Interface

UARTs
USB
PCIe
PCI
I²C/SPI
8-bit
VLIO
Combo
Wireless

Serial Transceivers
Multiprotocol
RS-485
RS-422
RS-232

2011

www.exar.com

INTERFACE

Why Exar?

Top reasons for using Exar Interface Products:
1. Exar is the industry leader in UARTs and Multiprotocol Transceivers
2. Exar offers the highest level of integration and solutions
3. Exar has the industry's fastest data rates and smallest package UARTs and Serial Transceivers
4. Exar continues to introduce "Industry Firsts" in UARTs and Serial Transceivers
5. Exar provides world-class technical support (typically within 24 hours)
   uarttechsupport@exar.com and **serialtechsupport@exar.com**

INTERFACE → **UARTs**

As the market leader in providing Universal Asynchronous Receiver and Transmitter (UART) solutions, Exar Corporation offers the broadest line of patented industry-proven product families. Exar's product line ranges from cost-effective industry-standard devices to high-performance multi-channel UARTs with a broad range of FIFO depths. Exar's stand-alone, off-the-shelf UART solutions reduce development time and provide an immediate competitive advantage in time-to-market and performance capabilities.

Legacy 8-bit UARTs provide parallel-to-serial or serial-to-parallel data conversion over industry standard asynchronous communication data interfaces such as RS-232, RS-422 and RS-485. In addition to the legacy 8-bit UARTs, Exar also offers I²C/SPI UARTs and conventional PCI UARTs. Recent innovative UART solutions from Exar include high-performance VLIO UARTs, USB UARTs and PCIe UARTs. Exar UARTs are found in consumer, industrial, telecommunication, embedded and numerous other applications.

UART Product Families

USB UARTs
Exar's Full Speed USB UARTs have the highest data rates of up to 12Mbps for USB UARTs on the market and are available in the industry's smallest packages. They are fully compliant to the USB 2.0 spec and are listed on the USB-IF Integrator's list.

PCIe UARTs
Exar's PCIe UARTs are listed on the PCI-SIG Integrator's list and are fully compliant to PCIe 2.0 (2.5Gbps). Exar's PCIe UART family is fully software compatible with the PCI UART family which minimizes the software driver development time. At 25Mbps, the PCIe UARTs are the industry's fastest UARTs.

PCI UARTs
Exar has the largest PCI UART family in the industry offering 5V PCI UARTs and Universal (3.3V or 5V) PCI UARTs. In addition, Exar is the only vendor to offer 66MHz PCI UARTs. All PCI UARTs have passed PCI compliance and are listed on the PCI-SIG Integrator's List.

I²C/SPI UARTs
Exar offers UARTs with 2-wire (I²C) and 4-wire (SPI) interfaces to easily increase functionality and value to any embedded system design. These UARTs have up to 8 GPIOs and data rates up to 16Mbps.

8-Bit UARTs
The 8-bit UART family is Exar's largest UART product family with data rates of up to 16Mbps. Most 8-bit UARTs have an Intel bus interface. There are some UARTs that have an additional Motorola bus interface. This allows for simple connectivity to various MCUs/CPUs.

VLIO UARTs
The VLIO bus interface is Exar's newest 8-bit interface option supporting data rates up to 20Mbps. Unlike the Intel and Motorola bus modes where there are separate address and data lines, the VLIO UARTs have multiplexed address/data lines. This additional 8-bit interface provides another option for interfacing to different types of MCUs/CPUs.

UART + Transceiver Combos
Exar's UART + Transceivers Combo family combines a UART and serial transceiver into a single QFN package. The small package makes it ideal for space-constrained applications, simplifies the hardware and optimizes the overall BOM cost.

Wireless UART
Exar's Wireless UART chipset consists of a Wireless UART controller and 900MHz RF Transceiver. The Wireless UART controller has an 8051 embedded MCU, 32KB system memory, 128-bit AES engine and Exar's proprietary firmware. The RF Transceiver has extensive hardware support such as RSSI, ED, LQI and CRC detection, for insuring data integrity in a noisy environment.

Key Features and Technologies

Pin-to-Pin Migration Path
Exar offers a migration path from legacy UART devices to enhanced high-performance devices by maintaining pin-to-pin compatibility whenever possible. This minimizes hardware and software changes enabling a shorter time-to-market.

Software Compatibility with Previous Generation UARTs
In addition to a pin-to-pin migration path, Exar offers newer UARTs that are software compatible with previous generation UARTs, thus simplifying the software driver development. If changes to the software driver are necessary, in most cases, they are minimal. Software drivers and source code for various UARTs are available, royalty-free, from Exar.

Low Voltage Operation
Exar offers low voltage UART product families that are capable of operating down to 1.62V. The lower operating power supply range is well suited for battery operated systems and handheld devices.

Industry's Lowest Power Consumption
Exar's enhanced UARTs are low power devices. In addition, the devices feature Sleep and Power Save modes for further power saving as low as 5 µA in Sleep mode.

Integrated Level Shifters
Exar offers USB UARTs, I²C/SPI UARTs and 8-bit UARTs with integrated level shifters. Absorbing the level shifter into the UART simplifies the hardware design for space-constrained designs and minimizes the BOM.

Fastest Data Rates
At 25Mbps, Exar offers the industry's fastest UARTs. In addition, slower/lower cost crystals and oscillators can be used to generate higher data rates with Exar's 8X and 4X sampling rate features.

Fractional Baud Rate Generator
Exar's Fractional Baud Rate Generator feature allows more flexibility for the designer in selecting a crystal or oscillator, since it can take any clock source to generate the standard legacy or custom baud rates.

Large FIFOs
Exar offers devices with 1 to 384 Bytes of FIFOs with programmable trigger levels and FIFO level counters. Larger FIFO sizes allow increased data throughput by loading and unloading more data per transaction. Larger FIFOs improve the performance by reducing the number of interrupts.

Independent TX/RX Baud Rate Generator
The baud rates of the TX and RX no longer have to be the same. This new feature in the XR16Mxxx single-channel UARTs allows different TX and RX baud rates so that the single channel UART can communicate with different UARTs at the same time.

Automatic Flow Control
Exar's enhanced UARTs offer auto RTS/CTS hardware and software flow control that prevent data loss, thus eliminating the need for re-transmission.

FIFO Level Counters
The FIFO level counter feature provides the exact number of bytes in the FIFO which improves the efficiency of loading data into the TX FIFO and unloading data out of the RX FIFO.

Programmable Trigger Levels
The Programmable Trigger Level provides the software the flexibility to optimize the TX and RX trigger levels for the best performance and throughput. UARTs without the programmable trigger level feature can only select from a few pre-defined trigger levels.

5V Tolerant Inputs
When the UART is operating at a supply voltage of less than 5V, the inputs can still withstand inputs up to 5V without increasing the power consumption or damaging the UART. This allows the UART to function seamlessly in a mixed voltage environment.

Multidrop Mode with Auto Address Detect
This feature simplifies both the hardware and software for 9-bit applications. The receiver will only receive data after an address match and will automatically ignore data if the address byte does not match.

Auto RS-485 Half-Duplex Direction Control with Programmable Turn-Around Delay
Exar was the first to introduce this unique feature to simplify the hardware and software design for half-duplex RS-485 systems.

Integrated Serial Transceivers
Exar offers UARTs with integrated RS-232 or RS-485 transceiver combos making it ideal for simplifying designs and using less board space in a single small footprint QFN package.

Serial Cable Replacement Wireless Solution
Exar's Wireless UART chipset consists of a Wireless UART controller and 900MHz RF Transceiver. With Exar's proprietary firmware, the Wireless UART chipset can be used as a serial cable replacement wireless solution.

Exar offers a complete portfolio of RS-232, RS-485, RS-422 and Multiprotocol transceivers with data rates up to 52Mbps. Exar is the market leader in high-speed RS-485/RS-422 and Multiprotocol transceivers. In addition, Exar offers a broad family of feature-rich RS-232 serial transceivers.

Exar uses state of the art structures to protect the transceiver pins against ESD of ±15kV without damage. The ESD structures withstand high ESD in all states: normal operation, shutdown and powered down. After an ESD event, the transceivers keep working without latch-up or damage. ESD protection can be tested in various ways. The transmitter outputs and receiver inputs are characterized for protection to the following limits:
- ±15kV using the Human Body Model
- ±8kV using the Contact Discharge method specified in IEC 61000-4-2
- ±15kV using the Air-Gap Discharge method specified in IEC 61000-4-2

Industry's ONLY Single Chip Solutions
Exar is the only one in the industry to offer single chip solutions that support RS-232, RS-485, RS-449, EIA-530, V.10, V.11, V.28, V.35, V.36, and X.21. As a result, Exar's solution takes up to 40% less board space than competitor solutions.

Fastest Data Rates
At 52 Mbps, the SP510 is the industry's fastest Multiprotocol Transceiver.

NET1/2 and TBR2 Compliance
SP3508, SP505, SP506, SP507, SP508, and SP509 are compliant to NET1/2 and TBR2 requirements.

Internal Termination
The SP3508, SP508, SP509 and SP510 designs offer internal V.11 and V.35 termination networks for the clock and data lines. Therefore, no external termination is required, thus simplifying the design.

Widest Selection of Protocols
Exar's Multiprotocol Transceiver family offers the widest availability of protocols. Protocols supported by a single Multiprotocol chip are RS-232, RS-485, RS-449, EIA-530, V.10, V.11, V.28, V.35, V.36, and X.21.

Independent Driver and Receiver Enables
There are independent enable pins for each driver and receiver. This provides design flexibility to minimize the noise and power consumption from any unused drivers and receivers.

Fastest Data Rates
At 52Mbps, the XR5486-88 are the industry's fastest RS-485/422 transceivers.

High Differential Output
The XR5486-88 and XR3170-78 families offer an extended driver output swing. This improves noise immunity and drives longer cables lengths than traditional RS-485/422 transceivers.

Hot Swap / Power-Up Glitch Protection
This feature prevents random data errors from appearing on the differential pairs due to undefined logic levels during power-up that improperly enable the transceivers.

Enhanced Receiver Failsafe
The Enhanced Receiver Failsafe feature ensures that the TTL outputs are in a known state when the differential pairs are floating or shorted without the need for any external biasing.

PROFIBUS
PROFIBUS is widely used in industrial control and automation applications and is ruggedized for use in harsh operating conditions. Higher differential output swing enhances noise immunity and drives longer data cables.

Slew Rate Limited
Slew Rate drivers minimize Electromagnetic Interference (EMI) and reduce reflections caused by improperly terminated cables. This allows for error-free data transmission.

