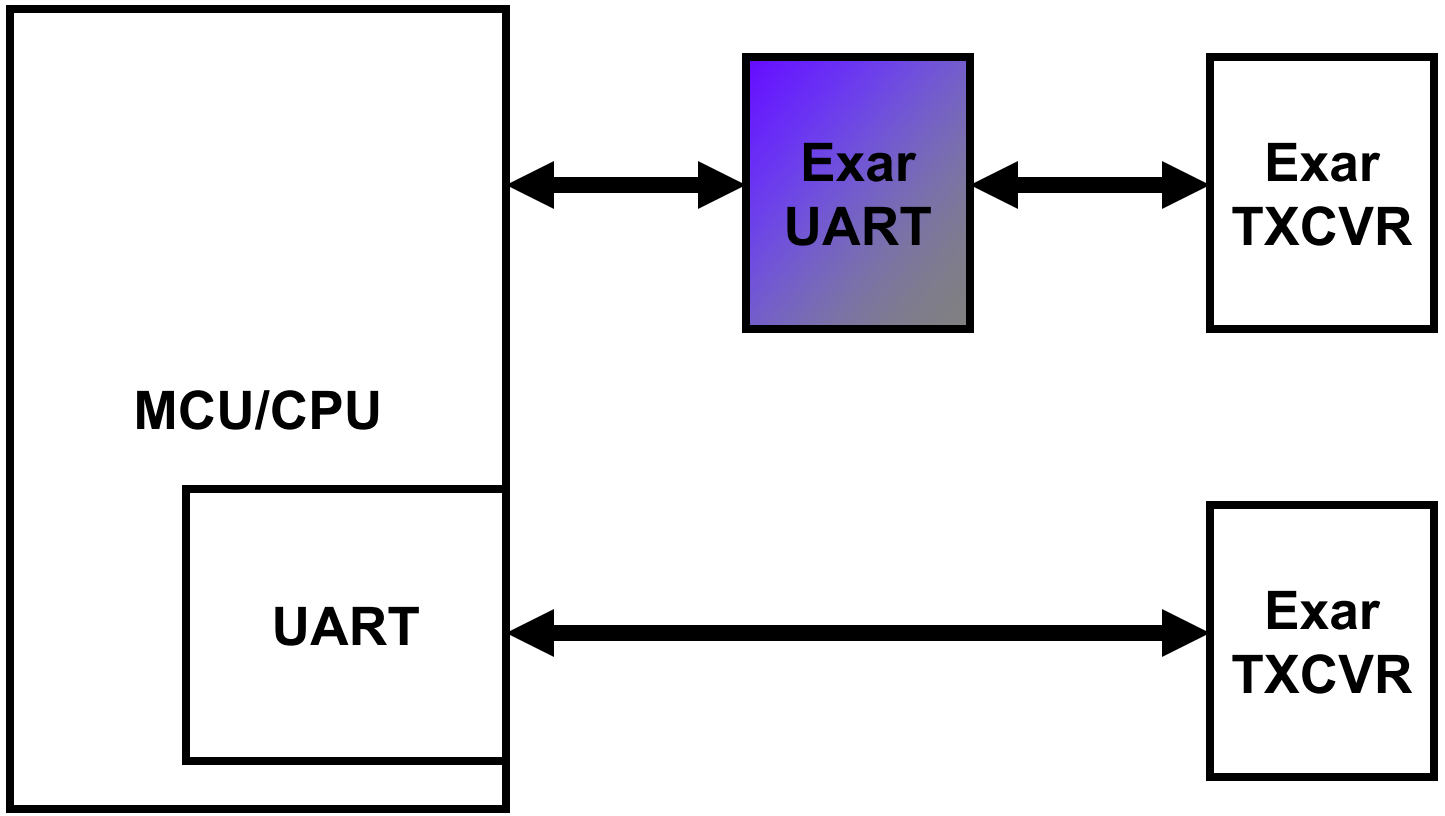
UARTs and Serial Transceivers Synergy

April 2010

Application Block Diagram



Why should we use a UART?

- UARTs Are Everywhere!
- Industry Standard For 30+ Years
- Simplest Way To Send Data Between Two Systems
- Add Functionality And Value To Any Application

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Why should we use a UART and Transceiver?

- **Longer Distances**
- **Noise Rejection/Immunity**
- **ESD Protection**

When is an Exar UART needed?

- **Are there enough UARTs?**
- **Are the UARTs fast enough?**
- **Do these UARTs have enhanced features to simplify the design or improve the performance?**

“No” to any of these questions =

Yes to Exar UART!

An Exar UART is needed!

- **More UART channels**
  - Communicate with more peripherals/systems
- **Higher performance w/ data rates up to 25 Mbps**
- **Enhanced features improves CPU performance**
  - Larger FIFOs
  - Automatic Flow Control
  - Auto RS-485 Half-Duplex Direction Control
  - Multidrop Mode with Auto Address Detect

Which Exar UART should we use?

