|   | 1 |                        | 2         |   |                        | 3        | 4   |                     | 5               |         |   |
|---|---|------------------------|-----------|---|------------------------|----------|---|---------------------|-----------------|---------|---|
| Г |   |                        |           | • |                        | <u> </u> |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   | Sheet: Mother Board C  | onnetics. |   | Sheet: Interposer Con  | t-al     |   | Sheet: DIMM Connec  | tion            |         |   |
|   |   | Sileet. Mother board C | omection  |   | Sileet. Interposer Con | iiot .   | 1   | Sileet. Dimm Connec | tion            | 1       |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
| Α |   |                        |           |   |                        |          |   |                     |                 |         | Δ |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   | File: mobo-conn.sch    |           | _ | File: interposer.sch   |          | I   | File: dimm-conn.sch | h               | 1       |   |
|   |   |                        |           |   | '                      |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         | _ |
| В |   | Chart O T- O C         |           |   |                        |          |   |                     |                 |         | B |
|   |   | Sheet: One To One Conr | nections  |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   | File: one-to-one-conn  | s.sch     |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
| П |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
| C |   |                        |           |   |                        |          |   |                     |                 |         | C |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
| Н |   |                        |           |   |                        |          |   |                     |                 |         | - |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        |          |   |                     |                 |         |   |
|   |   |                        |           |   |                        | The      | most interesting bits                       | are in the "Intern  | onser Control"  |         |   |
|   |   |                        |           |   |                        | Tille    | most interesting Dits                       | are in the interp   | Josef Control   |         |   |
| D |   |                        |           |   |                        |          |   |                     |                 |         | D |
|   |   |                        |           |   |                        | Sher     | et: /                                       |                     |                 |         |   |