1/8th Unit Load
A standard driver can drive up to 32 unit loads. The 1/8th unit load receiver input impedance allows eight times as many transceivers (up to 256) to be connected in parallel on a communication line.

Pin-to-Pin Compatibility
There are industry standard packages/pinouts for RS-485 transceivers. Therefore, migrating to faster RS-485 transceivers or RS-485 transceivers with additional features such as the Enhanced Receiver Failsafe and Hot Swap features can be accomplished with minimal changes to the design.

Auto On-Line® Feature
The RS-232 transceiver saves power by turning off the charge pumps and driver outputs when the RS-232 inputs see less than valid +/- 3V signals (ie. Cable is unplugged). The RS-232 transceiver will automatically wake up from the low power state when a valid RS-232 voltage is sensed at the receiver input.

Auto On-Line® Plus Feature
The RS-232 transceiver saves power by turning off the charge pumps and driver outputs if there are no transitions on the driver or receiver inputs for 30 seconds. The transceiver returns to normal operation with a transition on any of the driver or receiver inputs.

Highly Efficient Charge Pump
The charge pump is used to generate positive and negative signal voltages for the RS-232 drivers. This enables fully compliant RS-232 and V.28 signals from a single 3.0 or 5.5V power supply. The charge pumps use four external capacitors to hold and transfer electrical charge. The patented design uses a unique approach compared to older less efficient designs. The pumps use a four phase voltage shifting technique to attain symmetrical V+ and V- power supplies. An intelligent control oscillator regulates the operation of the charge pump to maintain the proper voltages at maximum efficiency.

Pin-to-Pin Compatibility
There are industry standard packages/pinouts for RS-232 transceivers. Therefore, migrating to faster RS-232 transceivers or RS-232 transceivers with additional features such as the Auto On-line Plus feature can be accomplished with minimal changes to the design.

UART and Serial Transceiver Synergy

The simplest connectivity solution to send serial data between two or more electronic devices is to use a UART and a serial transceiver. In most applications, a UART and a serial transceiver are required. UARTs and serial transceivers can be found in pervasive applications across different market segments such as industrial, telecom and consumer.

Industrial Applications
Point-of-Sale (POS)
Factory Automation
Ticketing Systems

Telecom Applications
Remote Access Servers
Network Server Management
Video Conferencing Systems

Consumer Applications
GPS Modules
HDTV/Set-Top Box
PDA/Smart Phone
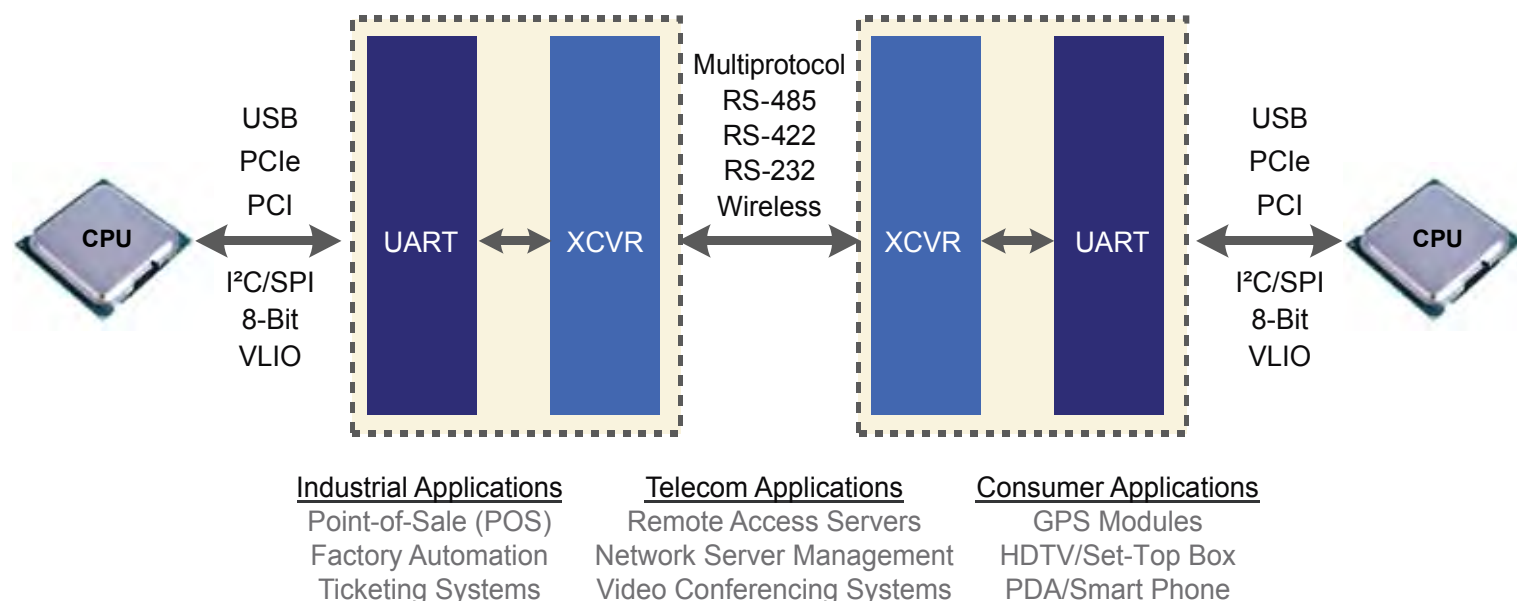
Exar's USB UARTs are fully compliant to the USB 2.0 Full-Speed specifications and are listed on the USB-IF Integrator's List. At 12Mbps, Exar's USB UARTs are the industry's fastest USB UARTs.

Software Drivers
The following software drivers for the USB UARTs are available from Exar: Windows 2000, XP, Vista, 7, CE 4.2, CE 5.0, CE 6.0, Linux 2.6.x, and Mac.

USB UARTs (3.3V)

The XR21V141x is available in 1-ch, 2-ch and 4-ch versions. The XR21V141x is a 3.3V device with 5V tolerant inputs. The XR21V141x has an internal 48MHz clock. Custom Vendor IDs, Product IDs, USB attributes and maximum power consumption can be programmed via an external I²C EEPROM.

UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	Auto HW/ SW Flow Control	Auto RS-485 Half-Duplex Control	Multidrop (9-bit) mode	Fractional Baud Rate Generator	Power Down Mode	5V Tolerant Inputs	Supply Voltage Range	Packages
XR21V1414	USB 2.0 FS	4	12	128 / 384	✓	✓	✓	✓	✓	✓	2.97V-3.63V	TQFP-48
XR21V1412	USB 2.0 FS	2	12	128 / 384	✓	✓	✓	✓	✓	✓	2.97V-3.63V	QFN-32
XR21V1410	USB 2.0 FS	1	12	128 / 384	✓	✓	✓	✓	✓	✓	2.97V-3.63V	QFN-16

USB UART Dongle Example
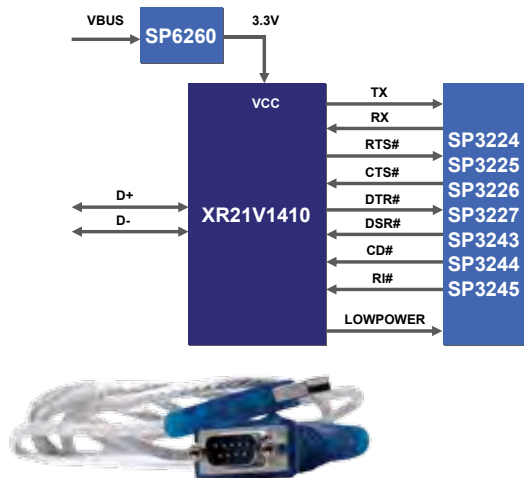
USB UART in Blood Pressure Monitor
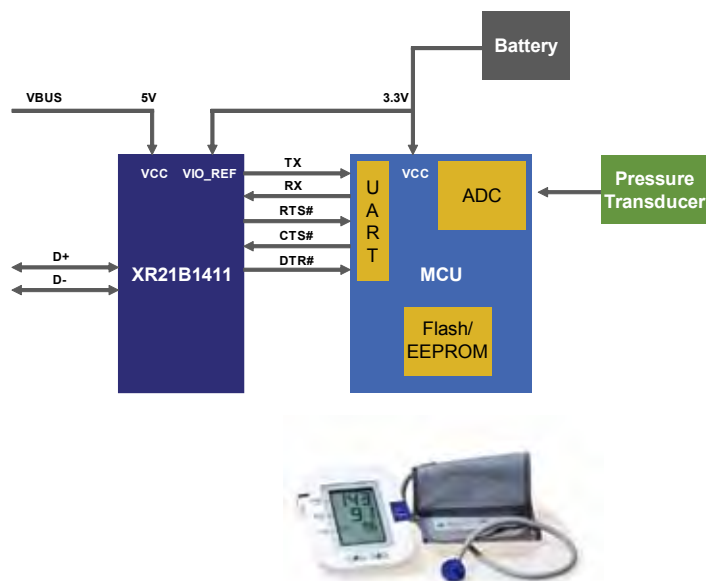
USB UARTs (5V)

The XR21B1411 is a 1-ch USB UART that can be powered directly from the 5V supply voltage from VBUS. The XR21B1411 has a programmable internal 6MHz – 48MHz clock. Custom Vendor IDs and Product IDs can be programmed via the internal OTP, therefore eliminating the requirement for an external EEPROM. In addition, the XR21B1411 has a voltage reference pin to adjust the I/O levels of the UART/GPIO signals which can greatly extend the battery life of portable applications.

UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	Auto HW/ SW Flow Control	Auto RS-485 Half-Duplex Control	Multidrop (9-bit) mode	Fractional Baud Rate Generator	Power Down Mode	Integrated Level Shifters	Supply Voltage Range	Packages
XR21B1411	USB 2.0 FS	1	12	128 / 384	✓	✓	✓	✓	✓	✓	4.5V-5.5V	QFN-16

Exar's PCIe UARTs (XR17V35x) are x1 PCIe endpoints that are compliant with the PCIe 2.0 Gen 1 (2.5Gbps) specifications. At 25Mbps, the PCIe UARTs are the industry's fastest UARTs. The PCIe UARTs have large 256 byte TX/RX FIFOs, 16 multi-purpose I/Os and support multidrop (9-bit) mode.

The XR17V35x is available in 2-ch, 4-ch and 8-ch versions. Like the PCI UART product family, the 4-ch and 8-ch versions of the PCIe UARTs are available in the same package and are pin compatible. In addition, the 4-ch and 8-ch PCIe UARTs have an expansion interface that will allow a single PCB design to support 4, 8, 12 or 16 UART channels.

