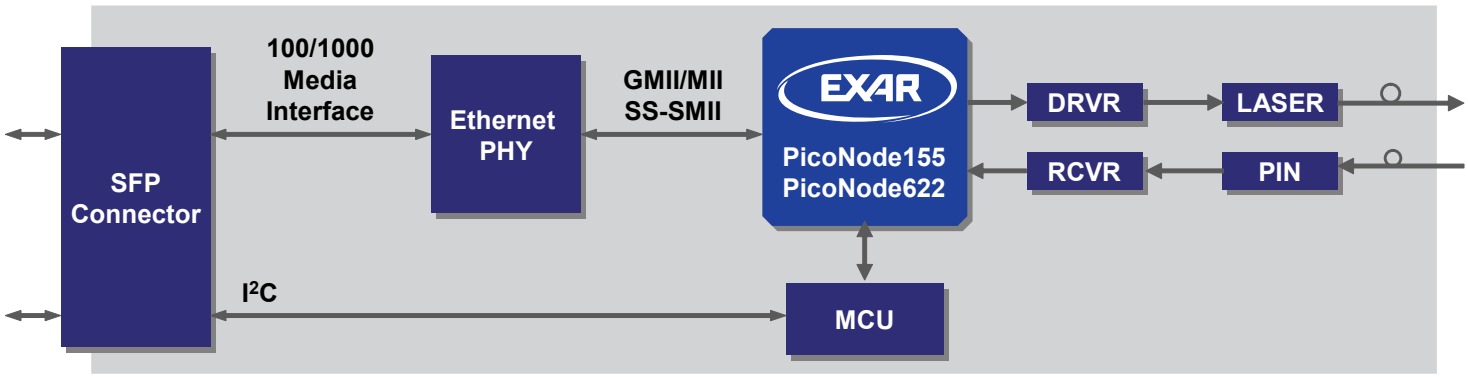
Exar's world-class EoS and EoPDH solutions are ideal for a wide variety of markets and applications:

- Small form factor Media/Protocol Converters
- Micro Multi-Service Provisioning Platforms (uMSPP)
- ADM/MSPP Service or cards
- Access Concentrators
- ROADMs