|   |   |                        |           |   |                        | File     | : fault-injector-3.sch                      | 1                   |                 |         |   |
|   |   |                        |           |   |                        | TI+      | e. Prototyne for                            | fault injecto       | r for DDR4 bus. |         |   |
| П |   |                        |           |   |                        | 770      | is. Frototype 101                           | rautt Injecto       | ינטט דאעע וטי.  | Davi 4  |   |
|   |   |                        |           |   |                        | Size     | : USLetter   Date:<br>ad E.D.A. kicad (5.1. | c\ 1                |                 | Rev: 1  |   |
| L |   |                        |           |   |                        | KiCa     | 10 E.D.A. KICAO (5.1.                       | 0)-1                |                 | 10: 1/5 |   |

| NC MB | 145 | NC | VPD | 217 / VPD MB | VPS MB | 146 | VRFCA DDR.BOT | VRS | VRS MB | 146 | VRS MB | VS MB | BAO B 22 RAS.n.A16.MB B2 RAS.n.A16.MB B2 RAS.n.A16.MB B2 RAS.n.A16.MB B2 RAS.n.A16.MB B2 RAS.n.A15.MB B2 RAS.n DQ6\_MB 10 DQ6 VSS\_MB 11 VSS DQ2\_MB 12 DQ2 VSS\_MB 156 VSS NC | 228 | WE\_n\_A14\_MB | 229 | WE\_n\_A14\_MB | 229 | WE\_n\_B14\_MB | 230 | NC\_MB | 231 | VDD\_MB | 23 VSS\_MB 13 VSS DQ3\_MB 157 DQ3 DQ12\_MB 14 DQ12 VSS\_MB 158 VSS DQ13\_MB 159 DQ13 VSS\_MB 15 VSS VSS\_MB 160 VSS DQ8\_MB 16 DQ8 DQ9\_MB 161 DQ9 VDD 234 VDD\_MB A17 234 A17 MB VSS MB 162 VSS A17 2234 A17,MB NC/C2 2355 NC C2 MB VDD 235 VOD\_MB CS3\_n/C1.NC SA2 239 (SS3\_n\_C1.NC\_MB) VSS 239 (VSS\_MB) DQ37 240 DQ37\_MB VSS 241 VSS\_MB VSS 242 VSS\_MB DQS1\_c\_MB 163 DQS1\_c DQS1\_t\_MB 164 DQS1\_t VSS\_MB 165 VSS DQ15\_MB 166 DQ15 VSS\_MB 167 VSS DQ11\_MB 168 DQ11 VSS MB 169 VSS | Date | VSS\_MB 173 DQS2\_c\_MB 174 DQS2\_c\_MB DQS2\_c DQS2\_t\_MB 175 VSS\_MB 176 VSS\_MB VSS | DQ29 | MB | 182 | DQ29 | VSS | MB | 183 | DQ25 | VSS 254 VSS MB)
DQS5.c 255 00S5.c MB
DQS5.t 256 00S5.c MB
DQS5.t 256 00S5.t MB
VSS 259 VSS MB
U447 259 0047.MB
VSS 259 0047.MB
VSS 261 0053.MB
VSS 261 00S3.MB
VSS 263 00S3.MB VSS\_MB 184 VSS\_MB 185 DQS3\_c\_MB 185 DQS3\_c DDR4\_to\_MB DQS3\_t\_MB 186 DQS3\_t VSS\_MB 187 DQ31\_MB 188 DQ31\_MB DQ31 VSS MB 191 VSS CB5\_MB 192 CB5 VSS\_MB 193 VSS DQ49 VSS 264 DQ49\_MB VSS VSS\_MB CB1\_MB 194 CB1 DQS6\_c DQS6\_c MB 266 DQS6\_c MB 267 DQS6\_t MB VSS MB VSS\_MB VSS\_MB 195 VSS DQS8\_c\_MB 196 DQS8\_t\_MB 197 DQS8\_t\_MB 197 DQS8\_t VSS\_MB 198 VSS\_MB 198 DQ54 VSS 124 DQ54\_MB VSS VSS\_MB DQ55 269 DQ55\_MB 270 VSS\_MB CB6\_MB 54 CB6 DQ50 126 DQ50\_MB 127 VSS\_MB VSS | 270 | VSS | MB | 271 | DQ51 | MB | VSS | 272 | VSS | MB | 273 | DQ61 | MB | VSS | 274 | VSS | MB | 274 | VSS | MB | 275 | DQ57 | MB | VSS | 276 | VSS | 276 | VSS | 277 | DQ57 | MB | VSS | 276 | VSS | MB | 277 | DQ57 | MB | VSS | MB | DQ57 | DQ57 | MB | VSS | MB | DQ57 | DQ57 | MB | VSS | MB | DQ57 | DQ57 | MB | DQ57 | DQ57 | MB | DQ57 | DQ57 | DQ57 | MB | DQ57 CB7\_MB 199 CB7 VSS\_MB 200 VSS CB3\_MB 201 CB3 VSS\_MB 202 VSS | VSS\_MB | 203 | VSS | CKE1\_NC MB | 204 | VDD\_MB | 204 | VDD | NC MB | 205 | NC | VDD | NC | VSS\_NC | VS ACT\_n\_MB 62 BG0\_MB 63 BG0 VDD\_MB 206 VDD BG1\_MB 207 BG1 VSS DQ62 VSS MB 136 VSS MB 136 VSS MB 137 DQ58 MB 137 DQ58 MB VSS MB VSS MB ALERT\_n\_MB 208 ALERT\_n | VDD\_MB | 209 | VDD | A11\_MB | 210 | A11 | A7\_MB | 211 | A7 SA0 139 SA0\_MB VSS 283 VSS\_MB A8\_MB 69 A6 VDD\_MB 212 VDD SA1 140 SA1\_MB VDDSPD 284 VDDSPD\_MB SDA 285 SDA\_MB 286 VPP\_MB 287 VPP\_MB SCL 141 SCL\_MB A5\_MB 213 A5 A4\_MB 214 A4 VDD\_MB 70 VDD A3\_MB 71 A3 VDD\_MB 215 VDD VPP 143 VPP\_MB A1\_MB 72 A3 NC 144 NC\_MB A2\_MB 216 A2 VPP 288 VPP\_MB Autogenerated, See misc/check-ddr4.pv Sheet: /Mother Board Connection/ File: mobo-conn.sch Title: The 228 DDR signals of the connector on the Mother Board Size: USLetter Date: 2019-11-01 KiCad E.D.A. kicad (5.1.6)-1

VDD 217 VDD\_DIMM

CK1\_ 218 CK1\_t DIMM

CK1\_ 219 CK1\_t DIMM

VDD 220 VDD\_DIMM

VTT 221 VTT\_DIMM

PARITY 222 PARITY\_DIMM

PARITY 222 PARITY\_DIMM | NC\_DIMM | 145 | NC | VREFCA DIMM | 146 | VREFCA DDR\_BOT | VSS\_DIMM | 148 | DQ5 | D VSS\_DIMM 149 VSS DQ1\_DIMM 150 DQ1 PARITY 2222 CARTY DIMM VDD 223 VDD DIMM 224 (BAL DIMM VDD 224 (BAL DIMM VDD 225 (ND DIMM) 226 (ND DIMM 227 (NC DIMM) VDD 229 (VDD DIMM) 231 (VDD DIMM 231 (VDD DIMM 233 (ND DIMM VDD 233 (ND DIMM 233 (ND DIMM 234 (A17 DIMM NC 22 235 (NC DIMM 234 (A17 DIMM NC 22 235 (NC DIMM 235 (VDD VSS\_DIMM 154 VSS DQ7\_DIMM 155 DQ7 VSS\_DIMM 156 VSS DQ3\_DIMM 157 DQ3 VSS\_DIMM 158 DQ13\_DIMM 159 DQ13\_DIMM DQ13 VSS\_DIMM 160 VSS DQ9\_DIMM 161 DQ9\_VSS\_DIMM 162 VSS\_DIMM 162 DQS1\_c\_DIMM 163 DQS1\_c DQS1\_t\_DIMM 164 DQS1\_t VSS\_DIMM 165 VSS CS3\_n/C1,NC DQ15\_DIMM 166 DQ15 | DQ3/2 | 24. | DQ3/2 | DIMM |
| DQ3/2 | 24. | DQ3/2 | DIMM |
| DQ3/2 | 24. | DQ3/3 | DIMM |
| DQ3/4 | 24. | DQ3/3 | DIMM |
| DQ5/4 | 24. | DQ3/4 | DIMM |
| DQ5/4 | 24. | DQ3/2 | DIMM |
| DQ5/4 | 24. | DQ3/2 | DIMM |
| DQ3/3 | 24. | DQ3/2 | DIMM |
| DQ3/3 | 24. | DQ3/2 | DIMM |
| DQ3/3 | 25. | DQ3/2 | DIMM |
| DQ4/3 | 25. | DQ5/2 | DIMM |
| DQ5/4 | 25. | DQ5/2 | DIMM |
| DQ5/4 | 25. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM |
| DQ5/4 | 26. | DQ5/2 | DIMM | | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 170 | 171 | 171 | 171 | 172 | 171 | 172 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 | 171 VSS\_DIMM 173 VSS
DQS2\_c\_DIMM 174 DQS2\_c S2\_t\_DIMM 175 |S2\_t\_DIMM 175 |VSS\_DIMM 176 |VSS\_DIMM 176 | VSS\_DIMM | 32 | DQ22 | VSS\_DIMM | 33 | VSS | DQ18\_DIMM | 34 | VSS\_DIMM | 35 | VSS | VSS\_DIMM | 35 | VSS | DQ22 DIMM | 33 | VSS | VSS | DSS | DQ23\_DIMM 177 DQ23 VSS\_DIMM 178 VSS DQ19\_DIMM 179 DQ19 VSS\_DIMM 180 DQ29\_DIMM 181 DQ29 VSS\_DIMM 182 VSS DQ25\_DIMM 183 VSS\_DIMM 184 VSS 3\_c\_DIMM 185 DQS3\_c VSS\_DIMM 189 VSS DQ27\_DIMM 190 DQ27 D055 248 (D053\_DIMM)
