% HW 13 State machine stepper driver

This stepper driver has 3 modes: 0: Full step 1: half step, 2: wave drive

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%

SUBDESIGN hw13

( clock, M[1..0], cw, enable :INPUT;

QA, QAN, QB, QBN :OUTPUT;)

VARIABLE

step :MACHINE of BITS (QA, QAN, QB, QBN)

WITH STATES (S0 = B"1010", S1 = B"1000", S2 = B"1001", S3 = B"0001",

S4 = B"0101", S5 = B"0100", S6 = B"0110", S7 = B"0010");

BEGIN

step.clk = clock;

step.ena = enable;

IF step == S0 THEN

CASE M[] IS

WHEN 0 => IF cw THEN step = S2; --Full

ELSE step = S6; END IF;

WHEN 1 => IF cw THEN step = S1; --Half

ELSE step = S7;END IF;

WHEN 2 => IF cw THEN step = S1; --Wave

ELSE step = S7;END IF;

-- WHEN 3 =>

END CASE;

ELSIF step == S1 THEN

CASE M[] IS

WHEN 0 => IF cw THEN step = S2; --FULL

ELSE step = S0;END IF;

WHEN 1 => IF cw THEN step = S2 ; --HALF

ELSE step = S0;END IF;

WHEN 2 => IF cw THEN step = S3; --WAVE

ELSE step = S7;END IF;

-- WHEN 3 =>

END CASE;

ELSIF step == S2 THEN

CASE M[] IS

WHEN 0 => IF cw THEN step = S4; --FULL

ELSE step = S0;END IF;

WHEN 1 => IF cw THEN step = S3 ; --HALF

ELSE step = S1;END IF;

WHEN 2 => IF cw THEN step = S3; --WAVE

ELSE step = S1;END IF;

-- WHEN 3 =>

END CASE;

ELSIF step == S3 THEN

CASE M[] IS

WHEN 0 => IF cw THEN step = S4; --FULL

ELSE step = S2;END IF;

WHEN 1 => IF cw THEN step = S4 ; --HALF

ELSE step = S2;END IF;

WHEN 2 => IF cw THEN step = S5 ; --WAVE

ELSE step = S1;END IF;

-- WHEN 3 =>

END CASE;

ELSIF step == S4 THEN

CASE M[] IS

WHEN 0 => IF cw THEN step = S6; --FULL

ELSE step = S2;END IF;

WHEN 1 => IF cw THEN step = S5 ; --HALF

ELSE step = S3;END IF;

WHEN 2 => IF cw THEN step = S5; --WAVE

ELSE step = S3;END IF;

-- WHEN 3 =>

END CASE;

ELSIF step == S5 THEN

CASE M[] IS

WHEN 0 => IF cw THEN step = S6; --FULL

ELSE step = S4;END IF;

WHEN 1 => IF cw THEN step = S6 ; --HALF

ELSE step = S4;END IF;

WHEN 2 => IF cw THEN step = S7 ; --WAVE

ELSE step = S3;END IF;

-- WHEN 3 =>

END CASE;

ELSIF step == S6 THEN

CASE M[] IS

WHEN 0 => IF cw THEN step = S0; --FULL

ELSE step = S4;END IF;

WHEN 1 => IF cw THEN step = S7; --HALF

ELSE step = S5;END IF;

WHEN 2 => IF cw THEN step = S7; --WAVE

ELSE step = S5;END IF;

-- WHEN 3

END CASE;

ELSIF step == S7 THEN

CASE M[] IS

WHEN 0 => IF cw THEN step = S0; --FULL

ELSE step = S6;END IF;

WHEN 1 => IF cw THEN step = S0; --HALF

ELSE step = S6;END IF;

WHEN 2 => IF cw THEN step = S1; --WAVE

ELSE step = S5;END IF;

-- WHEN 3 =>

END CASE;

END IF;

END;