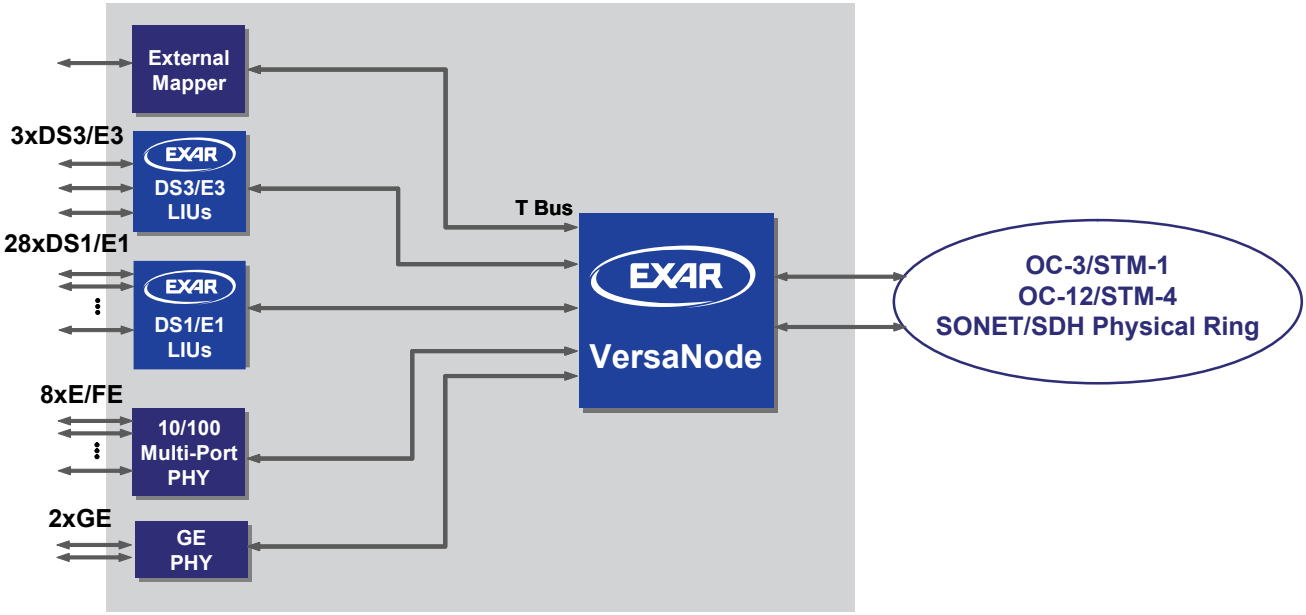
CopperNode CPE Application



PicoNode SFP Application



VersaNode uMSPP Application



Ethernet Transport - Ethernet over PDH					
Name	Description	Line Interface	Protocols	Data Channels	Client Interface
CopperNode	Remote Terminal Ethernet over nxT1/E1/T3/E3 Mapper	2xT3/E3 16xT1/E1	GFP, HDLC VCAT/LCAS	4	1xGE, 4xE/FE SPI-3 6xT1/E1
CopperNodeL	Remote Terminal Ethernet over nxT1/E1 Mapper	16xT1/E1	GFP, HDLC VCAT/LCAS	4	1xGE, 4xE/FE SPI-3
CopperNodeE	Remote Terminal Ethernet over nxT1/E1 Mapper	8xT1/E1	GFP, HDLC VCAT/LCAS	4	1xGE, 4xE/FE SPI-3
CopperNodeHE	Ethernet over nxT1/E1/T3/E3 Head End Aggregator	3xT3/E3 21(28*)xT1/E1	GFP, HDLC VCAT/LCAS	8	1xGE, 4xE/FE SPI-3
PicoNodeET1	Optimized Ethernet over nxT1/E1 Media/Protocol Conversion	4xT1/E1	GFP, HDLC VCAT/LCAS	1	1xGE/FE/E
PicoNodeET3	Optimized Ethernet over nxT3/E3 Media/Protocol Conversion Solution	2xT3/E3	GFP, HDLC VCAT/LCAS	1	1xGE/FE/E

Note: Latest products are bolded.

Ethernet Transport - Ethernet over SONET/SDH					
Name	Description	Line Interface	Protocols	Data Channels	Client Interface
PicoNode622	Optimized EoS Media/Protocol Conversion Solution	OC-3/STM-1 OC-3/STM-4	GFP, HLDC VCAT/LCAS	1	1xE/FE/GE
PicoNode155	Optimized EoS Media/Protocol Conversion Solution	OC-3/STM-1	GFP, HLDC VCAT/LCAS	1	1xE/FE/GE
RadioNode	155Mbps Micro-MSPP Solution	Dual OC-3/STM-1	GFP, HLDC VCAT/LCAS	24	2xGE, 8xE/FE SPI-3 28xT1/E1 3xT3/E3 155M Telecom Bus
VersaNode	622Mbps Micro-MSPP Solution	Dual OC-3/STM-1 Dual OC-12/STM-4	GFP, HLDC VCAT/LCAS	24	2xGE, 8xE/FE SPI-3 28xT1/E1 3xT3/E3 155M/622M Telecom Bus
DSF2500	2.5Gbps EoS Line Card Solution	Dual OC-3/STM-1 Dual OC-12/STM-4 Dual OC-48/STM-16	GFP, HLDC VCAT/LCAS	24	2xGE, 8xE/FE SPI-3
MSF2500	2.5Gbps Multi-Service Solution	Dual OC-3/STM-1 Dual OC-12/STM-4 Dual OC-48/STM-16	GFP, HLDC VCAT/LCAS	24	2xGE, 8xE/FE SPI-3 28xT1/E1 155M/622M Telecom Bus
GEM250	2.5Gbps Dual GE EoS Solution for WDM	Dual OC-48/STM-16	GFP, HLDC	2	2xGE
MSF250	2.5Gbps Multi-Service Solution	Dual OC-3/STM-1 Dual OC-12/STM-4 Dual OC-48/STM-16	GFP, HLDC VCAT/LCAS	24	2xGE, 8xE/FE SPI-3 28xT1/21xE1 155MTelecom Bus
DSF250	2.5Gbps EoS Line Card Solution	Dual OC-3/STM-1 Dual OC-12/STM-4 Dual OC-48/STM-16	GFP, HLDC VCAT/LCAS	24	2xGE, 8xE/FE SPI-3
MSF15	155Mbps Micro-MSPP Solution	Dual OC-3/STM-1	GFP, HLDC VCAT/LCAS	8	1xGE, 7xE/FE 28xT1/21xE1 2xT3/E3
DSF15	155Mbps EoS CPE Solution	OC-3/STM-1	GFP, HLDC VCAT/LCAS	8	1xGE, 7xE/FE 28xT1/21xE1

Note: Latest products are bolded.

SONET/SDH Solutions

Why Exar?

EXAR has highly integrated multi-channel SONET/SDH framer products with on chip high speed multi-channel SERDES functions, a range of SONET/SDH framer and mapper products as well as several key, stand alone SONET/SDH CDR and Transceiver products. The higher levels of integration and superior jitter performance has benefited many successful SONET/SDH product deployments.

Higher Levels of Integration and Functionality

At the high end, the highest density devices contain 16xOC48 or 4xOC192 framers with 768 Pointer Processors plus 32x2.5G high performance analog SERDES with CDR functions that drive SFPs and meet all SONET/SDH jitter performance requirements. These devices are well suited for the high density (4x10G) or 16x2.5G line card solutions required for next generation SONET/SDH networks.

Another family of Framer / Mapper products provide flexible mapping of multi-channel T1/E1 or DS3/E3 clients into SONET/SDH networks. The highest density product in this family provides mapping of 28 independent T1s (or 21 E1s) into an STS-1. It also supports the transparent transfer and regeneration of the independent T1/E1 clocks across the SONET/SDH network and meets all the jitter / wanders specs of the T1/E1 client interfaces.

Superior Jitter Performance

The standalone CDR and Transceiver (SERDES with CDR) products exceed the stringent SONET/SDH Jitter Generation specs for the transmitter (driving SFPs directly).

The receivers have a lot of margin for Jitter Tolerance and also meet Jitter transfer specs for certain regenerator applications where it is required.

