

VERIFICATION IP

PROCESSOR PERIPHERALS: UART

Enable efficient validation of SoC designs by simulating real-world peripheral interactions, ensuring functional accuracy and streamlining the verification process.

OVERVIEW

The UART (Universal Asynchronous Receiver-Transmitter) Verification IP is used to validate UART interfaces in System-on-Chip (SoC) designs. It ensures proper communication between devices through serial data transmission, verifying key aspects such as baud rate, data bits, parity, and stop bits. The VIP allows for testing both transmission and reception functionality, ensuring the integrity of data communication under various conditions. It also supports error injection and provides extensive debugging capabilities, aiding in the verification of UART-based peripherals for reliability and compliance with protocol standards.

KEY FEATURES

Protocol Compliance

- AMBA APB Verification IP ensures that the peripheral interface follows the APB protocol standard. This guarantees accurate communication between master and slave components.

Low Power and Low Bandwidth

- The APB is designed to handle peripherals with low power and low bandwidth needs. Verification IP ensures that such peripherals are validated with minimal resource usage.

Error Injection Capabilities

- Verification IP for APB supports error injection to simulate real-world errors. This feature helps in identifying potential issues in peripheral communication.

Single-Cycle Read/Write Operations

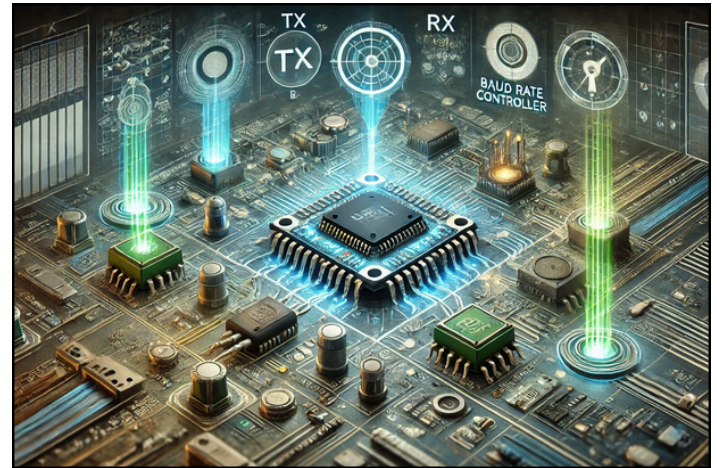
- APB allows for efficient, single-cycle read and write operations. The verification IP checks the correctness of these operations in different test scenarios.

Timing and Clock Validation

- The APB Verification IP validates clock and timing parameters for communication between master and slave devices. This ensures accurate data transfer in clocked designs.

Support for Backward Compatibility

- The verification IP supports backward compatibility with older APB versions. This ensures that new peripherals work seamlessly with legacy systems.



Functional Coverage Metrics

- The verification IP tracks functional coverage to ensure all functional scenarios are tested. This helps in validating the correctness of peripheral interfaces under various conditions.

Debugging and Tracing Support

- AMBA APB Verification IP provides enhanced debugging and trace capabilities. This feature simplifies fault identification and resolution during the verification process.

Simulation Environment Integration

- The APB Verification IP integrates easily with standard simulation tools like SystemVerilog and UVM. This allows for efficient and flexible verification of AMBA APB designs.

AMBA APB APPLICATIONS

UART Interface Verification

- AMBA APB Verification IP can be used to validate UART peripherals in SoC designs. It ensures that data transmission and reception work as expected with minimal latency.

GPIO Validation

- APB Verification IP is essential for testing General Purpose Input/Output (GPIO) interfaces. It guarantees proper communication for simple I/O devices in embedded systems.

Timer/Counter Validation

Using the APB Verification IP, timers and counters can be validated for precise functionality. This is critical in applications where accurate time delays are required.

Analog-to-Digital Converters (ADC)

The APB interface is often used in ADC peripherals. Verification IP ensures that data conversion and communication through the APB interface happen without error.

Power Management Units

Power management peripherals using APB can be tested for proper functionality. The verification IP ensures these components interact correctly with the system for power efficiency.

PWM (Pulse Width Modulation) Peripherals

APB Verification IP can validate PWM peripherals used for motor control or signal generation. It ensures that pulse width modulation signals are generated as expected.

LCD/LED Display Controllers

For display controllers that interface with APB, the verification IP ensures data transfer for proper screen rendering. This ensures the correct display of information on LCDs/LEDs.

Sensor Interfaces

AMBA APB Verification IP is used to validate the interfaces of sensors like temperature or pressure sensors. This guarantees that sensor data is correctly read and communicated to the processor.

