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| --- |
| 40Gbps CRC32 256bit |
|  |
|  |

[Pick the date]

1. Overview

CRC23 is used widely in digital communication for packet validation. This core implements parallel CRC32 engine with 256-bit input data-path. This core can reach 40Gbps at 156.25MHz clock

1. Interfaces

CRC32 Engine

www.fpga-ipcores.com

**256**

i256\_Din

**5**

i5\_SoPEmpty

**5**

i5\_EoPEmpty

**1**

i\_SoP

**1**

i\_EoP

**1**

i\_Dv

**1**

i\_Clr

**1**

i\_Clk

**32**

o32\_CRC

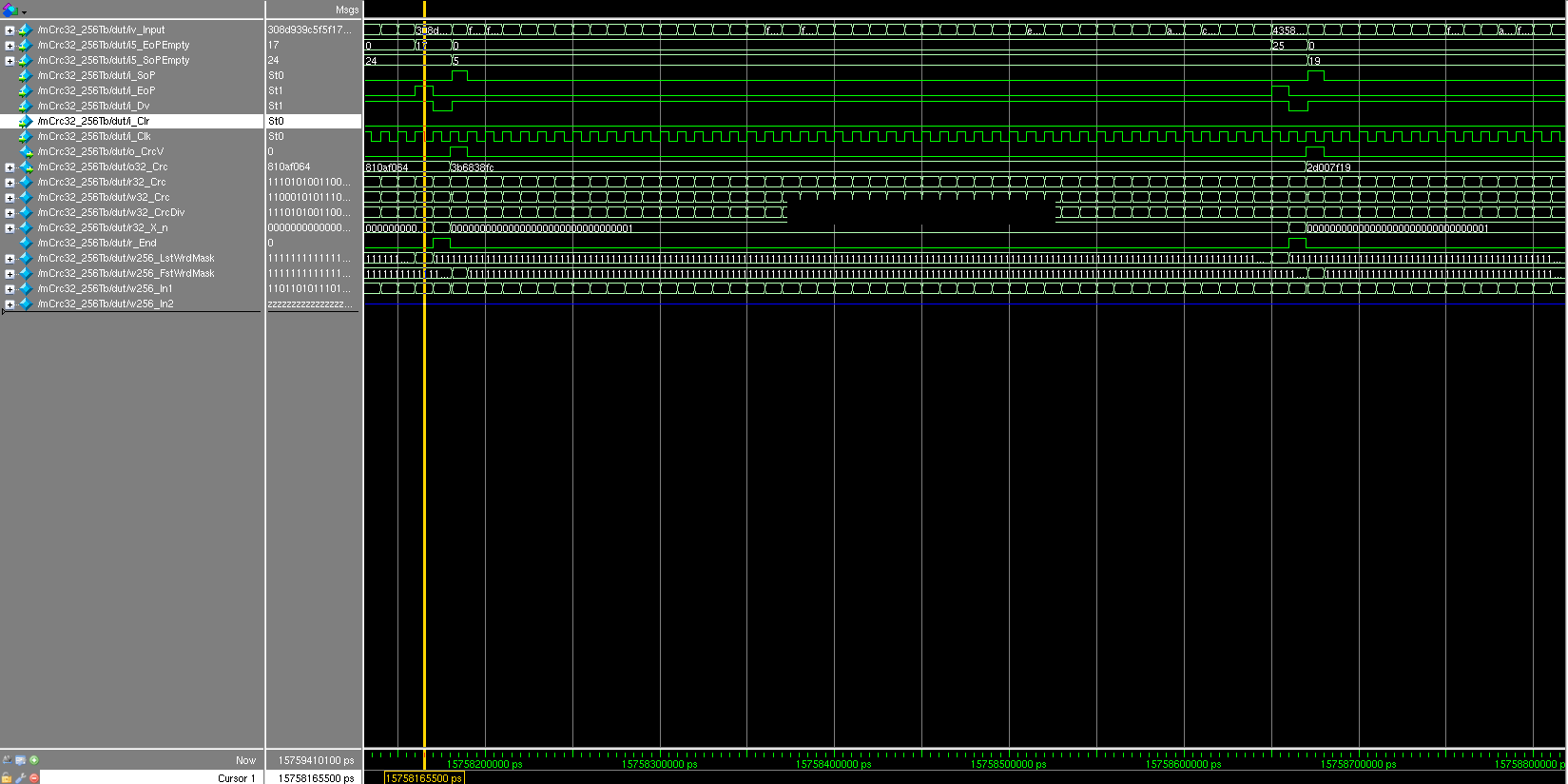
**1**

o\_CrcV

|  |  |
| --- | --- |
| Port name | Description |
| i256\_Din | Packet data input  256 bit wide, 32 byte |
| i5\_SoPEmpty | Number of empty bytes in the start of packet line |
| i5\_EoPEmpty | Number of empty bytes in the end of packet line |
| i\_SoP | Start of Packet, should be 1 cycle long |
| i\_EoP | End of Packet, should be 1 cycle long |
| i\_Dv | Data valid |
| i\_Clr | Synchronous clear to clear internal registers |
| i\_Clk | Clock input, 156.25MHz to achieve 40Gbps throughput |
| o32\_CRC | 32bit CRC Output |
| o\_CrcV | CRC valid flag |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Clk |  | Bit 255 Bit0  Byte 0 Byte31 | | |
| 1 | Start of Packet | Empty Bytes | Valid packet Data | |
| 2 | Packet Data | Valid packet Data | | |
|  | …. | Valid packet Data | | |
| n | End of Packet | Valid packet Data | | Empty Bytes |