Software Drivers
The PCIe UARTs are software compatible with the PCI UARTs. The following software drivers for the PCIe UARTs are available from Exar: Windows 2000, XP, Vista, 7, CE 4.2, CE 5.0, CE 6.0, VxWorks 5.5, Linux 2.4.x, Linux 2.6.x and QNX 4.25.

PCIe UARTs

UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	TX & RX FIFO Level Counters	Program. Trigger Levels	Auto HW/ SW Flow Control	Auto RS-485 Half-Duplex Control	Multidrop (9-bit) mode	Fractional Baud Rate Generator	Power Down Mode	5V Tolerant Inputs	Supply Voltage Range	No. of GPIOs	Packages
XR17V358	PCIe 2.0 (2.5Gbps)	8	25	256 / 256	✓	✓	✓	✓	✓	✓	✓	✓	3.0V-3.6V	16	FPBGA-176
XR17V354	PCIe 2.0 (2.5Gbps)	4	25	256 / 256	✓	✓	✓	✓	✓	✓	✓	✓	3.0V-3.6V	16	FPBGA-176
XR17V352	PCIe 2.0 (2.5Gbps)	2	25	256 / 256	✓	✓	✓	✓	✓	✓	✓	✓	3.0V-3.6V	16	FPBGA-113

RS-485 Example in Industrial Controls
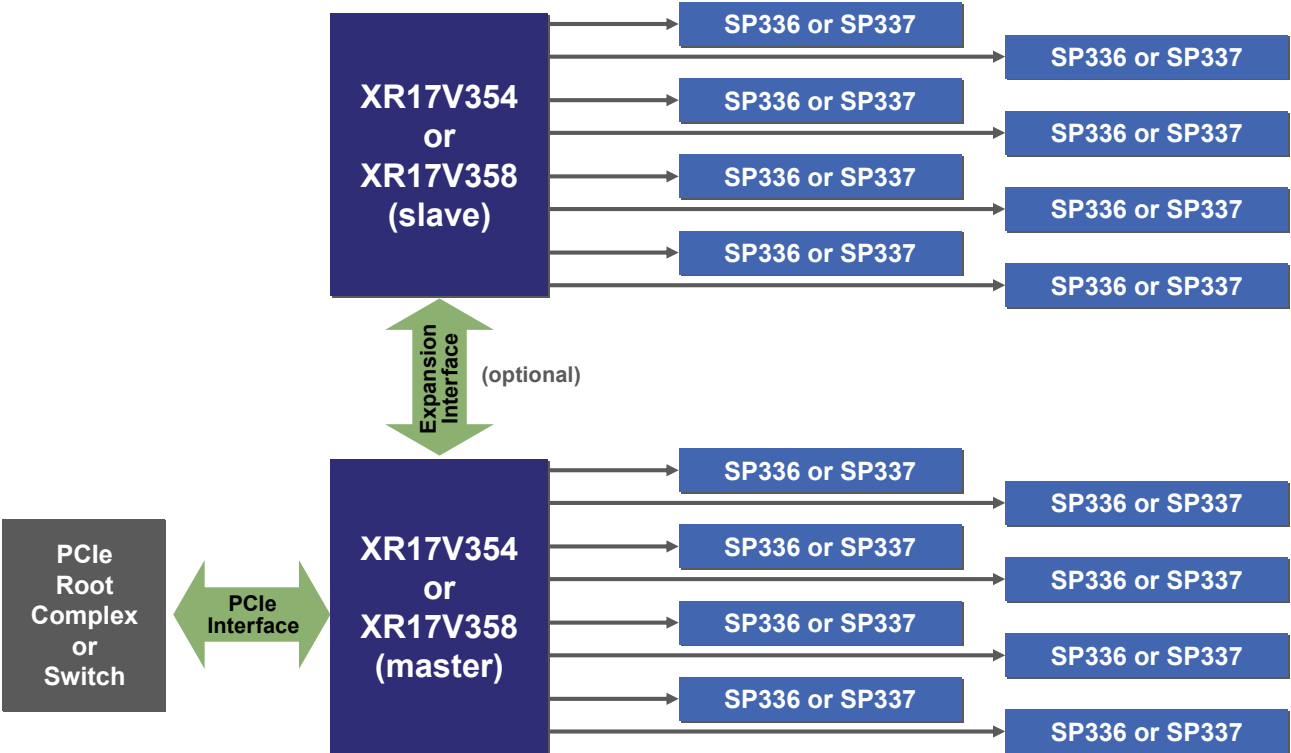
Exar has the largest PCI UART family in the industry offering 33MHz and 66MHz PCI UARTs. The 33MHz PCI UARTs consist of the XR17C15x which are 5V PCI UARTs and the XR17D15x which are Universal (3.3V or 5V) PCI UARTs. The 66MHz PCI UARTs are the XR17V25x. Exar is the only UART vendor in the industry to have a 66MHz PCI UART. All Exar PCI UARTs have passed PCI compliance and are listed on the PCI-SIG Integrator's List.

The XR17C15x, XR17D15x and XR17V25x are all available in 2-ch, 4-ch and 8-ch versions. The 4-ch and 8-ch devices are available in the LQFP-144 package and are pin compatible. Therefore, customers can design the same board for both a 4-ch and 8-ch design, depending on their requirements. There are 8 multi-purpose I/Os on the PCI UARTs.

Software Drivers
The following software drivers for the PCI UARTs are available from Exar: Windows NT 4.0, 2000, XP, Vista, 7, CE 4.2, CE 5.0, CE 6.0, VxWorks 5.5, Linux 2.4.x, Linux 2.6.x and QNX 4.25.

PCI UARTs (66MHz)

UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	TX & RX FIFO Level Counters	Program. Trigger Levels	Auto HW/ SW Flow Control	Auto RS-485 Half-Duplex Control	Fractional Baud Rate Generator	Power Down Mode	5V Tolerant Inputs	Supply Voltage Range	No. of GPIOs	Packages
XR17V258	PCI Bus 3.0	8	8	64 / 64	✓	✓	✓	✓	✓	✓	✓	3.0V-3.6V	8	LQFP-144
XR17V254	PCI Bus 3.0	4	8	64 / 64	✓	✓	✓	✓	✓	✓	✓	3.0V-3.6V	8	LQFP-144
XR17V252	PCI Bus 3.0	2	8	64 / 64	✓	✓	✓	✓	✓	✓	✓	3.0V-3.6V	8	TQFP-100

PCI UARTs (Universal 3.3V or 5V)

UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	TX & RX FIFO Level Counters	Program. Trigger Levels	Auto HW/ SW Flow Control	Auto RS-485 Half-Duplex Control	Fractional Baud Rate Generator	Power Down Mode	5V Tolerant Inputs	Supply Voltage Range	No. of GPIOs	Packages
XR17D158	PCI Bus 2.2	8	6.25 @ 5V 6.25 @ 3.3V	64 / 64	✓	✓	✓	✓		✓	✓	3.0V-3.6V, 4.5V-5.5V	8	LQFP-144
XR17D154	PCI Bus 2.2	4	6.25 @ 5V 6.25 @ 3.3V	64 / 64	✓	✓	✓	✓		✓	✓	3.0V-3.6V, 4.5V-5.5V	8	LQFP-144
XR17D152	PCI Bus 2.2	2	6.25 @ 5V 6.25 @ 3.3V	64 / 64	✓	✓	✓	✓		✓	✓	3.0V-3.6V, 4.5V-5.5V	8	TQFP-100

PCI UARTs (5V)

UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	TX & RX FIFO Level Counters	Program. Trigger Levels	Auto HW/ SW Flow Control	Auto RS-485 Half-Duplex Control	Fractional Baud Rate Generator	Power Down Mode	5V Tolerant Inputs	Supply Voltage Range	No. of GPIOs	Packages
XR17C158	PCI Bus 3.0	8	8	64 / 64	✓	✓	✓	✓		✓	✓	3.0V-3.6V	8	LQFP-144
XR17C154	PCI Bus 3.0	4	8	64 / 64	✓	✓	✓	✓		✓	✓	3.0V-3.6V	8	LQFP-144
XR17C152	PCI Bus 3.0	2	8	64 / 64	✓	✓	✓	✓		✓	✓	3.0V-3.6V	8	TQFP-100

RS-485 Example in Industrial Controls

Universal 3.3V or 5V PCI Board

The simple 2-wire (I²C) or 4-wire (SPI) interface enables an Exar I²C/SPI UART to easily be added to any embedded system design. The I²C interface can support fast mode with an I²C clock frequency of up to 400kHz. The SPI interface can support a clock frequency of up to 5MHz. The maximum UART baud rate is 16Mbps at 3.3V.

Sample Code
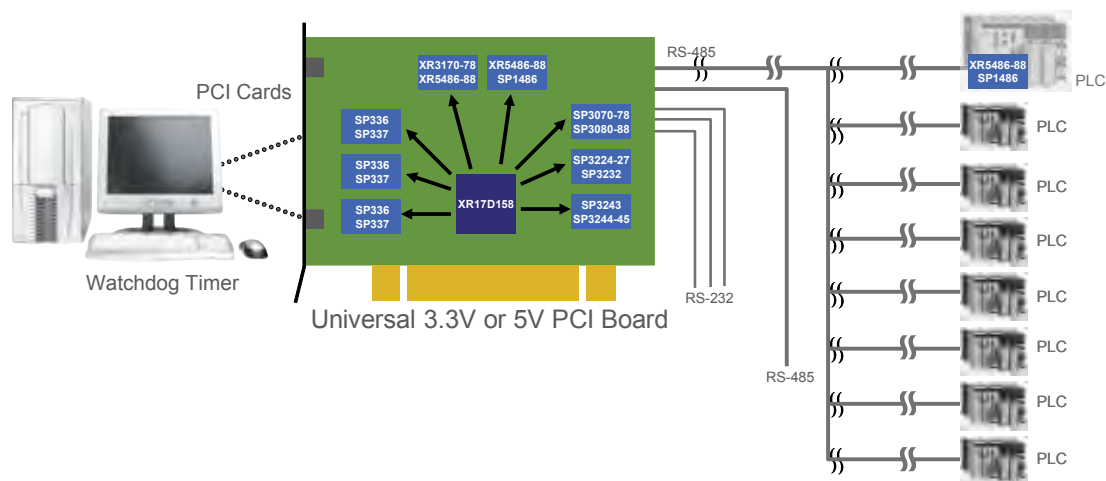A software example for initializing the I²C/SPI UART is available from Exar.