Diagnostics

Employing a full suite of loop-backs, Exar devices can quickly identify a fault location, invoke a complete set of alarms, and easily determine the fault type for the network operator. This detection and diagnostic capability is critical to reliable data transmission.

Exar's SONET/SDH products have the several client and facility side loop-backs for each function providing designers with a built-in diagnostic solution for the physical layer. A suite of Performance Monitoring (PMON) counters keep track of the integrity of each of section of the links.

Software Support

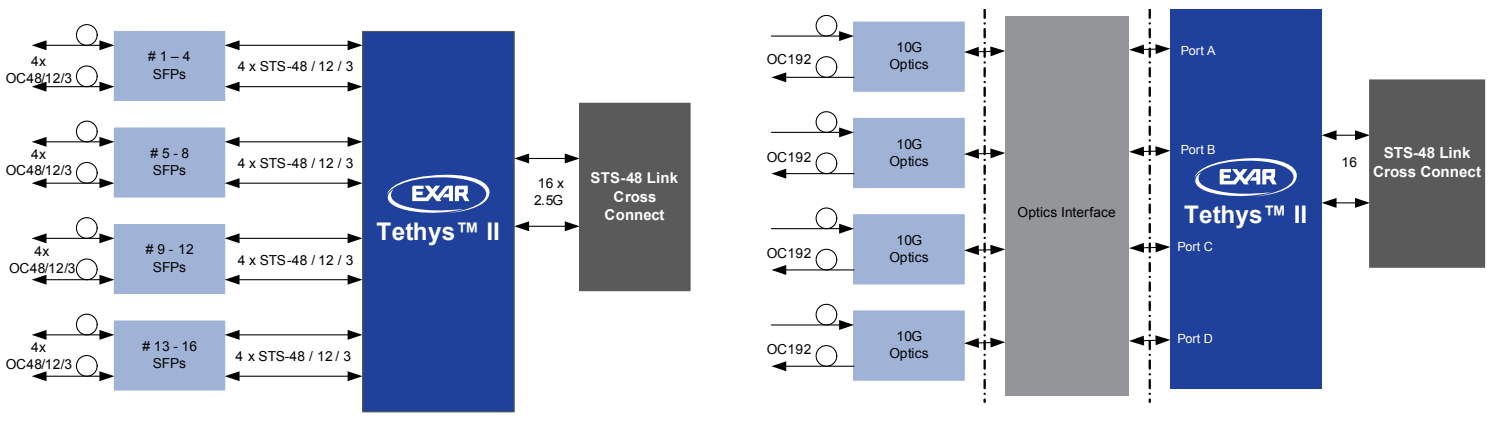
Exar provides a full set of device driver software for all of its SONET/ SDH products via a concise set of API (Application Programming Interface) calls to configure, and manage the channels with or without interrupt handling. Exar's device driver software for SONET/SDH products are fully tested and are operating system and processor independent. These device drivers (written in ANSI C) permits the user to compile and port this code very efficiently into their system software.

Applications of SONET/SDH products

Exar's world-class physical layer solutions are ideal for a wide variety of markets and applications:

- Line cards
- Access Concentrators
- Multi-Service Provisioning Platforms (MSPP)

Tethys Solutions



SONET/SDH - Multi-Channel/Multi-Rate Framer+Serdes

Part Number	Description	Line Interface	Protocols	Transceiver Interface	System Bus Interface	Power Supply	Package(s)
PEB1756AE	Tethys™ 2x10G SONET/SDH Framer and Pointer Processor	2xOC192	SONET/SDH	SFI-4.1	2.5G TFI	3.3V/1.2V	CBGA-1397
PEB1757AE	Tethys™ 2x10G, 16x2.5G/622M/155M SONET/SDH Framer and Pointer Processor	2xOC192 16xOC48/12/3	SONET/SDH	SFI-4.1 Serial 2.5G/ 622M/155M	2.5G TFI	3.3V/1.2V	CBGA-1397
PEB2756AE	**Tethys II™ 4x10G SONET/SDH Framer and Pointer Processor**	**4xOC192**	**SONET/SDH**	**SFI-4.1 SFI-4.2**	**2.5G TFI**	**3.3V/1.2V**	**CBGA-1397**
PEB2757AE	**Tethys II™ 4x10G, 16x2.5G/622M/155M SONET/SDH Framer and Pointer Processor**	**4xOC192 16xOC48/12/3**	**SONET/SDH**	**SFI-4.1 SFI-4.2 Serial 2.5G/ 622M/155M**	**2.5G TFI**	**3.3V/1.2V**	**CBGA-1397**

