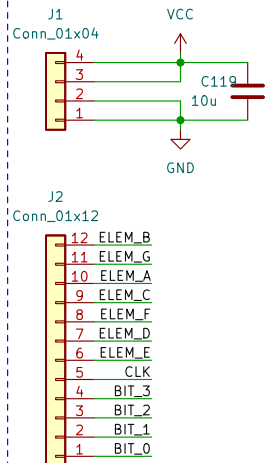
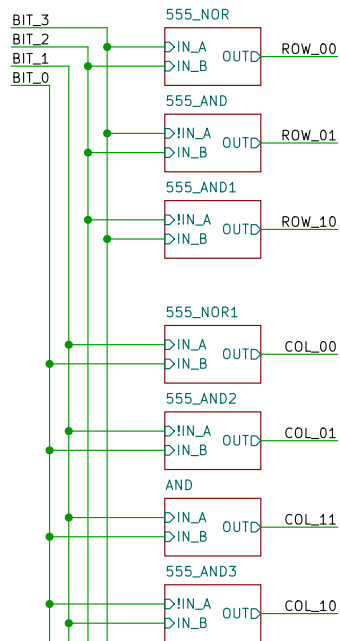


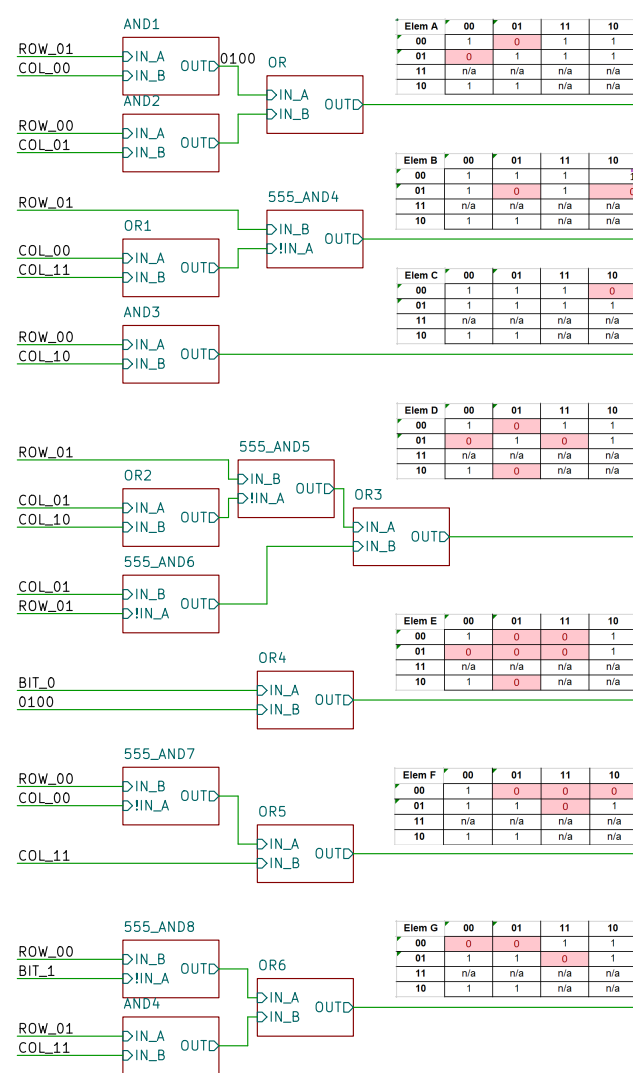
INTERFACE



K-MAP DECODING: Stage 1

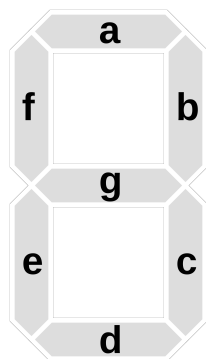
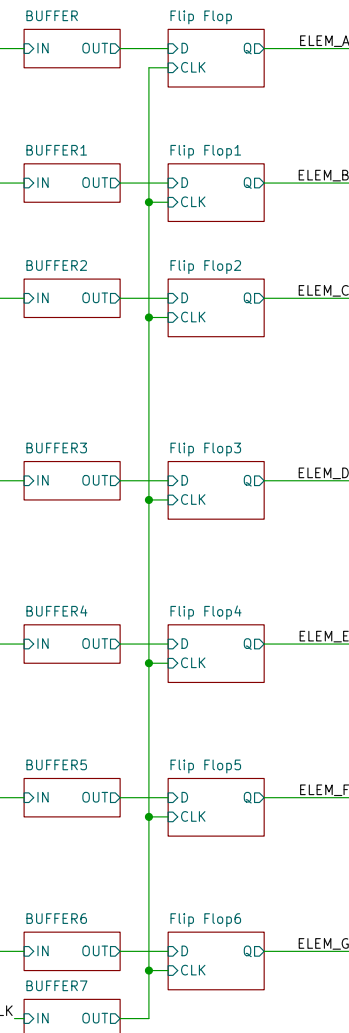


K-MAP DECODING: Stage 2