D049 264 (D049\_DIMM)
VS 265 (VSS\_DIMM)
D056.t 265 (VSS\_DIMM)
D056.t 270 (D055\_DIMM)
VS 268 (VSS\_DIMM)
D051 271 (D055\_DIMM)
D051 272 (VSS\_DIMM)
D051 272 (VSS\_DIMM)
D051 272 (VSS\_DIMM)
D051 273 (D051\_DIMM)
D051 273 (D051\_DIMM)
D051 275 (D057\_DIMM)
D051 275 (D057\_DIMM)
D057\_L 275 (D057\_DIMM)
D057\_L 276 (VSS\_DIMM)
D057\_L 277 (VSS\_DIMM)
D057\_L 278 (VSS\_DIMM)
D057\_L 279 (VSS\_DIMM)
D059\_L 284 (VSS\_DIMM)
D059\_L 285 (VSS\_DIM VSS DIMM 191 VSS CB5\_DIMM 192 CB5 VSS\_DIMM 193 VSS CB1\_DIMM 194 CB1 VSS\_DIMM 195 VSS DQS8\_c\_DIMM 196 DQS8\_c SB\_t\_DIMM 197 DQS8\_t VSS\_DIMM 198 VSS CB7\_DIMM 199 CB7 VSS\_DIMM 200 VSS CB3\_DIMM 201 CB3 VSS\_DIMM 202 VSS CKE1\_NC\_DIMM 203 CKE1\_NC VDD\_DIMM 204 VDD NC\_DIMM 205 NC VDD\_DIMM 206 VDD BG1\_DIMM 207 BG1 ALERT\_n\_DIMM 208 ALERT\_n A12\_BC\_n\_DIMM 65 A9\_DIMM 66 A9\_DIMM 66 A9 VDD\_DIMM 209 VDD A11\_DIMM 210 A11 A7\_DIMM) 211 A7 VDD\_DIMM 212 VDD A5 DIMM 213 A5 A4\_DIMM 214 A4 VDD\_DIMM 215 VDD A2\_DIMM 216 A2 VPP 288 VPP\_DIMM Autogenerated, See misc/check-ddr4.pv Sheet: /DIMM Connection/ File: dimm-conn.sch Title: DDR4 signals on the DIMM. (288 pins, ECC). Size: USLetter Date: 2019-11-01 Rev: 1 KiCad E.D.A. kicad (5.1.6)-1 ld: 3/5

|  | 1                                 |  | 2  | 3   | 4  | _ |  |  |  |  |
|--|-----------------------------------|--|--|---|--|---|--|--|--|--|
| NC_MB>   | NC_DIMM<br>VSS_DIMM               | VDD_MB<br>CKO_t_MB   | VDD_DIMM CKO_t_DIMM                          | NC_MB NC_DIMM  VREFCA_MB VREFCA_DIMM  | VDD_MB \-\left\left\left\left\left\left\left\left  |   |  |  |  |  |
| DQ4_MB>  | DQ4_DIMM                          | CK0_c_MB   | CKO_C_DIMM<br>VDD_DIMM                       | VSS_MB)—VSS_DIMM  | CK1_c_MB CK1_c_DIMM VDD_MB VDD_DIMM  |   |  |  |  |  |
| VSS_MB DQO_MB                                  | VSS_DIMM<br>DQO_DIMM              | VDD_MB<br>VTT_MB   | VTT_DIMM                                     | DQ5_MB  | VTT_MB VTT_DIMM  |   |  |  |  |  |
| VSS_MB DQS9_t_TDQS9_t_MB                       | VSS_DIMM<br>DQS9_t_TDQS9          | P_t_DIMM EVENT_n_MB  | EVENT_n_DIMM<br>AO_DIMM                      | DQ1_MB  | VDD MB VDD DIMM  |   |  |  |  |  |
| DQ\$09_c_TDQS9_c_MB<br>A VSS_MB                | DQS09_c_TDQ<br>VSS_DIMM           | BAO_MB   | VDD_DIMM<br>BAO_DIMM                         | DQSO_c_MB \ \DQSO_c_DIMM \ \DQSO_t_MB \ \DQSO_t_DIMM  | A10_AP_MB A10_AP_DIMM  | A |  |  |  |  |
| DQ6_MB VSS_MB                                  | VSS_DIMM                          | RAS_n_A16_MB   | RAS_n_A16_DIMM<br>VDD_DIMM                   | VSS_MB  |  |   |  |  |  |  |
| DQ2_MB<br>VSS_MB                               | DQ2_DIMM<br>VSS_DIMM              | CSO_n_MB VDD_MB  | CSO_n_DIMM  VDD_DIMM                         | VSS MR VSS DIMM   | WE_n_A14_MB  |   |  |  |  |  |