SONET/SDH - Mappers + Framers

Name	Description	Line Interface	Protocols	Bus Interface	System Bus Interface	Power Supply	Package(s)
Orion	Highest Density T1/E1 Aggregation Reference Design Platform	n/a	n/a	n/a	n/a	n/a	Reference Design
PSF15	T1/E1-to-SONET/SDH Framer/Mapper with Integrated 28-Channel T1/E1 LIUs/Framer and M13 Multiplexer	DS1/E1 2xSTM-0/STM-1	SDH	n/a	n/a	3.3V/2.5V/1.8V	CSBGA-812
XRT86SH221	Voyager-Lite: E1-to-SONET/SDH Framer/Mapper with Integrated 21-Channel Short-Haul E1 LIU	E1 1xSTM-0/STM-1	SDH	19.44/6.98MHz Telecom	n/a	3.3V/1.8V	PBGA-388
XRT86SH328	**Voyager: T1/E1-to-SONET/SDH Framer/Mapper with Integrated 28-Channel T1/E1 LIUs/Framer and M13 Multiplexer**	**DS1/E1 1x STS-1/STS-3 1xSTM-0/STM-1**	**SONET/ SDH**	**19.44/6.98MHz Telecom**	**n/a**	**3.3V/ 1.8V**	**BGA-568**
XRT94L31	3xDS3/E3/STS-1 to OC-3/STM-1 Framer Mapper	DS3/E3 STS-1/ STS-3 STM-1	SONET/SDH	n/a	n/a	3.3V	TBGA-504
XRT94L33	3xDS3/E3/STS-1 or ATM/POS to OC-3/STM-1 Framer Mapper	1xSTS-3 1xSTM-1 3xDS3/E3/STS-1	SONET/SDH ATM/PPP	8-Bit 77.76MHz	Utopia/POS PHY	3.3V	PBGA-504
XRT94L43	12xDS3/E3/STS-1 to OC-12/STM-4 Framer Mapper	1xSTS-12 4xSTS-3	n/a	8-Bit 77.76MHz	n/a	2.5V	PBGA-516

SONET/SDH - Transceivers/CDR

Part Number	Description	Line Interface	Protocols	Transceiver Interface	Power Supply	Package(s)
XRT91L30	155/622 Mbps SONET/SDH Transceiver	OC-12/OC-3	SONET/SDH	8-Bit TTL	3.3V	PQFP-64
XRT91L31	**155/622 Mbps SONET/SDH Transceiver**	**OC-12/OC-3**	**SONET/SDH**	**8-Bit TTL**	**3.3V**	**PQFP-64**
XRT91L33	**155/622 Mbps CDR**	**OC-12/3 STM-4/1**	**SONET/SDH**	**LVDS**	**3.3V**	**TSSOP-20**
XRT91L33A	**155/622 Mbps CDR with Enhanced Jitter Performance**	**OC-12/3 STM-4/1**	**SONET/SDH**	**LVDS**	**3.3V**	**TSSOP-20**
XRT91L34	4-Channel 155/622 Mbps CDR	OC-12/3/1 STM-4/1/0	SONET/SDH	8-Bit TTL	3.3V/1.8V	LQFP-128

Note: Latest products are bolded.

T/E/J Carrier Solutions

Why Exar?

Exar has a comprehensive and broad T/E/J physical layer product portfolio: Line Interface Units (LIUs), framers, LIU/framer combos, LIU/Jitter Attenuator Combos (with and without Desynchronization), BITS clock receivers and transceivers, and PCM line interfaces. Our products provide bridging solutions from existing networks to EoPDH, Circuit Emulation (CES) and Pseudo Wire applications as well as providing synchronization for Ethernet networks through our BITS solutions. Exar has a history of innovation with many industry firsts:

- R³ Technology™ (Reconfigurable, Relayless Redundancy)
- An 8-Channel integrated LIU and framer device, replaces several discrete components
- Up to 14-Channel long/short haul T1 LIU, (21-Channel for E1)
- Up to 12-Channel LIU and Jitter Attenuator for access, digital cross connect amongst others
- A 28-Channel T1/E1 LIU/Framer with VT/TU Mapper and M13 Multiplexer
- Up to 12-Channel T3/E3 LIU
- Up to 8-Channel T3/E3 LIU/Framer Combos

PDH Framer and LIU Solutions

Exar has a great reputation for offering innovative T1/E1/J1 as well as T3/E3/STS-1 products with many industry firsts, including the single-chip Jitter Attenuators (JA), integrated LIU with JA and CDR (Clock and Data recovery), and an integrated LIU plus SONET/SDH de-synchronizer. The LIU function incorporates the R³ (Relayless, Reconfigurable Redundancy) Technology™ for minimal footprint and cost effective solutions. Exar is well known for outstanding product reliability and design support over a wide range of devices. Used individually or in chipsets, these devices are used in systems for many of the leading networking equipment manufacturers.

Exar PDH Technology Advantages

Exar offers many advantages to system designers. Key among these are features that provide flexibility in design, enable system reliability, reduce cost, and provide standards compliant solutions.

R³ Technology™

R³ Technology™ means Reconfigurable, Relayless Redundancy. Designers can configure or reconfigure a card (board) in software without changing any external components.

- Reduces time-to-market/manufacturing costs
- Allows single Bill-of-Material (BOM) for worldwide applications

Temperature

All of Exar's T/E Carrier and DS3/E3 products are industrial grade with a temperature of -40°C to +85°C.

Innovative Features

Redundancy

Internal switches help to implement 1:1 or 1+1 redundancy without the need for any relays, which helps to reduce cost and board space while improving reliability.

Hot Swapping

Exar's LIUs not only support 1:1 or 1+1 redundancy, but also support hot swapping without relays.

Integrated Timing Generators

An on-board timing circuit generates the appropriate system clocks from a single crystal. This again eliminates the need to change any components externally.

Design Flexibility

Choice of Host (software) or Hardware mode for interfacing and control provide design flexibility.

