Universal Asynchronous Receiver / Transmitter (UART) Design for Hand Held Mobile Devices

A.Geetha

Dept of ETE, Bharath University, Chennai,Tamil Nadu, India

ABSTRACT: A Universal Asynchronous Receiver / Transmitter (UART) is responsible for performing the main task in serial communications with computers.Advanced Peripheral Bus (APB) is an interface defines in the advanced Microcontroller Bus Architecture (AMBA), which was introduced by ARM ltd and widely used as on-chip bus in system on-chip (Soc) designs. After coding the design, students will be required to develop verification plan describing verification strategy for the design.This is followed by verification environment development and simulation of design. Once design is cleared through functional verification students will develop synthesis strategy document. Afterwards synthesis scripts will be coded and design will be synthesizes on 45nm technology and timing checks will be performed. Synthesis report with final working frequency, gate count and chip area will be published.Project is targeted towards very low power handheld devices with operating voltage of 0.7-0.9V. Low power clock gating strategies will be developed and applied.Target operating frequency is 100 MHz and silicon area under 0.01 sq mm. Differentoptimization experiments will be conducted to ascertain best area to frequency trade off.Students will gain experience in developing architecture from given specification.Students will be exposed to developing micro architecture and describing it in VerilogHDL.

KEYWORDS: UART,ARM,APB,AMBA,Verilog HDL

I.1INTRODUCTION

UART stands for "Universal Asynchronous Receiver/Transmitter". It is the chip (on themodem circuit board on internal modems, and on the motherboard for external COM ports) thatallows the CPU to share data with the serial device (modem) by converting parallel data formatinto a serial data stream to be sent over the phone lines as an analog signal. It then receivesanalog signals in a serial stream and converts them to parallel data to communicate back to theCPU.The Universal Asynchronous Receiver/Transmitter (UART) controller is the keycomponent of the serial communications subsystem of a computer. The UART takes bytes ofdata and transmits the individual bits in a sequential fashion. At the destination, a second UARTre-assembles the bits into complete bytes. Many chips provide UART functionalityin silicon, and low-cost chips exist to convert logic level signals (such as TTL voltages) to RS-232 level signals (for example, Maxim's MAX232).A universal asynchronous receiver/transmitter (UART) is a type of "asynchronousreceiver / transmitter", a piece of computer hardware that translates data between parallel andserial forms.A UART is usually an individual (or part of an) integrated circuit used for serialcommunications over a computer or peripheral device serial port. UARTs are now commonlyincluded in microcontrollers.

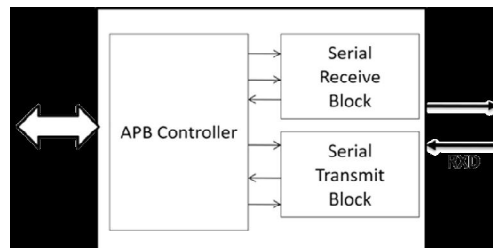## II. BLOCK DIAGRAMS

2.1 Block diagram of UART

Figure 2.1 Basic UART block diagram.

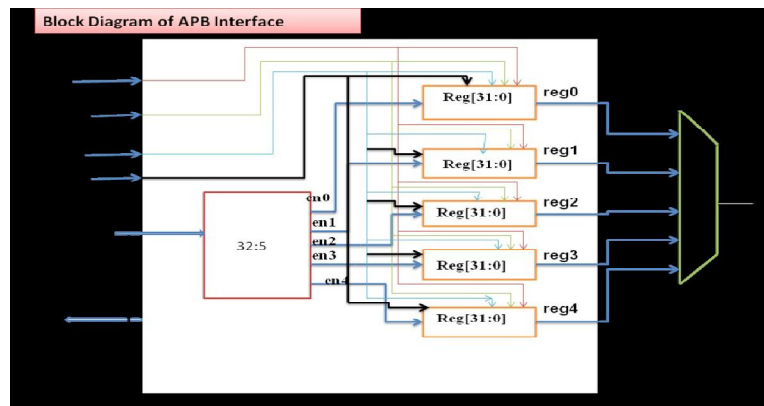**2.2 Block diagram of APB Interface**

Figure 2.2 Basic UART block diagram

III. CONCLUSION

The increasing number of electronic devices and networked embedded systems in automotive applications results in high complexity in fault diagnosis and testing process. An automotive network diagnostic system using a knowledge-based technique is proposed. The system monitors and diagnoses automotive networks. The network fault codes and possible causes are then stored in the fault database for manufacturing and service purposes. In the experimental stage, a communication network set-up is conveniently accomplished by CAN bus simulation tools. To obtain a dependable knowledge base, several diagnostic information sources have been considered in building the knowledge base of the system. The Black Box system built can be implemented in any vehicle. As soon as the driver runs the motor, this system will begin saving the events of the corresponding vehicle. The last 21 seconds are always saved in the EEPROM of the Black Box, and in case of an accident, an additional 10 seconds of events after this accident will be saved.

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