FLIP FLOPS

Buffer the OR gate stages. For symmetry buffer all flip flops



jessefarrell92@gmail.com

Sheet: /
File: BCD_7seg.kicad_sch

Title: BCD to 7 Segment Decoder

Size: A4 Date: 2022-05-13

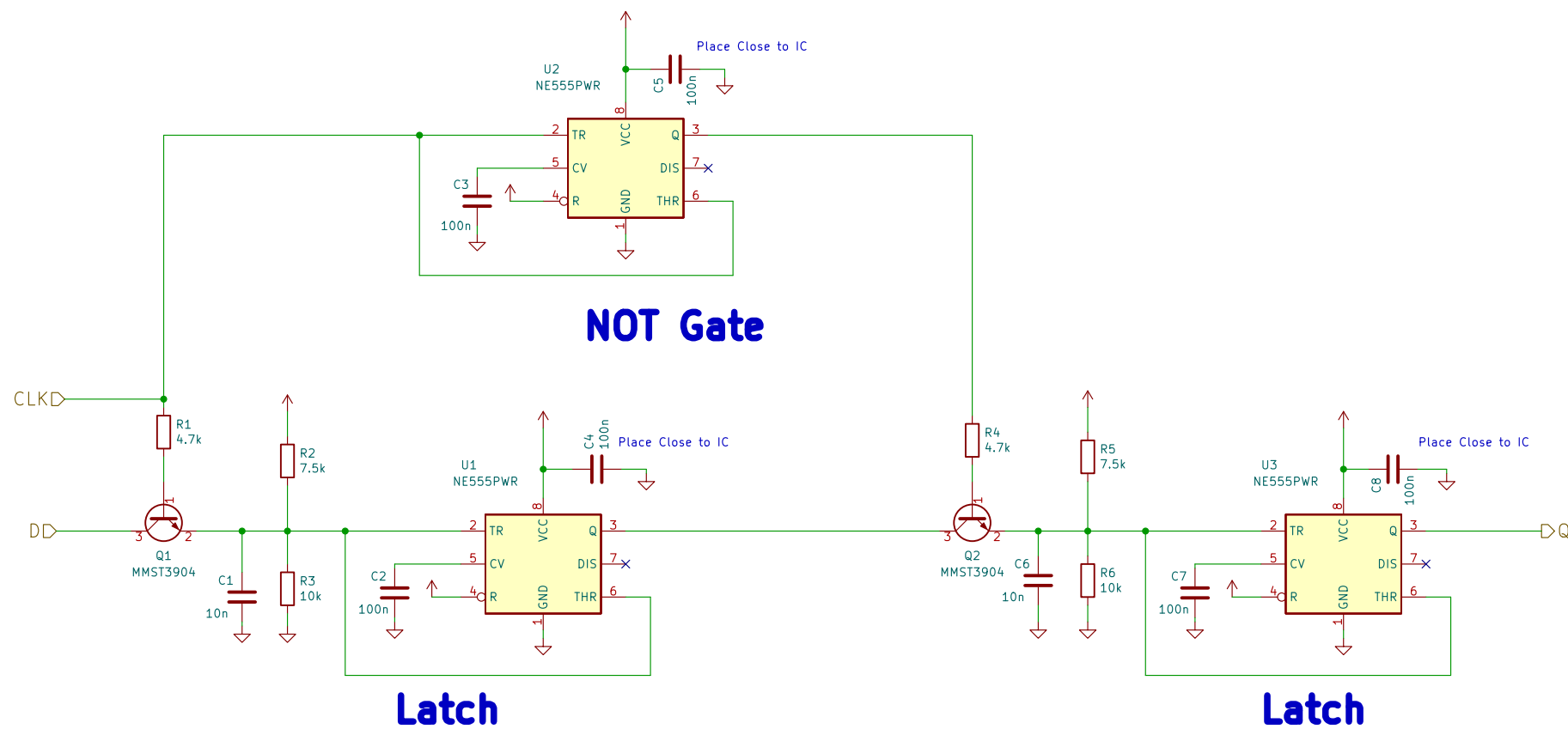
KiCad E.D.A. kicad (6.0.5)