Extensive Diagnostic Capability

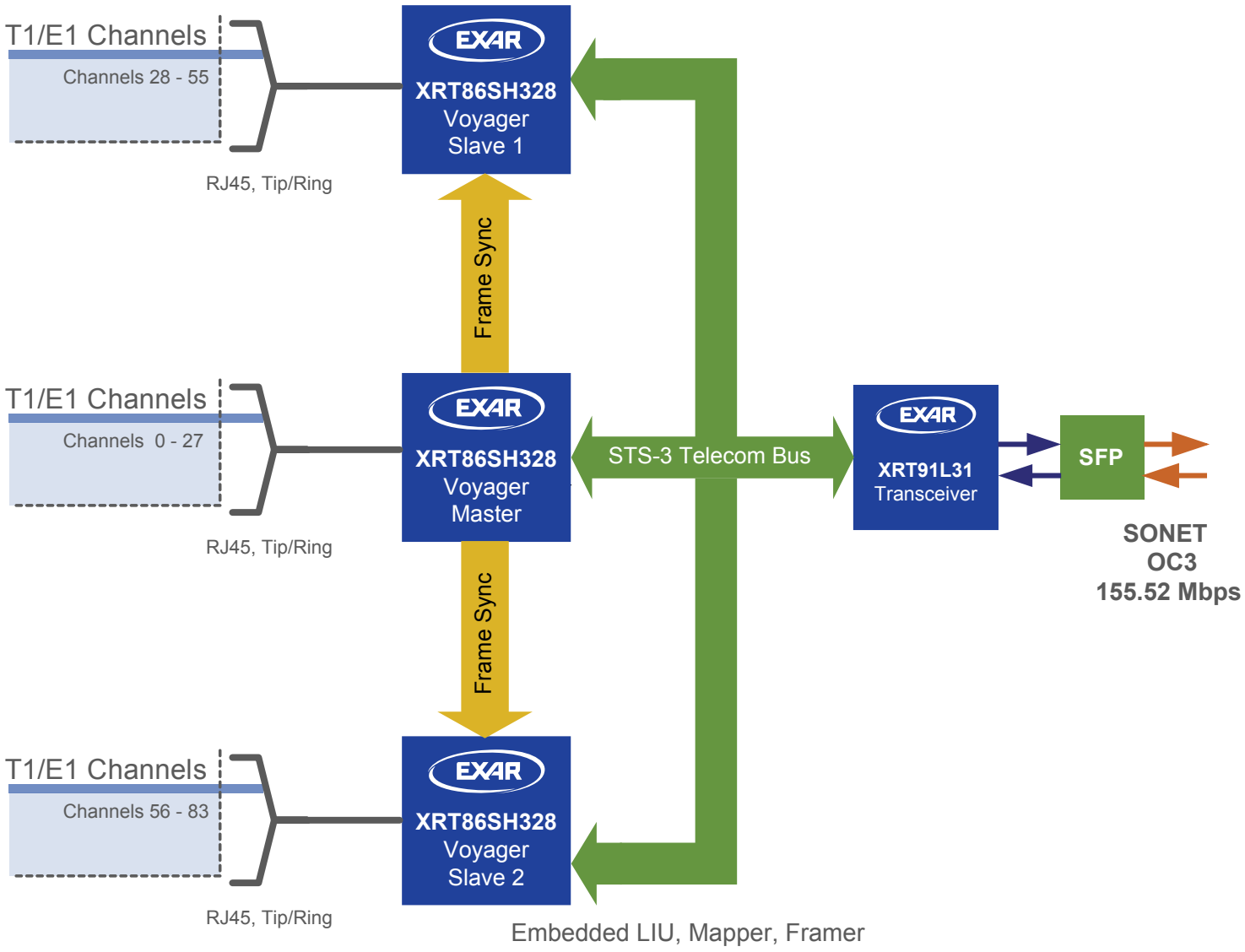
System users can quickly isolate a fault location, use alarms, and determine the nature of the fault.

Applications of T1/E1/J1 and T3/E3/STS-1 products

Exar's world-class physical layer solutions are ideal for a wide variety of markets and applications:

- BITS (T1/E1)
- Digital Cross Connects
- Access Concentrators
- Multi-Service Provisioning Platforms (MSPP)
- ATM and Frame Relay Switches
- Routers
- Wireless Base Stations
- DSLAMs

Integrated PDH to SONET Mapper Solution (Orion)



PDH - E1 LIUs

Part Number	Description	No. of Channels	Data Rate(s)	Clock Recovery	Short/ Long Haul	Operating Power Supply, Max Current	Package(s)
XRT5683A	PCM Line Interface Chip	1	E1, E2, T1, T2	✓ with Tank Ckt	S	5V ±5%, 40mA	PDIP-18 SOIP-18
XRT56L85	Low Power PCM LIU	1	E1	✓ with Tank Ckt	S	5V ±5%, 16mA	SOIC-18 PDIP-18
XRT5793	4-Channel E1 LIU	4	E1		S	5V ±5%, and -5V 5%, 68mA	TQFP-80 PLCC-68
XRT5794	4-Channel E1 LIU	4	E1		S	5V ±5%, and -5V 5%, 68mA	TQFP-80 PLCC-68
XRT5894	**4-Channel E1 LIU**	**4**	**E1**		**S**	**3.3V, 5V ±5%, 210mA**	**TQFP-64**

Note: Latest products are bolded.