I²C/SPI UARTs

UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	TX & RX FIFO Level Counters	Program. Trigger Levels	Auto HW/SW Flow Control	Auto RS-485 Half-Duplex Control	Multidrop (9-bit) mode	Fractional Baud Rate Generator	Power Down Mode	Integrated Level Shifters	Supply Voltage Range	Number of GPIOs	Packages
XR20M1172	I²C or SPI	2	16.0 @ 3.3V 12.5 @ 2.5V 8.0 @ 1.8V	64 / 64	✓	✓	✓	✓		✓	✓		1.62V-3.63V	8 8	QFN-32 TSSOP-28
XR20M1280	I²C or SPI	1	24.0 @ 3.3V	128 / 128	✓	✓	✓	✓	✓	✓	✓	✓	1.62V-3.63V	16 8 4	QFN-40 QFN-32 QFN-24
XR20M1170	I²C or SPI	1	16.0 @ 3.3V 12.5 @ 2.5V 8.0 @ 1.8V	64 / 64	✓	✓	✓	✓		✓	✓		1.62V-3.63V	n/a n/a 8 8 8	QFN-16 QFN-24 QFN-28 TSSOP-16 TSSOP-24

I²C/SPI Application Example

VCC = 1.62V-3.63V

CPU/ MCU

I²C / SPI Interface

UART
XR20M1170
XR20M1172
XR20M1280

TXA
RXA
RTSA#
CTSA#
DTRA#
DSRA#

GPS Module

TXB
RXB
RTSB#
CTSB#
DTRB#
DSRB#
CDB#
RIB#

RS-232
SP3232
SP3224
SP3225
SP3226
SP3227

Turn left in 2 miles
Route
Main Menu
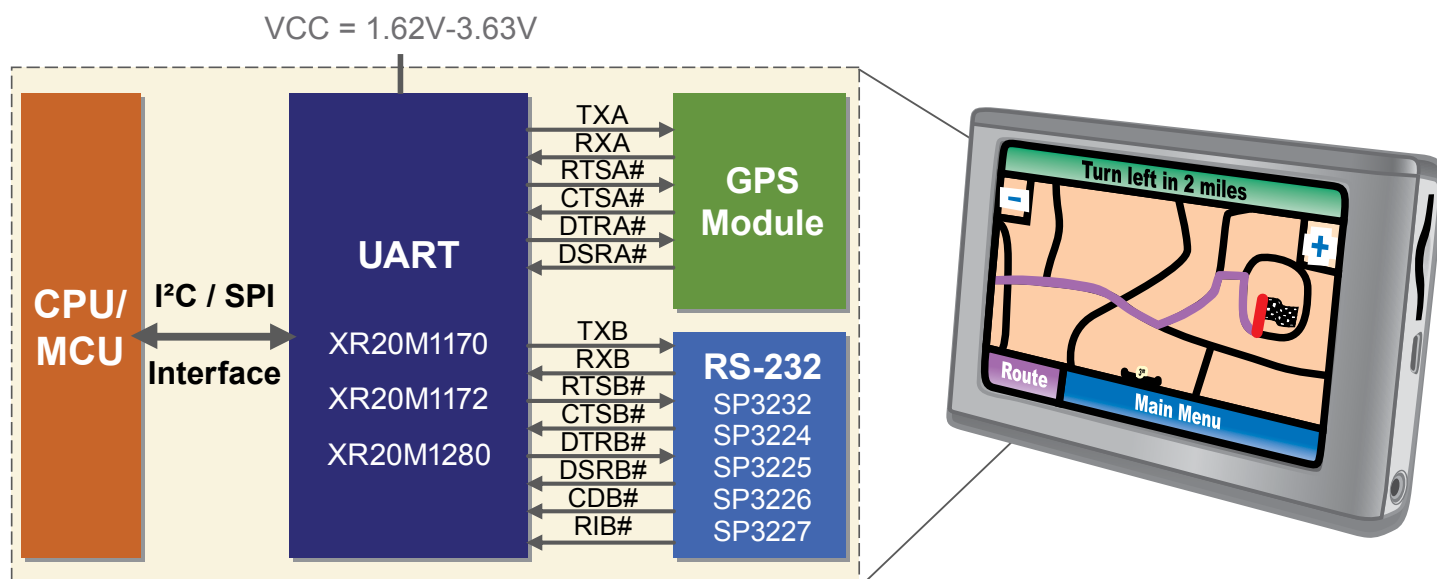
8-bit UARTs
The 8-bit UART product family is Exar's largest UART product family with more than 70 UARTs. The 8-bit UART product family consists of 1-ch, 2-ch, 4-ch and 8-ch UARTs with FIFOs ranging from 1 byte up to 128 bytes. All of the UARTs have either an 8-bit Intel bus interface or Motorola bus interface.

VLIO UARTs
The VLIO UART product family is Exar's newest 8-bit UART product family. With the combination of low power consumption in the Sleep/PowerSave mode (less than 3uA at 1.8V) and in the industry's smallest packages, including a 3x3x0.9mm BGA package, the VLIO UARTs are ideal for battery-powered applications.

Intel bus interface vs. Motorola bus interface
The primary difference between the Intel bus interface and the Motorola bus interface is the read and write control lines. For the Intel bus interface, there are separate control lines for the read and write strobes (IOR# and IOW#). However, the Motorola bus interface only has a single control line (R/W#).

VLIO bus interface vs. Intel/Motorola bus interface
The primary differences between the VLIO bus interface and the Intel or Motorola bus interfaces are the address and data lines. The address and data lines are separate for the Intel/Motorola bus interface, while the address and data lines are multiplexed for the VLIO bus interface.

Software Drivers/Sample Test Programs
Exar's 8-bit UARTs will work with the standard serial driver in most operating systems. However, software drivers to support Exar's enhanced features are available for Windows 95/98, NT 4.0, 2000, XP, CE 4.2, CE 5.0 and CE 6.0 for various UARTs. In addition, VxWorks 5.5, Linux 2.4.x, Linux 2.6.x drivers and sample DOS test programs are available.

8-bit UARTs: "C" UART Product Family
The "C" UART product family is the 5V UART product family. Some UARTs in this product family are 5V only devices, but most UARTs in this family can operate with a 2.97V supply voltage. The maximum baud rate is up to 6.25Mbps.

UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	TX & RX FIFO Level Counters	Program. Trigger Levels	Auto HW/SW Flow Control	Auto RS-485 Half-Duplex Control	Multidrop (9-bit) mode	Fractional Baud Rate Generator	Power Down Mode	5V Tolerant Inputs	Supply Voltage Range	Packages
XR16C864	Intel or Motorola	4	2.0 @ 5V 1.5 @ 3.3V	128 / 128	✓	✓	✓	✓			✓	✓	2.97V-5.5V	QFP-100
XR16C854 / 854D	Intel or Motorola	4	2.0 @ 5V 1.5 @ 3.3V	128 / 128	✓	✓	✓	✓			✓	✓	2.97V-5.5V	PLCC-68 LQFP-64 QFP-100
ST16C654 / 654D	Intel or Motorola	4	1.5 @ 5V 0.5 @ 3.3V	64 / 64			✓				✓		2.97V-5.5V	PLCC-68 LQFP-64 QFP-100
ST16C554 / 554D	Intel or Motorola	4	1.5 @ 5V 0.5 @ 3.3V	16 / 16									2.97V-5.5V	PLCC-68 LQFP-64
ST68C554	Motorola	4	1.5 @ 5V 0.5 @ 3.3V	16 / 16									2.97V-5.5V	PLCC-68
ST16C454	Intel or Motorola	4	1.5 @ 5V 0.5 @ 3.3V	1 / 1									2.97V-5.5V	PLCC-68
XR16C2850	Intel	2	6.25 @ 5V 4.0 @ 3.3V	128 / 128	✓	✓	✓	✓			✓	✓	2.97V-5.5V	PLCC-44 TQFP-48
XR16C2852	Intel	2	6.25 @ 5V 4.0 @ 3.3V	128 / 128	✓	✓	✓	✓			✓	✓	2.97V-5.5V	PLCC-44
ST16C2550	Intel	2	4.0 @ 5V 1.875 @ 3.3V	16 / 16								✓	2.97V-5.5V	PDIP-40 PLCC-44 TQFP-48
ST16C2552	Intel	2	4.0 @ 5V 1.875 @ 3.3V	16 / 16								✓	2.97V-5.5V	PLCC-44
ST16C2450	Intel	2	1.5 @ 5V 0.5 @ 3.3V	1 / 1								✓	2.97V-5.5V	PDIP-40 PLCC-44 TQFP-48
XR16C850	Intel or PC COM Port	1	2.0 @ 5V 1.375 @ 3.3V	128 / 128	✓	✓	✓	✓			✓	✓	2.97V-5.5V	PLCC-44 TQFP-48
ST16C650A	Intel or PC COM Port	1	3.0 @ 5V 2.0 @ 3.3V	32 / 32			✓				✓	✓	2.97V-5.5V	PLCC-44 TQFP-48
ST16C580	Intel	1	1.5 @ 5V 0.5 @ 3.3V	16 / 16			✓				✓		2.97V-5.5V	TQFP-48
ST16C550	Intel	1	1.5 @ 5V 0.5 @ 3.3V	16 / 16									2.97V-5.5V	PDIP-40 PLCC-44 TQFP-48
ST16C450	Intel	1	1.5 @ 5V 0.5 @ 3.3V	1 / 1									2.97V-5.5V	PDIP-40 PLCC-44 TQFP-48
ST16C1550	Intel	1	1.5 @ 5V 0.5 @ 3.3V	16 / 16							✓		2.97V-5.5V	PLCC-28 TQFP-48
ST16C1551	Intel	1	1.5 @ 5V 0.5 @ 3.3V	16 / 16							✓		2.97V-5.5V	PLCC-28 TQFP-48
ST16C1450	Intel	1	1.5 @ 5V 0.5 @ 3.3V	1 / 1							✓		2.97V-5.5V	PLCC-28 TQFP-48
ST16C552* / 552A*	Intel	2	1.5 @ 5V 0.5 @ 3.3V	16 / 16							✓	✓	2.97V-5.5V	PLCC-68

8-bit UARTs: "C" UART Product Family

The "C" UART product family is the 5V UART product family. Some UARTs in this product family are 5V only devices, but most UARTs in this family can operate with a 2.97V supply voltage. The maximum baud rate is up to 6.25Mbps.

UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	TX & RX FIFO Level Counters	Program. Trigger Levels	Auto HW/SW Flow Control	Auto RS-485 Half-Duplex Control	Multidrop (9-bit) mode	Fractional Baud Rate Generator	Power Down Mode	5V Tolerant Inputs	Supply Voltage Range	Packages
ST16C452* / 452PS*	Intel	2	1.5 @ 5V 0.5 @ 3.3V	1 / 1							✓	✓	2.97V-5.5V	PLCC-68
XR82C684	Intel or Motorola	4	1.0 @ 5V	3 / 3					✓		✓		4.5V-5.5V	PLCC-44 PLCC-68
XR68/88C192	Intel or Motorola	2	1.0 @ 5V 0.5 @ 3.3V	16 / 16			✓		✓		✓	✓	2.97V-5.5V	PLCC-44 LQFP-44
XR68/88C92	Intel or Motorola	2	1.0 @ 5V 0.5 @ 3.3V	8 / 8			✓		✓		✓	✓	2.97V-5.5V	PDIP-40 PLCC-44 LQFP-44
XR68C681	Motorola	2	1.0 @ 5V	1 / 3			✓		✓		✓		4.5V-5.5V	PLCC-44 PDIP-40
XR88C681	Intel	2	1.0 @ 5V	1 / 3			✓		✓		✓		4.5V-5.5V	PLCC-44 PDIP-40

*This device also has a printer port.

8-bit UARTs: "L" UART Product Family

Most UARTs in the "L" UART product family can operate with a supply voltage of 2.25V-5.5V. All UARTs in the "L" UART product family have 5V tolerant inputs so they can interface with legacy 5V devices but can operate at lower supply voltage. In addition to operating at a lower voltage, the "L" UART product family has a Sleep/PowerSave mode to minimize the power consumption. The maximum baud rate is up to 6.25Mbps.

UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	TX & RX FIFO Level Counters	Program. Trigger Levels	Auto HW/SW Flow Control	Auto RS-485 Half-Duplex Control	Multidrop (9-bit) mode	Fractional Baud Rate Generator	Power Down Mode	5V Tolerant Inputs	Supply Voltage Range	Packages
XR16L788	Intel or Motorola	8	6.25 @ 5V 4.0 @ 3.3V	64 / 64	✓	✓	✓	✓			✓	✓	2.25V-5.5V	QFP-100
XR16L784	Intel or Motorola	4	6.25 @ 5V 4.0 @ 3.3V	64 / 64	✓	✓	✓	✓			✓	✓	2.25V-5.5V	LQFP-64
XR16L2750	Intel	2	6.0 @ 5V 4.0 @ 3.3V 3.0 @ 2.5V	64 / 64	✓	✓	✓	✓			✓	✓	2.25V-5.5V	PLCC-44 TQFP-48
XR16L2751	Intel or Motorola	2	6.0 @ 5V 4.0 @ 3.3V 3.0 @ 2.5V	64 / 64	✓	✓	✓	✓			✓	✓	2.25V-5.5V	TQFP-48
XR16L2752	Intel	2	6.0 @ 5V 4.0 @ 3.3V 3.0 @ 2.5V	64 / 64	✓	✓	✓	✓			✓	✓	2.25V-5.5V	PLCC-44
XR16L2550	Intel	2	4.0 @ 5V 2.0 @ 3.3V 1.0 @ 2.5V	16 / 16			✓				✓	✓	2.25V-5.5V	PLCC-44 TQFP-48 QFN-32
XR16L2551	Intel or Motorola	2	4.0 @ 5V 2.0 @ 3.3 V 1.0 @ 2.5V	16 / 16			✓				✓	✓	2.25V-5.5V	TQFP-48 QFN-32
XR16L2552	Intel	2	4.0 @ 5V 2.0 @ 3.3V 1.0 @ 2.5V	16 / 16			✓				✓	✓	2.25V-5.5V	PLCC-44 TQFP-48
XR16L2450	Intel	2	4.0 @ 5V 2.0 @ 3.3V 1.0 @ 2.5V	1 / 1							✓	✓	2.25V-5.5V	PLCC-44 TQFP-48
XR16L651	Intel or Motorola	1	3.0 @ 5V 2.0 @ 3.3V 1.0 @ 2.5V	32 / 32			✓	✓			✓	✓	2.25V-5.5V	TQFP-48
XR16L570	Intel	1	3.0 @ 5V 2.0 @ 3.3V 1.5 @ 2.5V 0.75 @ 1.8V	16 / 16			✓				✓	✓	1.62V-5.5V	QFN-24 QFN-32
XR16L580	Intel or Motorola	1	3.0 @ 5V 2.0 @ 3.3V 1.5 @ 2.5V	16 / 16			✓				✓	✓	2.25V-5.5V	QFN-24 QFN-28 QFN-32 TQFP-48

8-bit UARTs: "V" UART Product Family

The "V" UART product family is a high performance UART product family. At 3.3V, some UARTs in this UART product family have a maximum baud rate of 16Mbps. The operating voltage range for the "V" UARTs is from 2.25V-3.63V. All "V" UARTs have 5V tolerant inputs. The "V" UART product family was the first UART product family to have Exar's innovative Fractional Baud Rate Generator feature.

UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	TX & RX FIFO Level Counters	Program. Trigger Levels	Auto HW/SW Flow Control	Auto RS-485 Half-Duplex Control	Multidrop (9-bit) mode	Fractional Baud Rate Generator	Power Down Mode	5V Tolerant Inputs	Supply Voltage Range	Packages
XR16V798	Intel or Motorola	8	8.0 @ 3.3V 6.25 @ 2.5V	64 / 64	✓	✓	✓	✓		✓	✓	✓	2.25V-3.63V	QFP-100
XR16V698	Intel or Motorola	8	15.0 @ 3.3V 10.0 @ 2.5V	32 / 32	✓		✓	✓	✓	✓	✓	✓	2.25V-3.63V	QFP-100
XR16V598	Intel or Motorola	8	15.0 @ 3.3V 10.0 @ 2.5V	16 / 16	✓		✓	✓	✓	✓	✓	✓	2.25V-3.63V	QFP-100
XR16V794	Intel or Motorola	4	8.0 @ 3.3V 6.25 @ 2.5V	64 / 64	✓	✓	✓	✓		✓	✓	✓	2.25V-3.63V	LQFP-64
XR16V654 / 654D	Intel or Motorola	4	16.0 @ 3.3V 12.5 @ 2.5V	64 / 64			✓			✓	✓	✓	2.25V-3.63V	QFN-48 PLCC-68 LQFP-64 LQFP-80 QFP-100
XR16V564 / 564D	Intel or Motorola	4	16.0 @ 3.3V 12.5 @ 2.5V	32 / 32			✓			✓	✓	✓	2.25V-3.63V	QFN-48 PLCC-68 LQFP-64 LQFP-80
XR16V554 / 554D	Intel or Motorola	4	8.0 @ 3.3V 6.25 @ 2.5V	16 / 16								✓	2.25V-3.63V	QFN-48 PLCC-68 LQFP-64 LQFP-80
XR16V2750	Intel	2	8.0 @ 3.3V 6.25 @ 2.5V	64 / 64	✓	✓	✓	✓		✓	✓	✓	2.25V-3.63V	TQFP-48 QFN-32
XR16V2751	Intel or Motorola	2	8.0 @ 3.3V 6.25 @ 2.5V	64 / 64	✓	✓	✓	✓		✓	✓	✓	2.25V-3.63V	TQFP-48
XR16V2752	Intel	2	8.0 @ 3.3V 6.25 @ 2.5V	64 / 64	✓	✓	✓	✓		✓	✓	✓	2.25V-3.63V	PLCC-44 QFN-32
XR16V2650	Intel	2	16.0 @ 3.3V 12.5 @ 2.5V	32 / 32	✓		✓			✓	✓	✓	2.25V-3.63V	TQFP-48 QFN-32
XR16V2651	Intel or Motorola	2	16.0 @ 3.3V 12.5 @ 2.5V	32 / 32	✓		✓			✓	✓	✓	2.25V-3.63V	TQFP-48 QFN-32
XR16V2652	Intel	2	16.0 @ 3.3V 12.5 @ 2.5V	32 / 32	✓		✓			✓	✓	✓	2.25V-3.63V	PLCC-44 QFN-32
XR16V2550	Intel	2	16.0 @ 3.3V 12.5 @ 2.5V	16 / 16	✓		✓			✓	✓	✓	2.25V-3.63V	TQFP-48 QFN-32
XR16V2551	Intel or Motorola	2	16.0 @ 3.3V 12.5 @ 2.5V	16 / 16	✓		✓			✓	✓	✓	2.25V-3.63V	TQFP-48 QFN-32
XR16V2552	Intel	2	16.0 @ 3.3V 12.5 @ 2.5V	16 / 16	✓		✓			✓	✓	✓	2.25V-3.63V	PLCC-44 QFN-32

Cell Phone with Bluetooth

Power-Save   VCC=3.3V

CPU/MCU

8-bit
Intel Motorola VLIO

UART
XR16M570
XR16M580
XR16M581
XR16M670
XR16M680
XR16M681
XR16M770
XR16M780
XR16M781

TX
RX
RTS#
CTS#
DTR#
DSR#
CD#
RI#

Bluetooth w/EDR Module
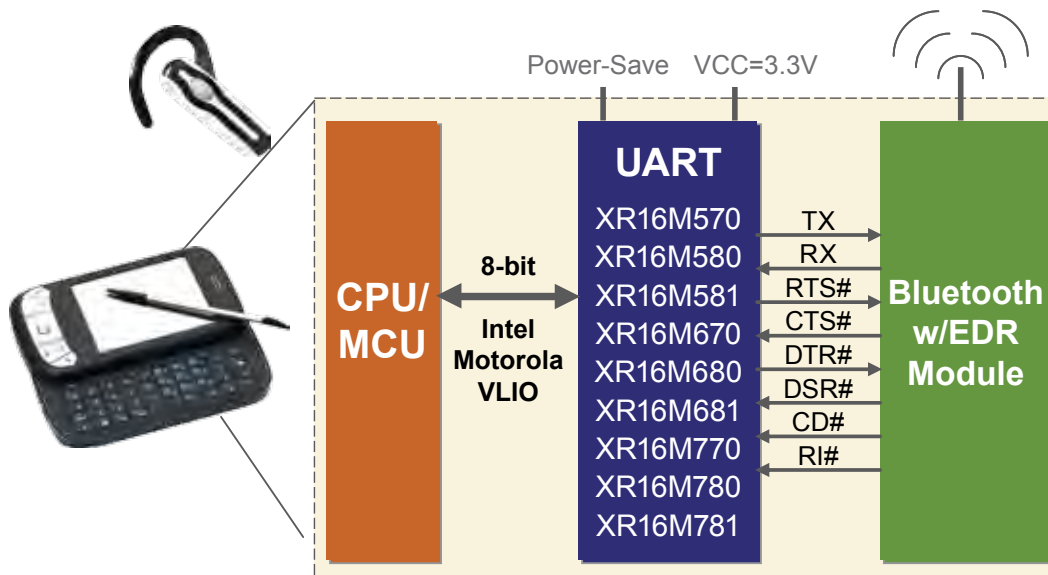
8-bit UARTs: "M" UART Product Family

The "M" UART product family is a low voltage and high performance UART product family. The "M" UART product family can operate from 1.62V-3.63V with a maximum baud rate of up to 16Mbps at 3.3V. Like the "V" UART product family, the "M" UART product family also has the Fractional Baud Rate Generator feature. Unlike the "V" UART product family, the "M" UART product family does not have 5V tolerant inputs.

UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	TX & RX FIFO Level Counters	Program. Trigger Levels	Auto HW/SW Flow Control	Auto RS-485 Half-Duplex Control	Multidrop (9-bit) mode	Fractional Baud Rate Generator	Power Down Mode	Supply Voltage Range	Packages
XR16M698	Intel or Motorola	8	15.0 @ 3.3V, 10.0 @ 2.5V, 5.0 @ 1.8V	32 / 32	✓		✓	✓	✓	✓	✓	1.62V-3.63V	QFP-100
XR16M598	Intel or Motorola	8	15.0 @ 3.3V, 10.0 @ 2.5V, 5.0 @ 1.8V	16 / 16	✓		✓	✓	✓	✓	✓	1.62V-3.63V	QFP-100
XR16M654 / 654D	Intel or Motorola	4	16.0 @ 3.3V, 12.5 @ 2.5V, 8.0 @ 1.8V	64 / 64			✓			✓	✓	1.62V-3.63V	QFN-48, PLCC-68, LQFP-64, LQFP-80, QFP-100
XR16M564 / 564D	Intel or Motorola	4	16.0 @ 3.3V, 12.5 @ 2.5V, 8.0 @ 1.8V	32 / 32			✓			✓	✓	1.62V-3.63V	QFN-48, PLCC-68, LQFP-64, LQFP-80
XR16M554 / 554D	Intel or Motorola	4	8.0 @ 3.3V, 6.25 @ 2.5V, 4.0 @ 1.8V	16 / 16								1.62V-3.63V	QFN-48, PLCC-68, LQFP-64, LQFP-80
XR16M2750	Intel	2	8.0 @ 3.3V, 6.25 @ 2.5V, 4.0 @ 1.8V	64 / 64	✓	✓	✓	✓		✓	✓	1.62V-3.63V	TQFP-48, QFN-32
XR16M2751	Intel or Motorola	2	8.0 @ 3.3V, 6.25 @ 2.5V, 4.0 @ 1.8V	64 / 64	✓	✓	✓	✓		✓	✓	1.62V-3.63V	TQFP-48
XR16M2752	Intel	2	8.0 @ 3.3V, 6.25 @ 2.5V, 4.0 @ 1.8V	64 / 64	✓	✓	✓	✓		✓	✓	1.62V-3.63V	PLCC-44, QFN-32
XR16M752	Intel	2	16.0 @ 3.3V, 12.5 @ 2.5V, 8.0 @ 1.8V	64 / 64	✓	✓	✓	✓		✓	✓	1.62V-3.63V	TQFP-48, QFN-32
XR68M752	Intel or Motorola	2	16.0 @ 3.3V, 12.5 @ 2.5V, 8.0 @ 1.8V	64 / 64	✓	✓	✓	✓		✓	✓	1.62V-3.63V	BGA-49, TQFP-48, QFN-32
XR16M2650	Intel	2	16.0 @ 3.3V, 12.5 @ 2.5V, 8.0 @ 1.8V	32 / 32	✓		✓			✓	✓	1.62V-3.63V	TQFP-48, QFN-32
XR16M2651	Intel or Motorola	2	16.0 @ 3.3V, 12.5 @ 2.5V, 8.0 @ 1.8V	32 / 32	✓		✓			✓	✓	1.62V-3.63V	TQFP-48, QFN-32
XR16M2550	Intel	2	16.0 @ 3.3V, 12.5 @ 2.5V, 8.0 @ 1.8V	16 / 16	✓		✓			✓	✓	1.62V-3.63V	TQFP-48, QFN-32
XR16M2551	Intel or Motorola	2	16.0 @ 3.3V, 12.5 @ 2.5V, 8.0 @ 1.8V	16 / 16	✓		✓			✓	✓	1.62V-3.63V	TQFP-48, QFN-32
XR16M890*	Intel/ Motorola/ VLIO	1	24.0 @ 3.3V	128 / 128	✓	✓	✓	✓	✓	✓	✓	1.62V-3.63V	TQFP-48, QFN-40, QFN-32
XR16M770	Intel	1	16.0 @ 3.3V, 12.5 @ 2.5V, 7.5 @ 1.8V	64 / 64	✓	✓	✓	✓	✓	✓	✓	1.62V-3.63V	QFN-24, BGA-25, QFN-32
XR16M780	Intel or Motorola	1	16.0 @ 3.3V, 12.5 @ 2.5V, 7.5 @ 1.8V	64 / 64	✓	✓	✓	✓	✓	✓	✓	1.62V-3.63V	BGA-25, QFN-32, TQFP-48
XR16M781	VLIO	1	20.0 @ 3.3V, 16.0 @ 2.5V, 10.0 @ 1.8V	64 / 64	✓	✓	✓	✓	✓	✓	✓	1.62V-3.63V	QFN-24, BGA-25, QFN-32
XR16M670	Intel	1	16.0 @ 3.3V, 12.5 @ 2.5V, 7.5 @ 1.8V	32 / 32	✓		✓			✓	✓	1.62V-3.63V	QFN-24, BGA-25, QFN-32
XR16M680	Intel or Motorola	1	16.0 @ 3.3V, 12.5 @ 2.5V, 7.5 @ 1.8V	32 / 32	✓		✓	✓	✓	✓	✓	1.62V-3.63V	BGA-25, QFN-32, TQFP-48
XR16M681	VLIO	1	20.0 @ 3.3V, 16.0 @ 2.5V, 10.0 @ 1.8V	32 / 32	✓		✓	✓	✓	✓	✓	1.62V-3.63V	QFN-24, BGA-25, QFN-32
XR16M570	Intel	1	16.0 @ 3.3V, 12.5 @ 2.5V, 7.5 @ 1.8V	16 / 16	✓		✓	✓	✓	✓	✓	1.62V-3.63V	QFN-24, BGA-25, QFN-32
XR16M580	Intel or Motorola	1	16.0 @ 3.3V, 12.5 @ 2.5V, 7.5 @ 1.8V	16 / 16	✓		✓	✓	✓	✓	✓	1.62V-3.63V	BGA-25, QFN-32, TQFP-48
XR16M581	VLIO	1	20.0 @ 3.3V, 16.0 @ 2.5V, 10.0 @ 1.8V	16 / 16	✓		✓	✓	✓	✓	✓	1.62V-3.63V	QFN-24, BGA-25, QFN-32

*This device has integrated level shiters and up to 16 GPIOs.

Exar's UART + Transceivers Combo family combines a UART and serial transceiver into a single QFN package. The small package makes it ideal for space-constrained applications, simplifies the hardware and minimizes the BOM. There are 3 types of combos:

- 8-bit UART + RS-232 transceiver
- 8-bit UART + RS-485 transceiver
- I²C/SPI + RS-232 transceiver

UART + Transceiver Combos - 8-bit UART + RS-232 transceiver

UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	TX & RX FIFO Level Counters	Program. Trigger Levels	Auto HW/ SW Flow Control	Auto RS-485 Half-Duplex Control	Fractional Baud Rate Generator	5V Tolerant Inputs	Power Down Mode	Supply Voltage Range	Packages
XR19L202	Intel or Motorola	2	1 @ 5V 1 @ 3.3V	64 / 64	✓	✓	✓	✓	✓	✓	✓	3.3V-5.5V	QFN-48
XR19L212	Intel or Motorola	2	1 @ 5V 1 @ 3.3V	64 / 64	✓	✓	✓	✓	✓	✓	✓	3.3V-5.5V	QFN-48
XR19L222	Intel or Motorola	2	1 @ 5V 1 @ 3.3V	64 / 64	✓	✓	✓	✓	✓	✓	✓	3.3V-5.5V	QFN-64
XR19L200	Intel or Motorola	1	0.25 @ 5V 0.25 @ 3.3V	16 / 16			✓			✓	✓	3.0V-5.5V	QFN-32
XR19L210	Intel or Motorola	1	0.25 @ 5V 0.25 @ 3.3V	16 / 16			✓			✓	✓	3.0V-5.5V	QFN-40
XR19L220	Intel or Motorola	1	0.25 @ 5V 0.25 @ 3.3V	16 / 16			✓			✓	✓	3.0V-5.5V	QFN-40

UART + Transceiver Combos - 8-bit UART + RS-485 transceiver

UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	TX & RX FIFO Level Counters	Program. Trigger Levels	Auto HW/ SW Flow Control	Auto RS-485 Half-Duplex Control	Fractional Baud Rate Generator	5V Tolerant Inputs	Power Down Mode	Supply Voltage Range	Packages
XR19L402	Intel or Motorola	2	8 @ 5V 8 @ 3.3V	64 / 64	✓	✓		✓	✓	✓	✓	2.97V-3.63V, 4.5V-5.5V	QFN-48
XR19L400	Intel or Motorola	1	8 @ 5V 8 @ 3.3V	64 / 64	✓	✓		✓	✓	✓	✓	2.97V-3.63V, 4.5V-5.5V	QFN-40

UART + Transceiver Combos - I²C/SPI + RS-232 transceiver

UART Device	Data Bus Interface	UART Ch.	Max Data Rate (Mbps)	TX/RX FIFO Bytes	TX & RX FIFO Level Counters	Program. Trigger Levels	Auto HW/ SW Flow Control	Auto RS-485 Half-Duplex Control	Fractional Baud Rate Generator	5V Tolerant Inputs	Power Down Mode	Supply Voltage Range	Packages
XR20V2172	I²C or SPI	2	1.0 @ 5V 1.0 @ 3.3V	64 / 64	✓	✓	✓	✓	✓		✓	3.3V-5.5V	QFN-64
XR20V2170	I²C or SPI	1	0.25 @ 3.3V	64 / 64	✓	✓	✓	✓	✓		✓	2.97V-3.63V	QFN-40

Exar's Wireless UART chipset consists of a Wireless UART controller and 900MHz RF Transceiver. With Exar's proprietary firmware, the Wireless UART chipset can be used as a serial cable replacement wireless solution.