1. Performance



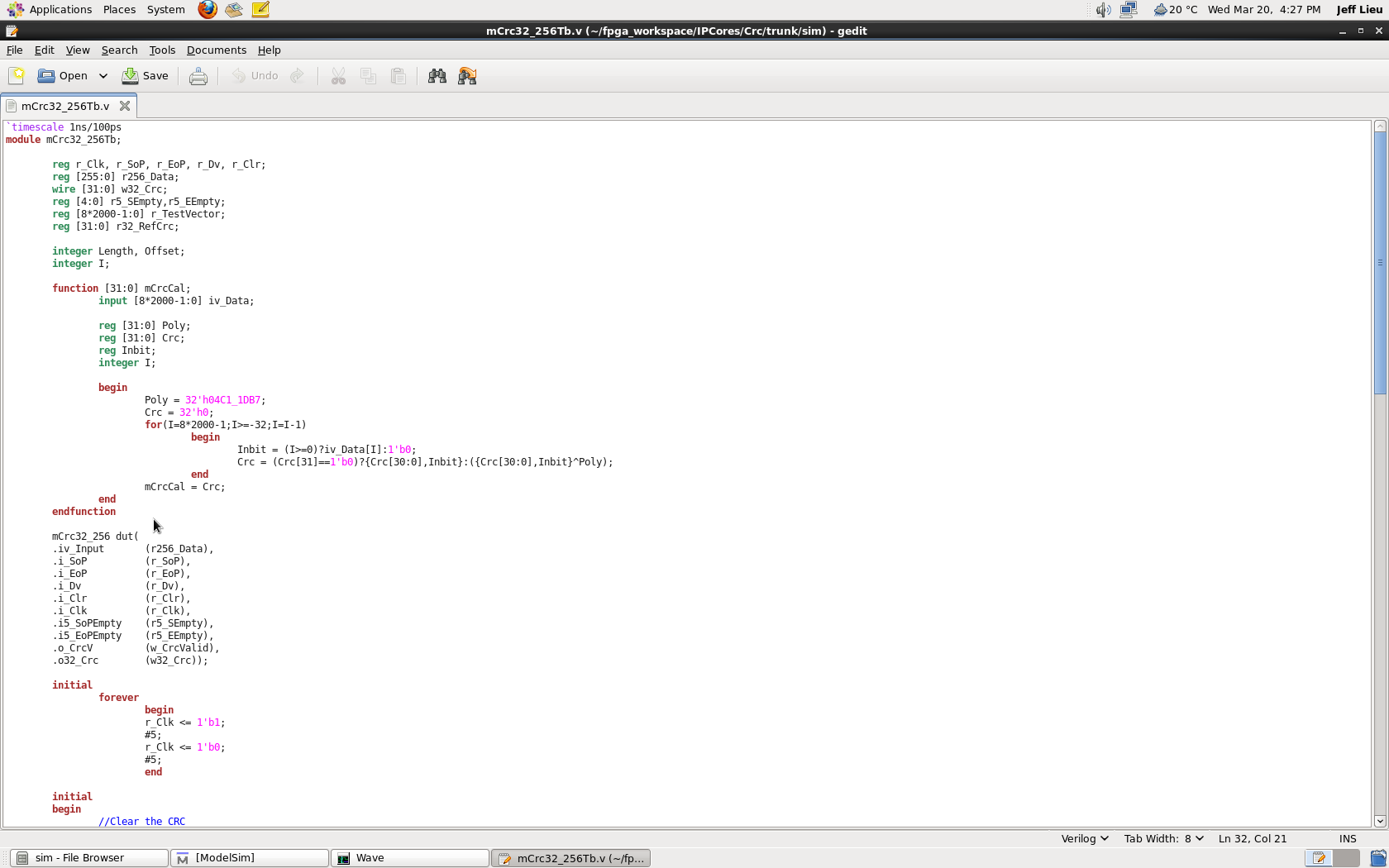
The engine requires an additional cycle after end of packet to compute the CRC value. The next packet should only start 1 cycle after end of previous packet.

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| --- | --- | --- | --- |
| Parameters | ArriaVGXC5ES |  |  |
| Registers | 199 |  |  |
| ALM | 1380 |  |  |
| Max Speed  Slow 1100mV 85oC | 176MHz |  |  |
|  |  |  |  |

1. VERIFICATION

The CRC results are verified against traditional serial method of CRC calculation for 1 million packets with random sizes.

The algorithm to generate referenced CRC is shown below



1. Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| Date | Author | Core’s Revision | Description |
| 30Mar13 | JL | 1.0 | Initial Release |