PDH - E1 LIUs

Part Number	Description	No. of Channels	Data Rate(s)	Clock Recovery	Short/ Long Haul	Operating Power Supply, Max Current	Package(s)
XRT5897	7-Channel E1 LIU	7	E1		S	3.3V ±5%, 340mA	TQFP-100
XRT59L91	**1-Channel E1 LIU**	**1**	**E1**		**S**	**3.3V ±5%, 56mA**	**SOIC-16**
XRT5997	**7-Channel E1 LIU**	**7**	**E1**		**S**	**3.3V ±5%, 175mA**	**TQFP-100**
XRT59L921	21-Channel E1 LIU	21	E1		S	3.3V, 300mA	STBGA-316
XRT81L27	7-Channel E1 LIU with CDR	7	E1	✓	S	3.3V ±5%, 55mA	TQFP-128
XRT82D20	**1-Channel E1 LIU with JA & CDR**	**1**	**E1**	✓	**S**	**3.3V ±5%, 58mA**	**SOJ-28**
XRT82L24A	4-Channel E1 Line Transceiver with JA & CDR	4	E1	✓	S	3.3V ±5%, 228mA	TQFP-100
XRT83SL28	8-Channel E1 Short-Haul LIU with JA & CDR	8	E1	✓	S	3.3V ±5%	TQFP-144
XRT83VSH28	**8-Channel E1 Short-Haul LIU with JA & CDR**	**8**	**E1**	✓	**S**	**3.3V ±5%**	**BGA-225**
XRT83SL216	16-Channel E1 Short-Haul LIU with JA & CDR	16	E1	✓	S	3.3V ±5%	BGA-289

PDH - T1/E1/J1 LIUs

Part Number	Description	No. of Channels	Data Rate(s)	Clock Recovery	Short/ Long Haul	Operating Power Supply	Package(s)
XRT83D10	1-Channel DS1/CEPT LIU with JA & CDR	1	T1/E1	✓	n/a	3V ±5%, 5V ±5%	SOJ-28
XRT83L30	**1-Channel T1/E1/J1 Long-Haul, Short-Haul LIU with JA & CDR**	**1**	**T1/E1/J1**	✓	**S/L**	**3.3V ±5%**	**PQFP-64**
XRT83L34	4-Channel T1/E1/J1 Long-Haul, Short-Haul LIU with JA & CDR	4	T1/E1/J1	✓	S/L	3.3V ±5%	TQFP-128
XRT83VL38	**8-Channel T1/E1/J1 Long-Haul, Short-Haul LIU with JA & CDR**	**8**	**T1/E1/J1**	✓	**S/L**	**3.3V ±5%**	**BGA-225**
XRT83L314	14-Channel T1/E1/J1 Long-Haul, Short-Haul LIU with JA & CDR	14	T1/E1/J1	✓	S/L	3.3V ±5%	BGA-304
XRT83SL30	1-Channel T1/E1/J1 Short-Haul LIU with JA & CDR	1	T1/E1/J1	✓	S	3.3V ±5%	TQFP-64
XRT83SL34	4-Channel T1/E1/J1 Short-Haul LIU with JA & CDR	4	T1/E1/J1	✓	S	3.3V ±5%	TQFP-128
XRT83VSH38	**8-Channel T1/E1/J1 Short-Haul LIU with JA & CDR**	**8**	**T1/E1/J1**	✓	**S**	**3.3V ±5%**	**BGA-225**
XRT83VSH314	**14-Channel T1/E1/J1 Short-Haul LIU with JA & CDR**	**14**	**T1/E1/J1**	✓	**S**	**3.3V/1.8V**	**PBGA-304**
XRT83VSH316	**16-Channel T1/E1/J1 Short-Haul LIU with JA & CDR**	**16**	**T1/E1/J1**	✓	**S**	**3.3V/1.8V with 5V tolerant**	**STBGA-316**

Note: Latest products are bolded.

PDH - Framer + LIU Combos

Part Number	Description	No. of Channels	Data Rate(s)	Clock Recovery	Short/ Long Haul	Operating Power Supply	Package(s)
XRT86VL30	**1-Channel T1/E1/J1 Framer and LIU Combination with R³ Technology™**	**1**	**T1/E1/J1**	✓	**S/L**	**3.3V ±5%**	**LQFP-128 LQFP-80**
XRT86VL32	2-Channel T1/E1/J1 Framer and LIU Combination with R³ Technology™	2	T1/E1/J1	✓	S/L	3.3V ±5%	BGA-225
XRT86VL34	4-Channel T1/E1/J1 Framer and LIU Combination with R³ Technology™	4	T1/E1/J1	✓	S/L	3.3V ±5%	BGA-225
XRT86VX38	**8-Channel T1/E1/J1 Framer and LIU Combination with R³ Technology™**	**8**	**T1/E1/J1**	✓	**S/L**	**3.3V ±5%**	**fpBGA–256**
XRT86SH221	Voyager-Lite: E1-to-SONET/SDH Framer/ Mapper with Integrated 21-Channel Short-Haul E1 LIU	21	E1, 1xSTS-1	✓	S	3.3V/1.8V	PBGA-388
XRT86SH328	**Voyager: T1/E1-to-SONET/SDH Framer/ Mapper with Integrated 28-Channel T1/E1 LIUs/Framer and M13 Multiplexer**	**28**	**DS1, E1, 1xSTS-1**	✓	**S**	**3.3V/1.8V**	**BGA-568**

