*Project: RMC75E FPGA TEST BENCH*

*Module: module.vhd*

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**QuadXface Module Description:**

The QuadXface module is a quadrature counter module designed to work with incremental encoders or similar devices. It provides the ability to count pulses generated by A and B inputs and detect the direction of rotation.The module supports four different count registers: QuadCount, HomeReg, Latch0Reg, and Latch1Reg.

The QuadXface module also includes several features related to homing and capturing counts:

- Homing: It supports different homing triggers like rising edge, falling edge, index edge, etc.

- Capture: It can capture the QuadCount value on specific events (e.g., rising/falling edges of A or B, index edge).

The module is configurable and supports multiple settings:

- Homing Trigger Type: Defines the type of trigger for homing (rising, falling, index edge, etc.).

- Edge Mode: Determines whether to detect the index pulse on rising or falling A/B input.

- Learn Mode: Enables capturing the home position for homing calibration.

- Latch Inputs: Allows selecting which axis (X or Y) to latch during Latch0 and Latch1 events.

- Home and Index Polarity: Configurable polarity for home and index inputs.

- Accumulator Overflow Detection: Detects overflow of the internal count accumulator.