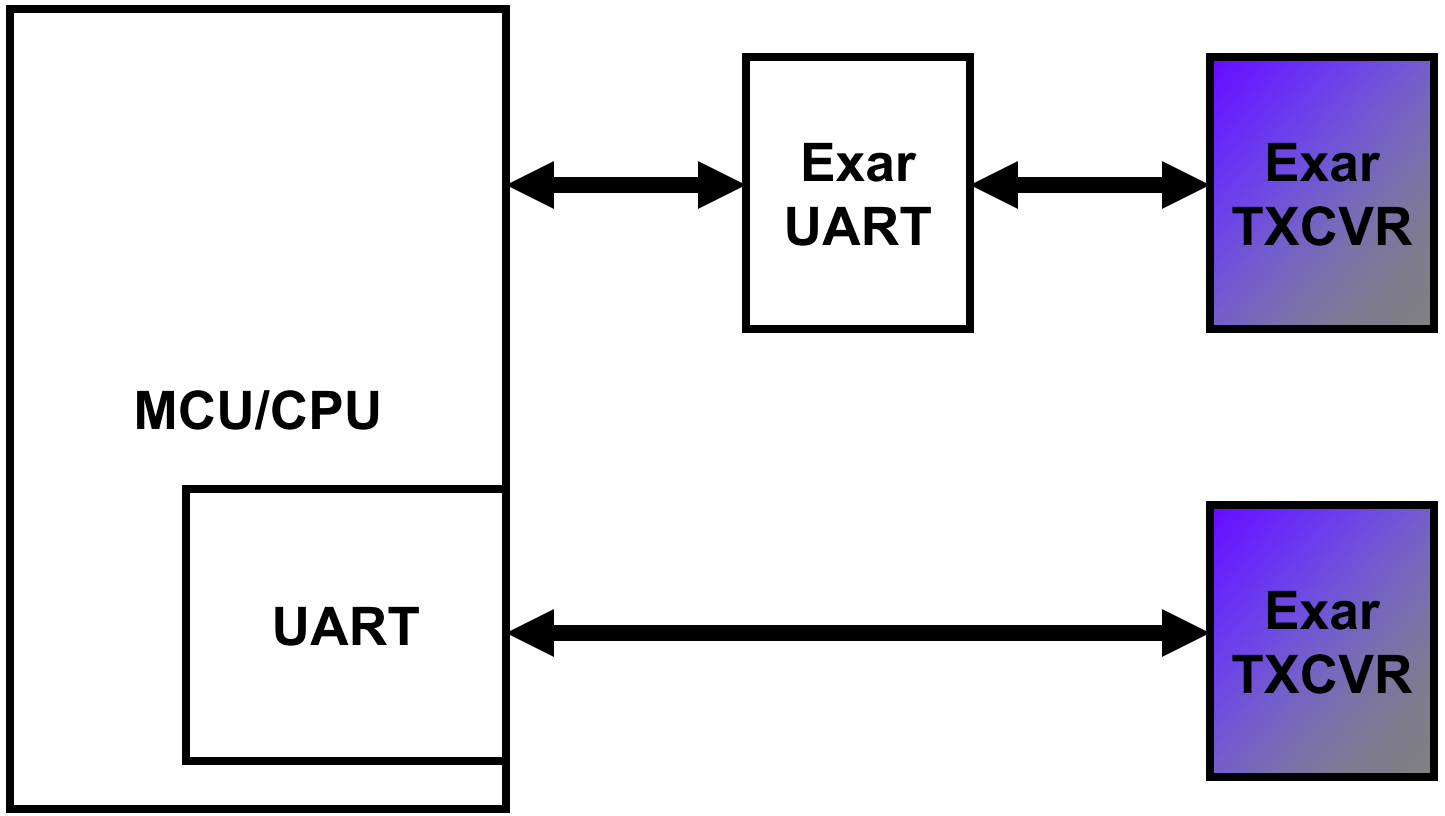
- **It depends!**
  - How many additional peripherals/systems do you want to communicate with?
  - What is the maximum data rate of the peripheral/system?
  - What enhanced features do you need or want to offer?
  - What interfaces are available on the processor?

More than 100 UARTs to choose from!

Other considerations for selecting a UART

- **Will the UART be in a RS-485 application?**
- **Will the UART be used in a multidrop application?**
- **Will one of the channels be used for Infrared?**
- **What is the supply voltage for the processor?**
- **What is the supply voltage for the transceiver?**

Application Block Diagram



Which transceiver should we use?

- **It depends!**
  - Is it point-to-point or point-to-multipoint?
  - Is the distance less than or greater than 15 meters?

	< 15 meters	**> 15 meters**
Point-to-Point	RS-232 or RS-422	RS-422
Point-to-Multipoint	RS-485	RS-485

  - What is the maximum data rate?

	≤ 1 Mbps	**> 1 Mbps**
Maximum Data Rate	RS-232, RS-485 or RS-422	RS-485 or RS-422

Which transceiver should we use?

Specification	RS-232	RS-422	RS-485	PROFIBUS
Transmission Type	Single Ended	Differential	Differential	Differential
Maximum Cable Length	15 m	1200 m	1200 m	1200 m
Minimum Driver Output Voltage	±5 V	±2 V	**±1.5 V**	**±2.1 V**
Driver Load Impedance	300 Ω	100 Ω	54 Ω	54 Ω
Receiver Input Resistance (min.)	3kΩ to 7kΩ	4kΩ	**12kΩ**	**20kΩ**
Receiver Input Sensitivity	±3 V	±200 mV	±200 mV	±200 mV
Receiver Input Voltage Range	−15 V to +15 V	−7 V to +7 V	−7 V to +12 V	−7 V to +12 V

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Other factors for selecting a Transceiver?

- **What is the operating voltage of the UART?**
- **Does the UART have 5V tolerant inputs?**
- **How much ESD protection is necessary?**
- **What other enhanced features are necessary?**
  - Auto On-Line® Plus (RS-232)
  - 1/8th Unit Load (RS-485/RS-422)
  - Receiver Equalization (RS-485/RS-422)
  - Slew Rate Control (RS-485/RS-422)

More than 1000 Transceiver Options!

EXAR Powering Connectivity™

When is a transceiver not needed?

- **UARTs are less than a few feet away**
- **UARTs are not exposed to the outside world**
- **Examples**
  - Server backplane
  - Bluetooth module
  - GPS module

E-mail hotline: uarttechsupport@exar.com