| VSS_MB DQ12_MB VSS_MB                          | VSS_DIMM<br>DQ12_DIMM<br>VSS_DIMM | CAS_n_A15_MB<br>ODTO_MB  | VDD_DIMM]  CAS_n_A15_DIMM  ODTO_DIMM         | DQ3_MB  | NC_MB NC_DIMM  |   |  |  |  |  |
| DQ8_MB VSS_MB                                  | DQ8_DIMM<br>VSS_DIMM              | VDD_MB<br>CS1_n_NC_MB  | VDD_DIMM<br>CS1_n_NC_DIMM                    |   | NC_MB  |   |  |  |  |  |
| DOSTO + TOOSTO + MR                            | DQS10_t_TDQS                      | 510_t_DIMM   | VDD_DIMM ODT1_NC_DIMM                        | VSS MR VSS DIMM   | A17_MB   | Ц |  |  |  |  |
| DQS10_c_TDQS10_c_MB \                          | VSS_DIMM<br>DQ14_DIMM             | VDD_MB<br>  CS2_n_C0_MB<br>  VSS_MB  | VDD_DIMM                                     | DQ51 c MB   | \( \text{VDD_MB} \) \( \text{VDD_DIMM} \) \( \text{CS3_n_C1,NC_DIMM} \) \( \text{CS3_n_C1,NC_DIMM} \)  |   |  |  |  |  |
| VSS_MB>  | VSS_DIMM                          | VSS_MB   | VDD_DIMM<br>CS2_n_CO_DIMM<br>VSS_DIMM        | DQ15_MB DQ15_DIMM   | SA2_MB \ (SA2_DIMM   |   |  |  |  |  |
| DQ10_MB<br>VSS_MB                              | VSS_DIMM                          | DQ36_MB  | VSS_DIMM                                     |   | DQ37_MB)(DQ37_DIMM   |   |  |  |  |  |
| DQ20_MB<br>VSS_MB                              | VSS_DIMM                          | DQ32_MB<br>VSS_MB  | DQ32_DIMM<br>VSS_DIMM                        | \[ \sqrt{VSS_MB} \rightarrow \sqrt{VSS_DIMM} \] \[ \ldot{DQ21_MB} \rightarrow \ldot{DQ21_DIMM} \]     | VSS_MB VSS_DIMM DQ33_MB DQ33_DIMM  |   |  |  |  |  |
| DQ16_MB<br>VSS_MB                              | VSS_DIMM                          | DQS13_t_TDQ13_t_MB>  | DQS13_t_TDQ13_t_DIMN DQS13_c_DIQS13_c_DI     |   | VSS_MB \-\ \VSS_DIMM \-\ \DQS4_c_DIMM \- |   |  |  |  |  |
| DQS11_t_TDQS11_t_MB > DQS11_c_MB >             | DQS11_t_TDQS                      | S11_t_DIMM VSS_MB  | VSS_DIMM<br>DQ38_DIMM                        | VSS_MB  | DQS4_t_MB DQS4_t_DIMM VSS_MB VSS_DIMM  | B |  |  |  |  |
| VSS_MB DQ22_MB                                 | VSS_DIMM<br>DQ22_DIMM             | VSS_MB   DQS13_tDQS13_tMB   DQS13_tDQS13_cMB   S11_tDIMM   VSS_MB   S11_cDIMM   DQS8_MB   VSS_MB   DQS4_MB   DQS4_ | VSS_DIMM<br>DQ34_DIMM                        | DQS2_t_MB DQS2_t_DIMM   | DQ39_MB DQ39_DIMM  |   |  |  |  |  |
| VSS_MB<br>DQ18_MB                              | VSS_DIMM<br>DQ18_DIMM             | VSS_MB<br>DQ44_MB  |  | DQ23_MB DQ23_DIMM VSS_MB VSS_DIMM   | DQ35_MB)—(DQ35_DIMM)   |   |  |  |  |  |
| VSS_MB>  | VSS_DIMM                          | VSS_MB>  | VSS_DIMM                                     | DQ19_MB)(DQ19_DIMM  | VSS_MB   |   |  |  |  |  |
| DQ28_MB<br>VSS_MB                              | DQ28_DIMM<br>VSS_DIMM             | DQ40_MB<br>VSS_MB  | VSS_DIMM                                     | VSS_MB  | VSS_MB VSS_DIMM DQ41_MB DQ41_DIMM  |   |  |  |  |  |
