Matrix values for the State Machine for moving sounds.

A State Machine has two trigger inputs (A and B) and four possible outputs (0..3). The file “StateMachineV1.16 correctietest.rcx” has two state machines with each 22 states. The state 0 corresponds to the idle state. The state 1..21 corresponds to the 21 speakers that are used for the moving sounds. Both state machines move synchronous through all the states.

When activated the state jump to 11, which corresponds to the middle speaker. From there the state machine move right to state 21. From state 21 it moves back to state 1 and then to state 21 etc. Since a speaker has to be activated when the previous speaker is at its maximum output, all the speaker specifications are one step ahead of the state number that corresponds with the speaker where the sound is located at the moment of the state transition.

# State Machine Matrix1

The outputs of the first state machine specify the Device (MUX) and Channel numbers of the speakers that has to be activated.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| State | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|  |  |  |  |  |  |  |  |  |  |  |  |
| If none | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| If jumpA | 11 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| If jumpB | 0 | 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| If both | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Output-0 | 0 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| Output-1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| Output-2 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 |
| Output-3 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| State | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|  |  |  |  |  |  |  |  |  |  |  |  |
| If none | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| If jumpA | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 21 |
| If jumpB | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| If both | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| Output-0 | 5 | 6 | 6 | 7 | 7 | 8 | 8 | 9 | 9 | 10 | 9 |
| Output-1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| Output-2 | 4 | 5 | 5 | 6 | 6 | 7 | 7 | 8 | 8 | 9 | 9 |
| Output-3 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |

Row 1: ‘If none’ means A and B are Low. The State Machines does not change state.

Row 2: ‘If jumpA’ means A is High and B is Low. The State Machine changes to the specified state. E.g. Moving one right until State 21 is reached.

Row 3: ‘If jumpB’ means A is Low and B is High. The State Machine changes to the specified state. E.g. Moving one left until State 1 is reached.

Row 4: ‘If both’ means A and B are High. The State Machines does not change state.

Row 5: ‘Output-0’ is the channel number for the MUX for the next speaker to start a sound when moving right

Row 6: ‘Output-1’ is the device number for the MUX for the next speaker to start a sound when moving right.

Row 7: ‘Output-2’ same as row 5 when moving left.

Row 8: ‘Output-3’ same as row 6 when moving left.

# State Machine Matrix2

The outputs of the second state machine specify the amplitude correction factors and the sound output channels of the speakers that has to be activated.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| State | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|  |  |  |  |  |  |  |  |  |  |  |  |
| If none | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| If jumpA | 11 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| If jumpB | 0 | 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| If both | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Output-0 | 0 | 244 | 247 | 251 | 260 | 259 | 247 | 267 | 274 | 277 | 275 |
| Output-1 | 0 | 244 | 230 | 244 | 247 | 251 | 260 | 259 | 247 | 267 | 274 |
| Output-2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| Output-3 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| State | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|  |  |  |  |  |  |  |  |  |  |  |  |
| If none | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| If jumpA | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 21 |
| If jumpB | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| If both | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| Output-0 | 257 | 271 | 252 | 258 | 273 | 239 | 233 | 230 | 234 | 242 | 234 |
| Output-1 | 277 | 275 | 257 | 271 | 252 | 258 | 273 | 239 | 233 | 230 | 234 |
| Output-2 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| Output-3 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |

Row 1 .. Row 4 same as before.

Row 5: ‘Output-0’ is the correction factor for the amplitude of the next speaker to start a sound when moving right

Row 6: ‘Output-1’ same as row 6 when moving left.

Row 7: ‘Output-2’ is the code for sound output channel A(=0) or B(=1) for which the correction factor applies when moving right.

Row 8: ‘Output-3’ same as row 7 when moving left.

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