Rev: 1

Id: 1/39

Note that this flip flop will trigger on the falling edge of CLK. Also the input D is flipped twice, hence output Q is D

555 FLIP FLOP



jessefarrell92@gmail.com

Sheet: /Flip Flop6/
File: block_555flipflop.kicad_sch

Title: 555 Flip Flop

Size: A4 Date: 2022-05-14

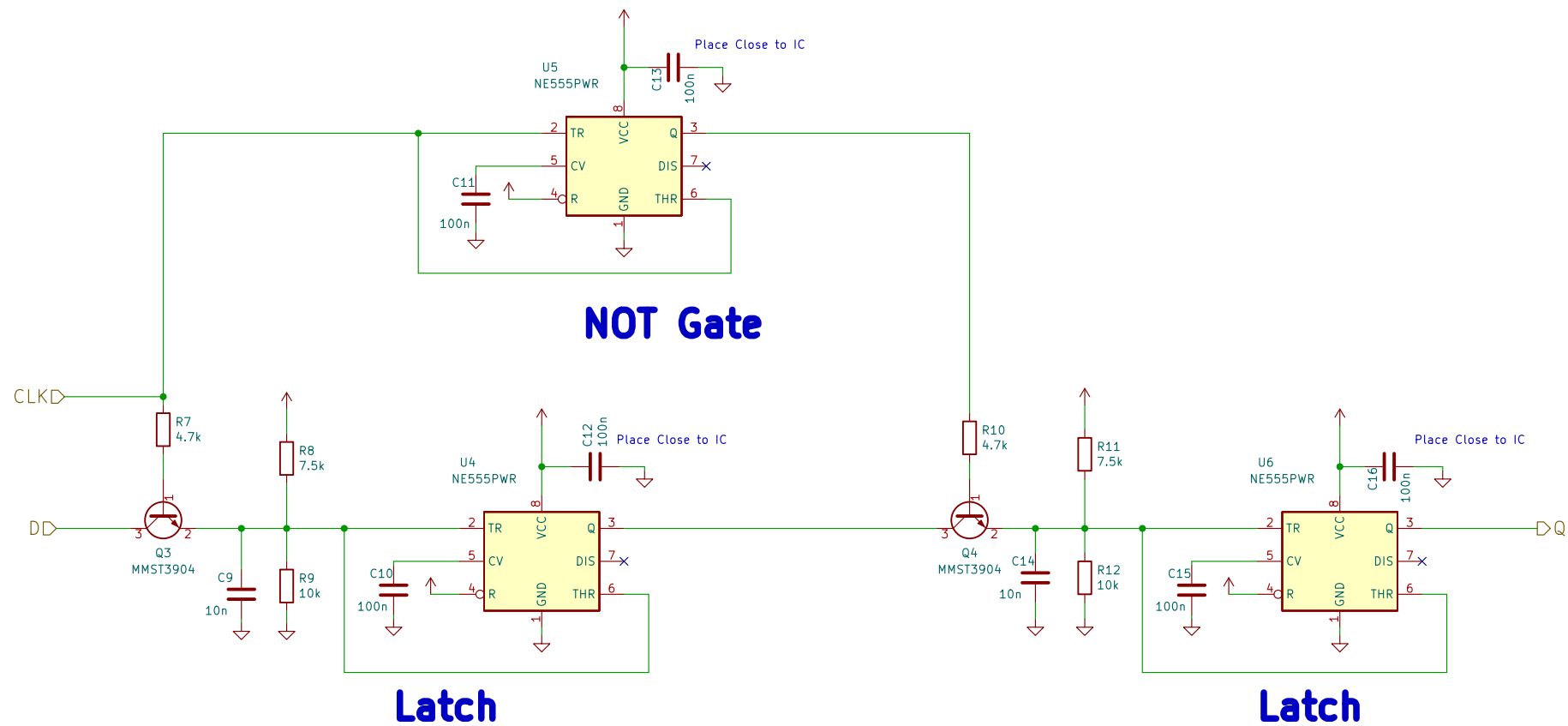
KiCad E.D.A. kicad (6.0.5)

