1. Encoding
   1. Line 8\_10 coding Block
      1. Specs.

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Direction | Width | Description |
| Enable | Input | 1 | Enable the encoder to do |
| TXDataK | Input | 1 | Define whether data is comman or actual data |
| Data | Input | 8 | Data to be encoded |
| Encoded\_data\_pos | Output | 10 | Encoded data |
| Encoded\_data\_neg | Output | 10 | Encoded data |

* + 1. Schematic
    2. Report Area & Power
  1. FSM\_RD “Running Disparity”
     1. Specs

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Direction | Width | Description |
| Enable | Input | 1 | Enable the encoder to do |
| TXDataK | Input | 1 | Define whether data is comman or actual data |
| Data\_neg | Input | 10 | RD(-) Data |
| Data\_pos | Input | 10 | RD(+) Data |
| Bit\_Rate\_10 | Input | 1 | Clk to send 10-bits to PMA |
| Rst | Input | 1 | Active low reset |
| Data\_10 | Output | 10 | Current Running Disparity Data |

* + 1. Schematic
    2. Power & Area
  1. Encoder Block
     1. Specs.

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Direction | Width | Description |
| MAC\_Data\_En | Input | 1 | Enable the encoder to do |
| TXDataK | Input | 1 | Define whether data is comman or actual data |
| Data | Input | 8 | Data from MAC |
| Bit\_Rate\_10 | Input | 1 | Clk to send 10-bits to PMA |
| Rst | Input | 1 | Active low reset |
| Data\_Out | Output | 10 | Data sent to PMA |

* + 1. Schematic
    2. Power & Area

1. Decoder
   1. Specs.

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Direction | Width | Description |
| CLK | Input | 1 | WordCLK (125 , 250 , 500) MHz |
| Rst\_n | Input | 1 | Active Low Reset |
| Data\_in | Input | 10 | Encoded Data |
| Data\_out | Output | 8 | Data recovered from decoder |
| DecodeError | Output | 1 | Error in Decoding |
| DisparityError | Output | 1 | Error in Data Disparity |
| RxDataK | Output | 10 | Indication whether it’s actual data or command |

* 1. Schematic
  2. Report Power & Area

1. Serial To Parallel
   1. Specs.

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Direction | Width | Description |
| Recovered\_Bit\_Clk | Input | 1 | Recovered CLK |
| Rst\_n | Input | 1 | Active Low Reset |
| Ser\_in | Input | 1 | Recovered serial bit from CDR |
| RXPolarity | Input | 1 | Indication to toggle serial bit or not |
| Data\_to\_Decoder | Output | 10 | Data recovered from decoder |

* 1. Schematic
  2. Report Power &Area

1. K 28.5 Detection
   1. Comma Detection Specs.

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Direction | Width | Description |
| CLK | Input | 1 | Bit Rate Clk (5G) |
| Rst\_n | Input | 1 | Active Low Reset |
| Detect\_Comma | Input | 10 | Data collected serially |
| RxValid | Output | 8 | Data recovered from decoder |
| Comma\_pulse | Output | 1 | Write pulse to write in buffer |

* 1. Schematic
  2. Report Power & Area

1. Gasket\_Rx
   1. Specs.

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Direction | Width | Description |
| Word\_Clk | Input | 1 | WordCLK (125 , 250 , 500) MHz |
| Rst\_n | Input | 1 | Active Low Reset |
| PCLK | Input |  | Parallel Data CLK |
| Width | Input | 6 | Width of data (8,16,32) |
| Data\_in | Input | 8 | Word Data |
| Data\_out | Output | 32 | Data sent to MAC |

* 1. Schematic
  2. Power & Area

1. PMA\_TX
   1. Specs.

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Direction | Width | Description |
| Bit\_Rate\_CLK | Input | 1 | Serial CLK(5G) |
| Bit\_Rate\_CLK\_10 | Input | 8 | Word CLK |
| Rst\_n | Input | 1 | Active Low Reset |
| Data\_in | Input | 10 | Encoded Data |
| MAC\_Data\_En | Input | 1 | Enable PMA |
| TX\_Out\_P | Output | 1 | Serial bit sent in positive lane |
| TX\_Out\_N | Output | 10 | Serial bit sent in negative lane |

* 1. Schematic
  2. Power & Area

1. Gasket\_TX
   1. Specs.

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Direction | Width | Description |
| PCLK | Input | 1 | Parallel CLK |
| Bit\_Rate\_CLK\_10 | Input | 1 | Word CLK |
| Reset\_n | Input | 1 | Active Low Reset |
| MAC\_TX\_Data | Input | 32 | Parallel Data sent from MAC |
| MAC\_Data\_En | Input | 1 | Enable |
| MAC\_TX\_DataK | Input | 4 | Indication From MAC to detect data sent is command or not |
| DataBusWidth | Input | 5 | Data sent Width |
| TXDataK | Output | 1 | Flag for command data |
| TXData | Output | 8 | Data to be encoded |

* 1. Report Power & Area
  2. Schematic

1. Common Block
   1. PLL (Freq. Multiplier)
      1. Specs

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Direction | Width | Description |
| Ref CLK | Input | 1 | 100 MHz clk to generate high rate clks |
| CLK | Input | 1 | 5 giga clock |

* + 1. Schematic
  1. Clock Divider
     1. Specs.

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Direction | Width | Description |
| Ref\_CLK | Input | 1 | Serial CLK(5G) |
| Div\_ratio | Input | 8 | Ratio for dividing high rates to low one |
| Rst\_n | Input | 1 | Active Low Reset |
| Divided clk | Output | 10 | Low rate clk |

* + 1. Schematic
    2. Power & Area
  1. Common Block
     1. Specs

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Direction | Width | Description |
| Ref\_Clk | Input | 1 | Reference Clk (100 MHz) |
| DataBusWidth | Input | 6 | Data Width (8,16,32) |
| Rst\_n | Input | 1 | Active Low Reset |
| Bit\_Rate\_Clk | Output | 1 | Serial CLK(5G) |
| Bit\_Rate\_Clk\_10 | Output | 1 | WordClk |
| PCLK | Output | 1 | Parallel Clk |

* + 1. Schematic
    2. Report Power & Area

1. RX\_Status
   1. Specs.

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Direction | Width | Description |
| Overflow | Input | 1 | Indication elastic buff is over flow |
| Underflow | Input | 1 | Indication elastic buff is under flow |
| Skp\_Added | Input | 1 | Indication for adding skp character |
| Skp\_Removed | Input | 1 | Indication for removing skp character |
| Decode\_Error | Input | 1 | Indication for error in decoding |
| Disparity\_Error | Input | 1 | Indication for error in disparity |
| RxStatus | Output | 3 | Indication for status of RX |

* 1. Schematic
  2. Report Power & Area