PDH - BITS Solutions

Part Number	Description	64Khz/8Khz/ 400Hz modes	BITS Rx	BITS Tx	SSM
XRT85L61	BITS (Building Integrated Timing Supply) Clock Extractor	✓	✓		
XRT86VL30	**BITS/SSM T1/E1/J1 Clock Recovery Element and Framer and Line Interface Combination featuring R³ Technology™**		✓	✓	✓

PDH - T3/E3 Line Interface Units (LIUs)

Part Number	Description	No. of Channels	Data Rate(s)	Clock Recovery	Operating Power Supply, Max Current	Package(s)
XRT71D00	1-Channel JA for DS3/E3/STS-1 WANs	1	DS3, E3, STS-1		3V, 5V, ±5%	TQFP-32
XRT71D03	3-Channel JA for DS3/E3/STS-1 WANs	3	DS3, E3, STS-1		3V, 5V, ±5%	TQFP-64
XRT71D04	4-Channel JA for DS3/E3/STS-1 WANs	4	DS3, E3, STS-1		3V, 5V, ±5%	TQFP-80
XRT7295AE	1-Channel E3 Line Receiver	1	E3	✓	5V ±5%, 106mA	PDIP-20 SOJ-20
XRT7295AT	1-Channel DS3/STS-1 Line Receiver	1	DS3/STS-1	✓	5V ±5%, 106mA	PDIP-20 SOJ-20
XRT7296	1-Channel DS3/STS-1/E3 Line Transmitter	1	DS3, E3, STS-1		5V ±5%, 133mA	PDIP-28 SOJ-28
XRT73LC00A	1-Channel DS3/E3/STS-1 LIU	1	DS3, E3, STS-1	✓	3V ±5%	TQFP-44
XRT73L02M	2-Channel DS3/E3/STS-1 LIU	2	DS3, E3, STS-1	✓	3V ±5%	TQFP-80
XRT73LC03A	3-Channel DS3/E3/STS-1 LIU	3	DS3, E3, STS-1	✓	3V	TQFP-120
XRT73LC04A	4-Channel DS3/E3/STS-1 LIU	4	DS3, E3, STS-1	✓	3V	TQFP-144

Note: Latest products are bolded.

PDH - T3/E3 Line Interface Units (LIUs)

Part Number	Description	No. of Channels	Data Rate(s)	Clock Recovery	Operating Power Supply, Max Current	Package(s)
XRT75VL00D	**1-Channel E3/DS3/STS-1 LIU with SONET Desynchronizer**	**1**	**E3/DS3/STS-1**	✓	**3V ±5%**	**TQFP-52**
XRT75L02D	2-Channel E3/DS3/STS-1 LIU with SONET Desynchronizer	2	DS3, E3, STS-1	✓	3V ±5%	TQFP-128
XRT75R03D	**3-Channel DS3/E3/STS-1 LIU with JA, Desynchronizer and R³ Technology™**	**3**	**DS3, E3, STS-1**	✓	**3V ±5%**	**TQFP-128**
XRT75L04D	4-Channel DS3/E3/STS-1 LIU with SONET Desynchronizer	4	DS3, E3, STS-1	✓	3V ±5%	TQFP-176
XRT75R06D	**6-Channel DS3/E3/STS-1 LIU with JA, Desynchronizer and R³ Technology™**	**6**	**DS3/E3/STS-1**	✓	**3V ± 5%**	**BGA-217**
XRT75R12D	**12-Channel DS3/E3/STS-1 LIU Family with JA, Desynchronizer and R³ Technology™**	**12**	**DS3/E3/STS-1**	✓	**3V ±5%**	**TBGA-420**

PDH - T3/E3 Framers

Part Number	Description	No. of Channels	Data Rate(s)	Operating Power Supply	Package(s)
XRT72L50	1-Channel DS3/E3 Framer IC with HDLC Controller	1	DS3, E3	3V ±5%	PQFP-100
XRT72L52	2-Channel DS3/E3 Framer IC with HDLC Controller	2	DS3, E3	3V ±5%	QFP-160
XRT72L53	3-Channel DS3/E3 Framer IC with HDLC Controller	3	DS3, E3	3V ±5%	PBGA-272
XRT72L54	4-Channel DS3/E3 Framer IC with HDLC Controller	4	DS3, E3	3V ±5%	PBGA-272
XRT72L56	6-Channel DS3/E3 Framer IC with HDLC Controller	6	DS3, E3	3V ±5%	PBGA-388
XRT72L58	8-Channel DS3/E3 Framer IC with HDLC Controller	8	DS3, E3	3V ±5%	PBGA-388

PDH - T3/E3 Combos

Part Number	Description	No. of Channels	Data Rate(s)	Operating Power Supply	Package(s)
XRT72L71	1-Channel ATM UNIs for DS3 ATM	1	DS3	3.3V, 5.0V ±10%	PQFP-160
XRT79L71	1-Channel DS3/E3 Framer/LIU combo with JA, ATM UNI/ PPP	1	DS3/E3	3.3V	PBGA-208

Note: Latest products are bolded.