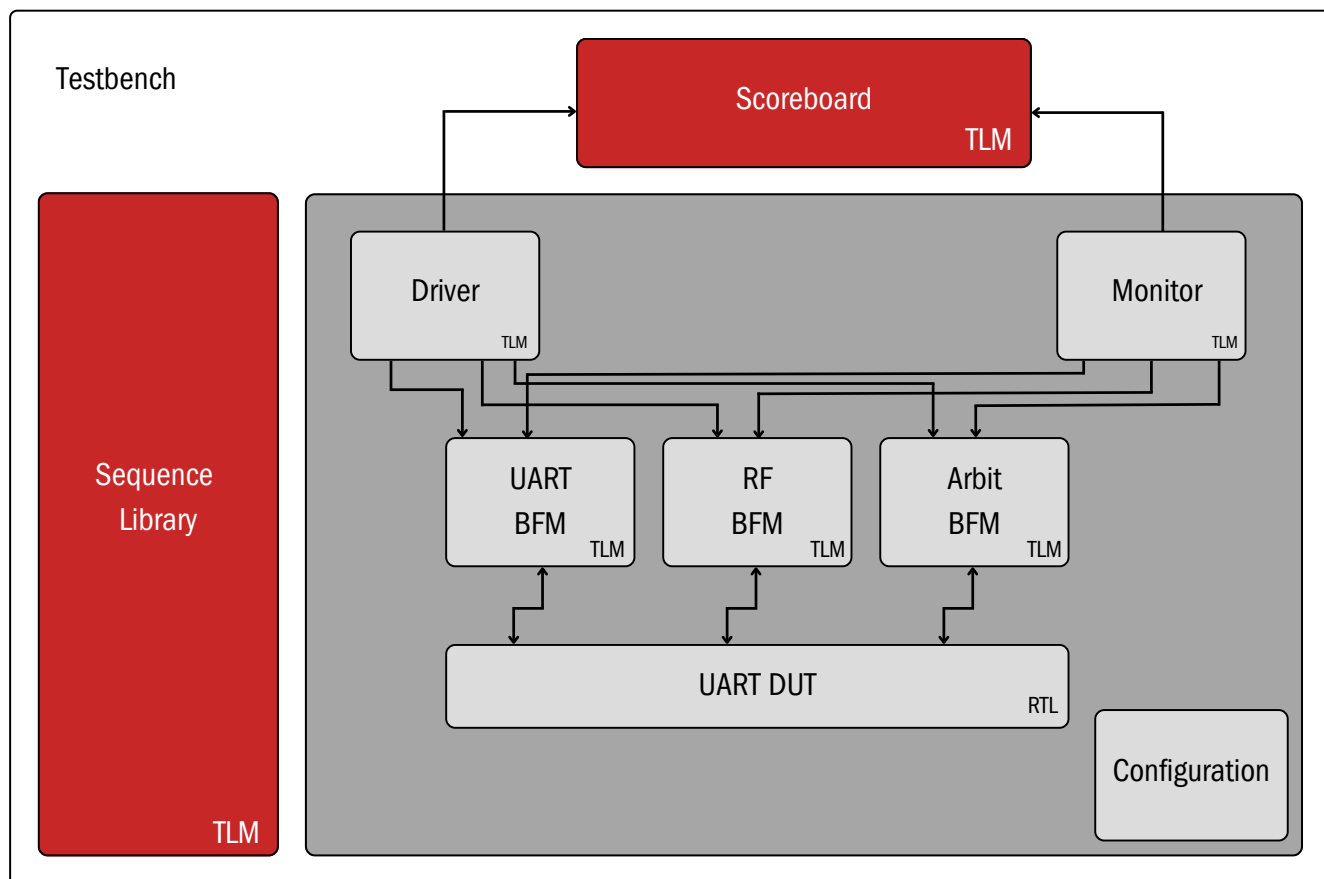
Serial Communication Peripherals

The APB interface is commonly used for serial communication peripherals such as SPI and I2C. Verification IP ensures that data integrity is maintained during serial data exchanges.

Embedded Systems Integration

APB Verification IP is valuable in embedded systems with peripherals that have simple read/write requirements. It ensures that each peripheral component functions as expected in a larger embedded system.

UART ARCHITECTURE





XtremeSilica Technologies Private Limited

494, 2nd Floor, CMH Road, Indiranagar,

Bengaluru, Karnataka 560038 India

www.xtremesilica.com

info@xtremesilica.com

+91 79932 79934