EV3a

|  |  |  |  |
| --- | --- | --- | --- |
| Signal Name | I/O | Width | Simple Description |
| Num\_generations | I | 8 | Number of generations for EA |
| Self\_energy | I | 4 | Reading in Self\_energy Vector which depends on Num\_Particles |
| crossoverFraction | I | 8 | Crossover population depends |
| Interact\_energy | I | 4 | Reading in interaction Matrix which depends on Num\_Particles |
| Num\_particleType | I | 2 | Number of types of particle |
| Pop\_size | I | 8 | The number of population size |
| Ind\_state\_in | I | 2\*11 | State\_input |
| clk | I | 1 | Posedge triggered Clock |
| rst\_n | I | 1 | Asynchronous negedge Reset |
| In\_valid | I | 1 | Indicate the data reading in is valid |
| Mutate\_rate\_in | I | 8 | Mutate\_rate |
| Min\_fit\_out | O | 10 | The lowest fit of the individual |
| done | O | 1 | Done |
| Best\_ind\_state | O | 2\*11 | Best individual depends on number of particles |
| Best\_ind\_mut | O | 8 | Best Mutate\_rate |

Evaluate\_fit

|  |  |  |  |
| --- | --- | --- | --- |
| Signal Name | I/O | Width | Simple Description |
| Self\_energy | I | 4 |  |
| Interact\_energy | I | 4 |  |
| latticeLength | I | 4 |  |
| Num\_particle | I | 2 |  |
| Ind\_state | I | 2\*11 | All of state in a individual |
| clk | I | 1 |  |
| rst\_n | I | 1 |  |
| In\_valid | I | 1 |  |
| start | I | 1 |  |
| Ind\_fit | O | 10 |  |
| Out\_valid | O | 1 |  |
|  |  |  |  |

This two bus should be increase if we want to accelerate.

Self\_energy

Interact\_energy

LFSR(linear feedback shift register)

|  |  |  |  |
| --- | --- | --- | --- |
| Signal Name | I/O | Width | Simple Description |
| In\_valid | I | 1 | Indicate the data seed is valid |
| random\_seed | I | 8 | Random seed |
| clk | I | 1 | Posedge triggered clock |
| rst\_n | I | 1 | Asynchronous negedge Reset |
| random\_num\_ff\_o | O | 8 | Random 8 bit number |

POP\_RF(I want to merge it into EV3a module)

|  |  |  |  |
| --- | --- | --- | --- |
| Signal Name | I/O | Width | Simple Description |
| Num\_generator | I | 8 |  |
| latticeLength | I | 4 |  |
| Num\_particle | I | 2 |  |
| Ind\_state\_in | I | 2\*11 |  |
| Ind\_mutate\_rate | I | 8 | Receive data from top module |
| crossoverFraction | I | 8 |  |
| clk | I | 1 |  |
| rst\_n | I | 1 |  |
| In\_valid | I | 1 |  |
| start | I | 1 |  |
| Out\_valid | O | 1 |  |
| Min\_fit\_out | O | 10 | The lowest fit of the individual |
| done | O | 1 |  |
| Ind\_state\_out | O | 2x11 | Serves as the input for fitness function |
|  |  |  |  |

Only need while doing self\_adaptive

Sigma\_max

Sigma\_min