| DQ24_MB VSS_MB DQS12_t_TDQS12_t_MB             | VSS_DIMM                          | DOCAL C TROCAL C MR  | DQS14_t_TDQS14_t_DIM<br>DQS14_c_TDQS14_c_DII | MM DQ25_MB \ DQ25_DIMM  | VSS_MB VSS_DIMM DQS5_c_MB DQS5_c_DIMM  | Н |  |  |  |  |
| DQS12_t_TDQS12_t_MB<br> DQS12_c_TDQS12_c_MB    | DQS12_t_TDQ9 DQS12_c_TDQ          | S12_t_DIMM VSS_MB  | VSS_DIMM<br>DQ46_DIMM                        | \[ \sqrt{VSS_MB} \rightarrow \sqrt{VSS_DIMM} \] \[ \ldot{DQS3_c_MB} \rightarrow \ldot{DQS3_c_DIMM} \] | DQS5_LB    DQS5_LD  IMM  |   |  |  |  |  |
| DQS12_c_TDQS12_c_MB\-<br>VSS_MB\-<br>DQ30_MB\- | VSS_DIMM<br>DQ30_DIMM             | VSS_MB<br>DQ42_MB<br>VSS_MB  | VSS_DIMM<br>DQ42_DIMM                        | VSS_MB>—(VSS_DIMM)  | DQ47_MB DQ47_DIMM VSS_MB VSS_DIMM  |   |  |  |  |  |
| VSS_MB DQ26_MB                                 | VSS_DIMM<br>DQ26_DIMM             | VSS_MB DQ52_MB   | -{VSS_DIMM                                   | DQ31_MB \ DQ31_DIMM   VSS_MB \ VSS_DIMM   | DQ43_MB DQ43_DIMM  |   |  |  |  |  |
| VSS_MB<br>CB4_MB                               | VSS_DIMM<br>CB4_DIMM              | VSS_MB<br>DQ48_MB  | VSS_DIMM<br>DQ48_DIMM                        | DQ27_MB DQ27_DIMM VSS_MB VSS_DIMM   | DQS3_MB  |   |  |  |  |  |
| C VSS_MB                                       | VSS_DIMM                          | VSS MB   | VSS DIMM                                     | CB5_MB CB5_DIMM   | DQ49_MB DQ49_DIMM  | С |  |  |  |  |
| CB0_MB<br>VSS_MB                               | CBO_DIMM<br>VSS_DIMM              | DQS15_t_TDQS15_t_MB > DQS15_c_TDQS15_c_MB  | DQS15_c_TDQS15_c_DII                         | MM CB1_MB CB1_DIMM  | VSS_MB VSS_DIMM DQS6_c_MB DQS6_c_DIMM  |   |  |  |  |  |
| DQS17_t_TDQS17_t_MB<br>DQS17_c_TDQS17_c_MB     | DQS17_t_TDQS<br>DQS17_c_TDQ       | S17_c_DIMM DQ54_MB>  | VSS_DIMM<br>DQ54_DIMM                        |   | DQS6_t_MB DQS6_t_DIMM VSS_MB VSS_DIMM  |   |  |  |  |  |
| VSS_MB CB6_MB                                  | VSS_DIMM<br>CB6_DIMM              | VSS_MB<br>DQ50_MB  | VSS_DIMM<br>DQ50_DIMM                        | DQS8_LMB DQS8_LDIMM<br>VSS_MB VSS_DIMM  | DQ55_MB DQ55_DIMM VSS_MB VSS_DIMM  |   |  |  |  |  |
| VSS_MB<br>CB2_MB<br>VSS_MB                     | VSS_DIMM<br>CB2_DIMM<br>VSS_DIMM  | VSS_MB)<br>DQ60_MB>  | VSS_DIMM<br>DQ60_DIMM                        | VSS_MB  | DQ51_MB)—(DQ51_DIMM)   |   |  |  |  |  |
| VSS_MB RESET_n_MB                              | VSS_DIMM<br>RESET_n_DIMN          | VSS_MB>  | VSS_DIMM<br>DQ56_DIMM                        | CB3_MB CB3_DIMM<br>VSS_MB VSS_DIMM  | VSS_MB   | Ц |  |  |  |  |
| VDD_MB CKE0_MB                                 | VDD_DIMM                          | VSS_MB   | VSS_DIMM                                     | (M) (VDD MB VDD DIMM)   | DOET MR DOET DIMM  |   |  |  |  |  |