Wireless UARTs

Name	Description	Interfaces	UART CH	Tx/Rx FIFO (Bytes)	Auto RTS/ CTS	5V Tol Inputs	Frequency	Data Rate @ 868.3MHz	Data Rate @ 903-927MHz	Rx Sensitivity @ 100Kbps	Rx Sensitivity @ 250Kbps	Output Power	Supply Voltage Range	Packages
XR18W750	Wireless UART Controller	Parallel (8-bit), Serial, I²C Master	1	64/64	✓	✓							2.25-3.63V	QFN-48
XR18W753	Single Chip 868MHZ to 956MHZ RF Transceiver	I²C Slave					868-956MHz	100Kbps	250Kbps	-94dBm	-91dBm	-24-0dBm	2.2-3.6V	QFN-48

Exar offers the industry's only single chip multiprotocol solutions and the fastest data rates, up to 52 Mbps. Multiprotocol transceivers support the popular serial protocols - V.10, V.11, V.28 (RS-232), V.35, V.36 (RS-449), EIA-530, EIA-530-A, and X.21. Advanced features like built-in cable termination, adjustable logic level, diagnostic loopback modes, and 15kV ESD protection provide maximum versatility and robust serial communication.

Multi Protocol Transceivers

Name	Drivers	Receivers	Data Rate (Mbps)	ESD (kV)	Internal Termination	Supported Protocols												Adj. Logic Level	Supply Voltage Range	Packages
						RS-232	RS-485	RS-422	RS-449	EIA-530	EIA-530A	V.10	V.11	V.28	V.35	V.36	X.21			
SP322	3	3	10	2	V.35, V.11								✓		✓				4.75V-5.25V	LQFP-44
SP331	4	4	10	2		✓	✓	✓						✓					4.75V-5.25V	WSOIC-28
SP332	4	4	10	2		✓	✓	✓						✓					4.75V-5.25V	WSOIC-28
SP334	3	5	10	2		✓	✓	✓						✓					4.75V-5.25V	WSOIC-28
SP336	4	4	10	15		✓	✓	✓						✓					3.135V-3.465V, 4.75V-5.25V	WSOIC-28 TSSOP-28
SP337	3	5	15	15		✓	✓	✓						✓					3.135V-3.465V, 4.75V-5.25V	WSOIC-28 TSSOP-28
SP3508	8	8	20	2	Complete	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓		3V-3.6V	LQFP-100
SP503	7	7	5	2		✓	✓	✓	✓	✓		✓	✓	✓			✓		4.75V-5.25V	LQFP-80
SP504	7	7	10	2	Basic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		4.75V-5.25V	LQFP-80
SP505A	7	7	10	2	V.35, V.11	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓		4.75V-5.25V	LQFP-80
SP505B	7	7	16	2	V.35, V.11	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓		4.75V-5.25V	LQFP-80
SP506	7	7	20	2	V.35, V.11	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓		4.75V-5.25V	LQFP-80
SP507	7	7	20	2	V.35, V.11	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓		4.75V-5.25V	LQFP-80
SP508	8	8	20	15	Complete	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓		4.75V-5.25V	LQFP-100
SP509	8	8	40	15	Complete	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓		4.75V-5.25V	LQFP-100
SP510	8	8	52	15	Complete	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	4.75V-5.25V	LQFP-100
SP526	4	4	10	15		✓			✓	✓		✓	✓	✓		✓	✓		4.75V-5.25V	MQFP-44

Multiprotocol Example in Network Switch Router
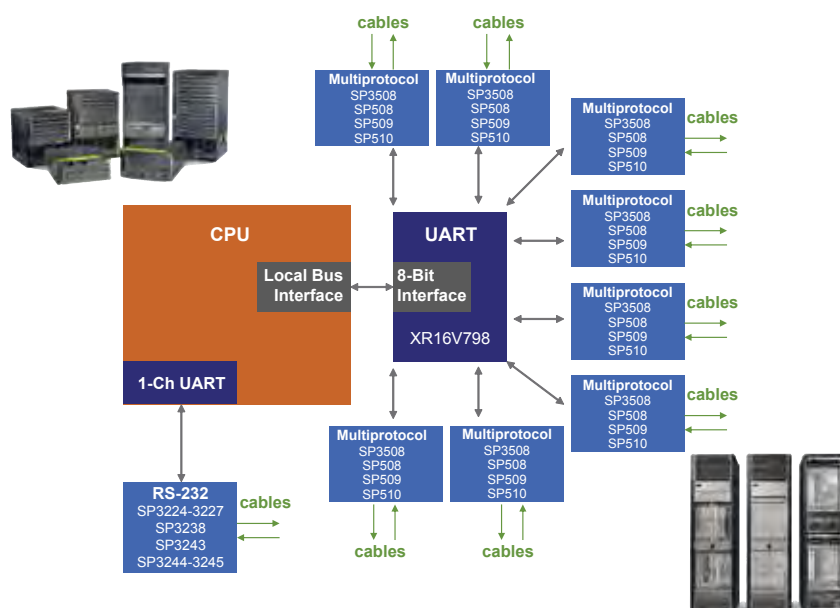
Exar has a diverse portfolio of RS-485/422 serial transceivers. Products range from industry standard transceivers to ultra high speed, 52Mbps and high differential output transceivers. In addition, Exar has RS-485/422 transceivers that are compliant to popular field buses including PROFIBUS. Advanced features like hotswap, enhanced failsafe, and 15kV ESD protection ensure reliable and robust data communication over long cable lengths.

RS-485/422 Transceivers

Name	Drivers	Receivers	Duplex	Data Rate (Mbps)	ESD (kV)	Rx Fail-Safe	Shutdown	Multi-Drop Nodes	Hot Swap	High Differential Output	PROFIBUS	Supply Voltage Range	Packages
SP1481E	1	1	Half	20	15	Open	✓	32				4.75V-5.25V	NSOIC-8
SP1485E	1	1	Half	20	15	Open		32				4.75V-5.25V	NSOIC-8
SP1486E	1	1	Half	20	15	Open, Short, Idle		256	✓	✓	✓	4.5V-5.5V	NSOIC-8
SP1490E	1	1	Full	20	15	Open		32				4.75V-5.25V	NSOIC-8
SP1491E	1	1	Full	20	15	Open	✓	32				4.75V-5.25V	NSOIC-14
SP26LV431	4	0	Full	60	2	No		10				3V-3.6V	NSOIC-16 PDIP-16
SP26LV432	0	4	Full	50	2	Open		10				3V-3.6V	NSOIC-16 PDIP-16
SP3070E	1	1	Full	0.25	15	Open, Short, Idle	✓	256	✓			3V-3.6V	NSOIC-14
SP3071E	1	1	Full	0.25	15	Open, Short, Idle		256				3V-3.6V	NSOIC-8
SP3072E	1	1	Half	0.25	15	Open, Short, Idle	✓	256	✓			3V-3.6V	NSOIC-8
SP3073E	1	1	Full	0.5	15	Open, Short, Idle	✓	256	✓			3V-3.6V	NSOIC-14
SP3074E	1	1	Full	0.5	15	Open, Short, Idle		256				3V-3.6V	NSOIC-8
SP3075E	1	1	Half	0.5	15	Open, Short, Idle	✓	256	✓			3V-3.6V	NSOIC-8
SP3076E	1	1	Full	16	15	Open, Short, Idle	✓	256	✓			3V-3.6V	NSOIC-14
SP3077E	1	1	Full	16	15	Open, Short, Idle		256				3V-3.6V	NSOIC-8
SP3078E	1	1	Half	16	15	Open, Short, Idle	✓	256	✓			3V-3.6V	NSOIC-8
SP3080E	1	1	Full	0.115	15	Open, Short, Idle	✓	256	✓			4.5V-5.5V	NSOIC-14
SP3081E	1	1	Full	0.115	15	Open, Short, Idle		256				4.5V-5.5V	NSOIC-8
SP3082E	1	1	Half	0.115	15	Open, Short, Idle	✓	256	✓			4.5V-5.5V	NSOIC-8
SP3083E	1	1	Full	0.5	15	Open, Short, Idle	✓	256	✓			4.5V-5.5V	NSOIC-14
SP3084E	1	1	Full	0.5	15	Open, Short, Idle		256				4.5V-5.5V	NSOIC-8
SP3085E	1	1	Half	0.5	15	Open, Short, Idle	✓	256	✓			4.5V-5.5V	NSOIC-8
SP3086E	1	1	Full	20	15	Open, Short, Idle	✓	256	✓			4.5V-5.5V	NSOIC-14
SP3087E	1	1	Full	20	15	Open, Short, Idle		256				4.5V-5.5V	NSOIC-8
SP3088E	1	1	Half	20	15	Open, Short, Idle	✓	256	✓			4.5V-5.5V	NSOIC-8
SP3483	1	1	Half	0.25	2	Open	✓	32				3.3V ±5% (3.135V-3.465V)	NSOIC-8
SP3485	1	1	Half	10	2	Open		32				3.3V ±5% (3.135V-3.465V)	NSOIC-8
SP3490	1	1	Full	10	2	Open		32				3.3V ±5% (3.135V-3.465V)	NSOIC-8