T/E Timing ICs and WAN Clock Solutions

Why Exar?

Exar provides a unique mix of timing solutions that address a wide variety of clocking and network interface needs. Over the years, EXAR's original waveform generators and timing devices have become Industry standard components quoted in numerous reference designs and thus have retained their popularity over many years. These legacy devices can be used for sine/square/sawtooth -wave generation, FSK modulation and demodulation, Clock multiplier, WAN Clocking, as well as products that address 64Kbps Co-directional interfaces, V.35 and BITS clock extractor applications.

Legacy Clocks

Exar has continued to support some industry standard clock devices that have been used as monolithic function generator ICs that produce quality sine, square, triangle and pulse waveforms in addition to FSK modulation/demodulation as well as voltage to frequency conversion.

Timing ICs

Exar supports two lines of timing ICs. The first is PLL based crystal or clock multipliers that provide LVDS outputs intended for use in designs that require high performance low jitter 155MHz, 312MHz and 622MHz clock sources ideal for SONET & SDH, Gigabit Ethernet and SPI-4 Phase 2 applications. The second is a dual-phase-locked loop ICs that generates two very low jitter output signals that can be used as synchronization clocks in wide area networking systems. This product family generates two integer multiples of 8kHz, 56kHz, and 64kHz while locked onto an incoming reference of 1.54MHz (T1), 2.048MHz (E1), 8kHz, 56kHz, or 64kHz.

Network Interface/Clock Extraction

Exar also carries products that support various network interfaces such as a 64Kbps Co-Directional Interface compatible with CITT G.703, a fully compliant V.35 interface, and a BITS clock extractor solution for E1, T1 or 64Kbps clock synchronization applications.

T/E Timing ICs - Voltage-to-Frequency Converter

Name	Description	Internal Power Dissipation	Package(s)
XR4151	Voltage-to-Frequency Converter	500mW	PDIP-8

T/E Timing ICs - Network Interface Products - V.35 Interfaces

Name	Description	Temp. Range	No. of V.35 Rec.	No. of V.35 Trans.	Loop-back	RCV V.11	Supplies	Max Speed	XMT Disable	Disable	Max P P Con. (mW)	Max Shutdown Current	Package(s)
XRT3588	V.35 Interface Receiver/ Transmitter	C	n/a	3			+5, -5	10 Mbps	✓	n/a	1280mW	10.2mA	PDIP-18
XRT3590	Single Chip V.35 Transceiver	I	3	3	✓	✓	+5, -5	20 Mbps	✓	✓	600mW	300 µA	SOIC-24
XRT3591B	Single Chip V.35 Transceiver	I	3	3	✓	✓	+5, -5	20 Mbps	✓	✓	600mW	300 µA	SOIC-24

Note: Latest products are bolded.

T/E Timing ICs - Voltage Controlled Oscillator (VCO)

Part Number	Description	Frequency	Supply Voltage	Package(s)
XR2209	Voltage Controlled Oscillator (VCO)	0.01Hz to 1MHz	4V to 13V	PDIP-8
XR2211A	FSK Demodulator/Tone Decoder	0.01Hz to 300KHz	4V to 13V	PDIP-14 SOIC-14

T/E Timing ICs - Co-Directional Products

Part Number	Description	No. of Channels	Data Rate(s)	Clock Recovery	Short/ Long Haul	Temp.	Operating Power Supply, Max Current	Package(s)
XRT6164	**Digital Line Interface Transceiver**	**1**	**64Kbps, E1**		**S**	**C**	**5V ±5%, 26.5mA**	**PDIP-16 SOIC-16**
XRT6164A	**Digital Line Interface Transceiver**	**1**	**64Kbps, E1**		**S**	**Ext. C**	**5V ±5%, 26.5mA**	**PDIP-16 SOIC-16**
XRT6165	**Co-directional Digital Data Processor**	**1**	**64Kbps, E1**	✓	**n/a**	**I**	**5V ±10%**	**SOIC-24**
XRT6166	**Co-directional Digital Data Processor**	**1**	**64Kbps, E1**	✓	**n/a**	**I**	**5V ±10%**	**SOIC-28**

T/E WAN Clocks - WAN Clocks

Part Number	Description	No. of PLLs	Input Frequency Range	Output Frequency Range	Temp.	Operating Power Supply	Package(s)
XRT8000	WAN Clock Synchronizer/Adapter for Communications	2	8kHz to 32,768kHz	150Hz to 2,048kHz	I	5.0V, 3.3V	PDIP-18 SOIC-18
XRT8001	WAN Clock	2	8kHz to 32,768kHz	56kHz to 16,384kHz	I	5.0V, 3.3V	PDIP-18 SOIC-18

T/E WAN Clocks - SONET Clock Generators

Part Number	Description	Multiplication Ratio	Power Supply	Package(s)
XRT8010	350MHz Clock & Crystal Multiplier with LVDS Outputs	8, 16	3.3V	QFN-16
XRT8020	650 MHz High-Speed Clock Synthesizer	8, 16, 32	3.3V	QFN-16

Note: Latest products are bolded.

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