| VDD_MB ACT_n_MB                                | VDD_DIMM ACT_n_DIMM BGO_DIMM      | DQS16_c_TDQS16_c_MB   VSS_MB   DQ62_MB   | DQS16_c_TDQS16_c_DII VSS_DIMM DQ62_DIMM      | MM [NC_MB] (NC_DIMM)  VDD_MB (VDD_DIMM)  BG1_MB (BG1_DIMM)  | DQ57_cMB   |   |  |  |  |  |
| BG0_MB>  | BGO_DIMM                          | DQ62_MB  | DQ62_DIMM                                    | BG1_MB BG1_DIMM   | VSS_MB VSS_DIMM  |   |  |  |  |  |
| VDD_MB A12_BC_n_MB                             | VDD_DIMM  A12_BC_n_DIM            |  | DQ58_DIMM                                    | ALERT_n_DIMM   VDD_MB   VDD_DIMM  | IVSS MB — (VSS DIMMI   |   |  |  |  |  |
| A9_MB VDD_MB                                   | A9_DIMM<br>VDD_DIMM               | VSS_MB\<br>SAO_MB\   | SAO_DIMM                                     | A11_MB \-\( A11_DIMM \) A7_MB \-\( A7_DIMM \)   | DQ59_MB DQ59_DIMM VSS_MB VSS_DIMM  |   |  |  |  |  |
| D A8_MB A6_MB                                  | A8_DIMM<br>A6_DIMM                | SA1_MB><br>SCL_MB>   | SA1_DIMM<br>SCL_DIMM                         | \( \bar{VDD_MB} \) \( \bar{VDD_DIMM} \) \( \bar{A5_DIMM} \) \( \bar{A5_DIMM} \)                       | VDDSPD_MB VDDSPD_DIMM SDA_MB SDA_DIMM  | D |  |  |  |  |
| VDD_MB<br>A3_MB                                | VDD_DIMM                          | VPP_MB   | VPP_DIMM<br>VPP_DIMM                         | A4_MB A4_DIMM<br>VDD_MB VDD_DIMM  | SDA_MB   |   |  |  |  |  |
| A1_MB  | A1_DIMM                           | NC_MB)   | NC_DIMM                                      | A2_MB A2_DIMM   | VPP_MB VPP_DIMM  |   |  |  |  |  |
|  |                                   |  |  |   |  |   |  |  |  |  |
|  |                                   |  |  |   |  |   |  |  |  |  |
| H  |                                   |  |  |   |  | Н |  |  |  |  |
|  |                                   |  |  |   |  |   |  |  |  |  |
|  |                                   |  |  |   |  |   |  |  |  |  |
|  |                                   |  |  |   |  |   |  |  |  |  |
|  |                                   |  |  |   |  |   |  |  |  |  |
| E  |                                   |  | ,  |   |  | E |  |  |  |  |
|  |                                   |  |  |   |  |   |  |  |  |  |
|  |                                   |  |  |   |  |   |  |  |  |  |
|  |                                   |  |  | Autogenerated. See misc/check-ddr4.py   |  |   |  |  |  |  |
|  |                                   |  |  | Sheet: /One To One Connections/<br>File: one-to-one-conns.sch   |  |   |  |  |  |  |
|  |                                   |  |  | Title: Direct connections between the DIMM and the Mother Board                                       |  |   |  |  |  |  |
| П  |                                   |  |  | Size: USLetter Date: 2019-11-01   | Rev: 1   | 二 |  |  |  |  |
|  | 1                                 |  | 2  | KiCad E.D.A. kicad (5.1.6)-1  | ld: 4/5  |   |  |  |  |  |
|  |                                   |  |  |   |  |   |  |  |  |  |