| RS-485/422 Transceivers													
Name	Drivers	Receivers	Duplex	Data Rate (Mbps)	ESD (kV)	Rx Fail-Safe	Shutdown	Multi-Drop Nodes	Hot Swap	High Differential Output	PROFIBUS	Supply Voltage Range	Packages
SP3491	1	1	Full	10	2	Open		32				3.3V ±5% (3.135V-3.465V)	NSOIC-14
SP3494	1	1	Half	2.5	2	Open	✓	32				3.3V ±5% (3.135V-3.465V)	NSOIC-8
SP3495E	1	1	Half	32	15	Open, Short, Idle	✓	64				3V-3.6V	NSOIC-8
SP3496E	1	1	Full	32	15	Open, Short, Idle		64				3V-3.6V	NSOIC-8
SP3497E	1	1	Full	32	15	Open, Short, Idle	✓	64				3V-3.6V	NSOIC-14
SP4082E	1	1	Half	0.115	15	Open, Short, Idle	✓	256				4.5V-5.5V	NSOIC-8
SP481E	1	1	Half	10	15	Open	✓	32				4.75V-5.25V	NSOIC-8 PDIP-8
SP483	1	1	Half	0.25	2	Open	✓	32				4.75V-5.25V	NSOIC-8 PDIP-8
SP483E	1	1	Half	0.25	15	Open	✓	32				4.75V-5.25V	NSOIC-8 PDIP-8
SP485	1	1	Half	5	2	Open		32				4.75V-5.25V	NSOIC-8 PDIP-8
SP485E	1	1	Half	10	15	Open		32				4.75V-5.25V	NSOIC-8 PDIP-8
SP485R	1	1	Half	1	2	Open		400				4.75V-5.25V	NSOIC-8 PDIP-8
SP486	4	0	Quad	10	2	No		32				4.75V-5.25V	WSOIC-16
SP487	4	0	Quad	10	2	No		32				4.75V-5.25V	WSOIC-16 PDIP-16
SP488	0	4	Quad	10	2	Open		32				4.75V-5.25V	WSOIC-16
SP490	1	1	Full	5	2	Open		32				4.75V-5.25V	NSOIC-8 PDIP-8
SP490E	1	1	Full	10	15	Open		32				4.75V-5.25V	NSOIC-8 PDIP-8
SP491	1	1	Full	5	2	Open	✓	32				4.75V-5.25V	NSOIC-14 PDIP-14
SP491E	1	1	Full	10	15	Open	✓	32				4.75V-5.25V	NSOIC-14 PDIP-14
XR3170E	1	1	Full	0.25	15	Open, Short, Idle	✓	256	✓	✓		3V-3.6V	NSOIC-14
XR3171E	1	1	Full	0.25	15	Open, Short, Idle		256		✓		3V-3.6V	NSOIC-8
XR3172E	1	1	Half	0.25	15	Open, Short, Idle	✓	256	✓	✓		3V-3.6V	NSOIC-8
XR3173E	1	1	Full	0.5	15	Open, Short, Idle	✓	256	✓	✓		3V-3.6V	NSOIC-14
XR3174E	1	1	Full	0.5	15	Open, Short, Idle		256		✓		3V-3.6V	NSOIC-8
XR3175E	1	1	Half	0.5	15	Open, Short, Idle	✓	256	✓	✓		3V-3.6V	NSOIC-8
XR3176E	1	1	Full	20	15	Open, Short, Idle	✓	256	✓	✓		3V-3.6V	NSOIC-14
XR3177E	1	1	Full	20	15	Open, Short, Idle		256		✓		3V-3.6V	NSOIC-8
XR3178E	1	1	Half	20	15	Open, Short, Idle	✓	256	✓	✓		3V-3.6V	NSOIC-8
XR5486E	1	1	Full	52	15	Open, Short, Idle	✓	256	✓	✓	✓	4.75V-5.25V	NSOIC-14
XR5487E	1	1	Full	52	15	Open, Short, Idle		256		✓	✓	4.75V-5.25V	NSOIC-8
XR5488E	1	1	Half	52	15	Open, Short, Idle	✓	256	✓	✓	✓	4.75V-5.25V	NSOIC-8

Exar offers a large portfolio of the RS-232 serial transceivers with more than 40 product offerings. The family consists of traditional RS-232 transceivers to the more advanced RS-232 transceivers with Auto On-line Plus features. In addition, many of the RS-232 transceivers have enhanced ESD protection. Exar offers new RS-232 products that meet rigid IEC 61000-4-2 Air-Gap and Contact ESD standards. This protection makes the product immune to damage from ESD strikes. Many of the devices are drop-in replacements and functional equivalents to existing industry standard solutions.

RS-232 Transceivers

Name	Drivers	Receivers	Data Rate (kbps)	ESD (kV)	Shutdown	TTL Tri-state	Auto On-Line	Auto On-Line Plus	Supply Voltage Range	Packages
SP202E	2	2	120	15					4.5V-5.5V	NSOIC-16 PDIP-16 WSOIC-16
SP206	4	3	120	10	✓	✓			4.5V-5.5V	SSOP-24 WSOIC-24
SP207	5	3	120	10					4.5V-5.5V	SSOP-24 WSOIC-24
SP207E	5	3	120	15					4.5V-5.5V	SSOP-24 WSOIC-24
SP208	4	4	120	10					4.5V-5.5V	SSOP-24 WSOIC-24
SP208E	4	4	120	15					4.5V-5.5V	SSOP-24 WSOIC-24
SP208EH	4	4	460	15					4.5V-5.5V	SSOP-24 WSOIC-24
SP211	4	5	120	10	✓	✓			4.5V-5.5V	SSOP-28 WSOIC-28
SP211E	4	5	120	15	✓	✓			4.5V-5.5V	SSOP-28 WSOIC-28
SP211EH	4	5	460	15	✓	✓			4.5V-5.5V	SSOP-28 WSOIC-28
SP213E	4	5	120	15	✓	✓			4.5V-5.5V	SSOP-28
SP213EH	4	5	460	15	✓	✓			4.5V-5.5V	SSOP-28
SP2209E	6	10	460	15					10.8V-13.2V, 3.125V-5.5V	TSSOP38
SP232A	2	2	120	2					4.5V-5.5V	NSOIC-16 PDIP-16 WSOIC-16
SP232E	2	2	120	15					4.5V-5.5V	NSOIC-16 PDIP-16 WSOIC-16
SP233A	2	2	120	2					4.5V-5.5V	WSOIC-20 PDIP-20
SP233E	2	2	120	15					4.5V-5.5V	WSOIC-20
SP236A	4	3	20	2	✓	✓			4.5V-5.5V	WSOIC-24
SP238A	4	4	20	2					4.5V-5.5V	WSOIC-24
SP310A	2	2	120	2	✓				4.5V-5.5V	WSOIC-18 PDIP-18
SP310E	2	2	120	15	✓				4.5V-5.5V	WSOIC-18 PDIP-18
SP312A	2	2	120	2	✓	✓			4.5V-5.5V	WSOIC-18
SP312E	2	2	120	15	✓	✓			4.5V-5.5V	WSOIC-18
SP3203E	3	2	250	15	✓				3V-5.5V	TSSOP-20
SP3220E	1	1	120	15	✓	✓			3V-5.5V	SSOP-16 TSSOP-16
SP3220EB	1	1	250	15	✓	✓			3V-5.5V	SSOP-16 TSSOP-16
SP3220EU	1	1	1000	15	✓	✓			3V-5.5V	SSOP-16 TSSOP-16
SP3222E	2	2	120	15	✓	✓			3V-5.5V	SSOP-20 WSOIC-18 TSSOP-20
SP3222EB	2	2	250	15	✓	✓			3V-5.5V	SSOP-20 WSOIC-18 TSSOP-20
SP3222EU	2	2	1000	15	✓	✓			3V-5.5V	SSOP-20 WSOIC-18 TSSOP-20

RS-232 Transceivers

Name	Drivers	Receivers	Data Rate (kbps)	ESD (kV)	Shutdown	TTL Tri-state	Auto On-Line	Auto On-Line Plus	Supply Voltage Range	Packages
SP3223E	2	2	120	15	✓	✓	✓		3V-5.5V	SSOP-20 TSSOP-20
SP3223EB	2	2	250	15	✓	✓	✓		3V-5.5V	SSOP-20 TSSOP-20
SP3223EU	2	2	1000	15	✓	✓	✓		3V-5.5V	SSOP-20 TSSOP-20
SP3224E	2	2	250	15	✓	✓		✓	3V-5.5V	SSOP-20 TSSOP-20
SP3225E	2	2	1000	15	✓	✓		✓	3V-5.5V	SSOP-20 TSSOP-20
SP3226E	1	1	250	15	✓			✓	3V-5.5V	SSOP-16 TSSOP-16
SP3227E	1	1	1000	15	✓			✓	3V-5.5V	SSOP-16 TSSOP-16
SP3232E	2	2	120	15					3V-5.5V	SSOP-16 TSSOP-16 NSOIC-16 WSOIC-16 PDIP-16
SP3232EB	2	2	250	15					3V-5.5V	SSOP-16 TSSOP-16 NSOIC-16 WSOIC-16 PDIP-16
SP3232EH	2	2	460	15					3V-5.5V	SSOP-16 TSSOP-16 WSOIC-16 PDIP-16
SP3232EU	2	2	1000	15					3V-5.5V	SSOP-16 TSSOP-16 NSOIC-16 WSOIC-16 PDIP-16
SP3238E	5	3	250	15	✓		✓		3V-5.5V	SSOP-28 TSSOP-28
SP3239E	5	3	250	15	✓				3V-5.5V	SSOP-28
SP3243E	3	5	120	15	✓		✓		3V-5.5V	SSOP-28 WSOIC-28 TSSOP-28
SP3243EB	3	5	250	15	✓		✓		3V-5.5V	SSOP-28 WSOIC-28 TSSOP-28 QFN32
SP3243EH	3	5	460	15	✓		✓		3V-5.5V	SSOP-28 WSOIC-28
SP3243EU	3	5	1000	15	✓		✓		3V-5.5V	SSOP-28 WSOIC-28 TSSOP-28 QFN32
SP3244E	3	5	250	15	✓			✓	3V-5.5V	SSOP-28 TSSOP-28 QFN32
SP3245E	3	5	1000	15	✓			✓	3V-5.5V	SSOP-28 TSSOP-28 QFN32
SP3249E	5	3	250	15					3V-5.5V	TSSOP-24
SP385E	2	2	120	15	✓				3.3V or 5V	SSOP-20 WSOIC-18

RS-485 Example in Point of Sale (POS)
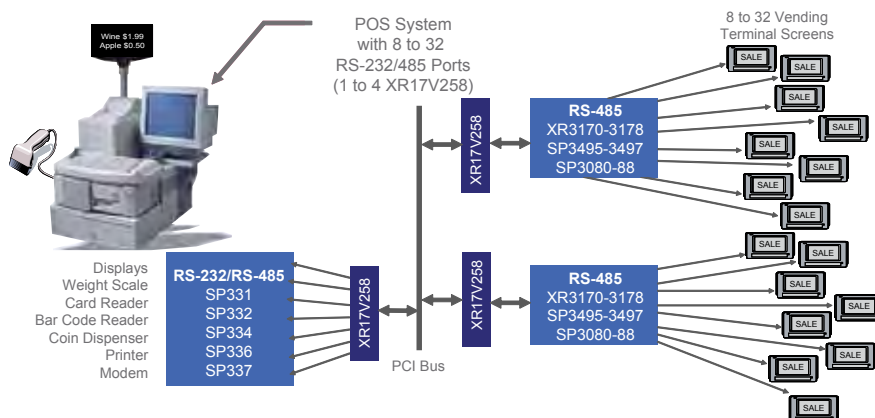
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