Rev: 1

Id: 2/39

Note that this flip flop will trigger on the falling edge of CLK. Also the input D is flipped twice, hence output Q is D

555 FLIP FLOP



jessefarrell92@gmail.com

Sheet: /Flip Flop1/
File: block_555flipflop.kicad_sch

Title: 555 Flip Flop

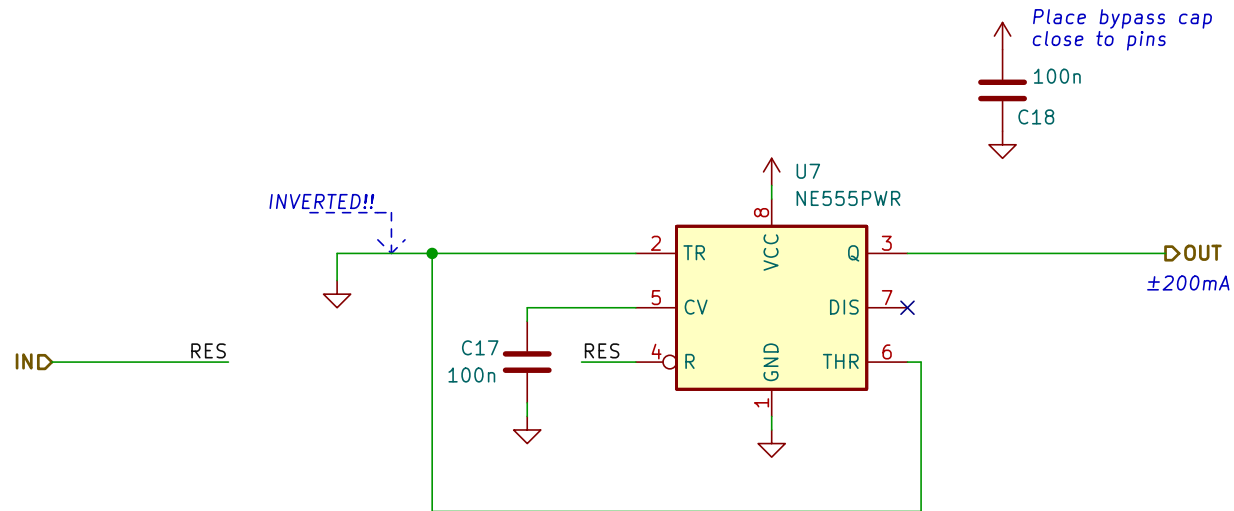
Size: A4 Date: 2022-05-14

KiCad E.D.A. kicad (6.0.5)

Rev: 1

Id: 3/39

555 Buffer



Basic Buffer, note there
is no hysteresis on reset...
threshold is about 0.6V

jessefarrell92@gmail.com

Sheet: /BUFFER1/

File: block_555Buffer.kicad_sch

Title: 555 BUFFER

Size: A5

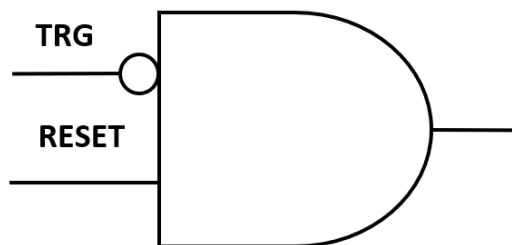
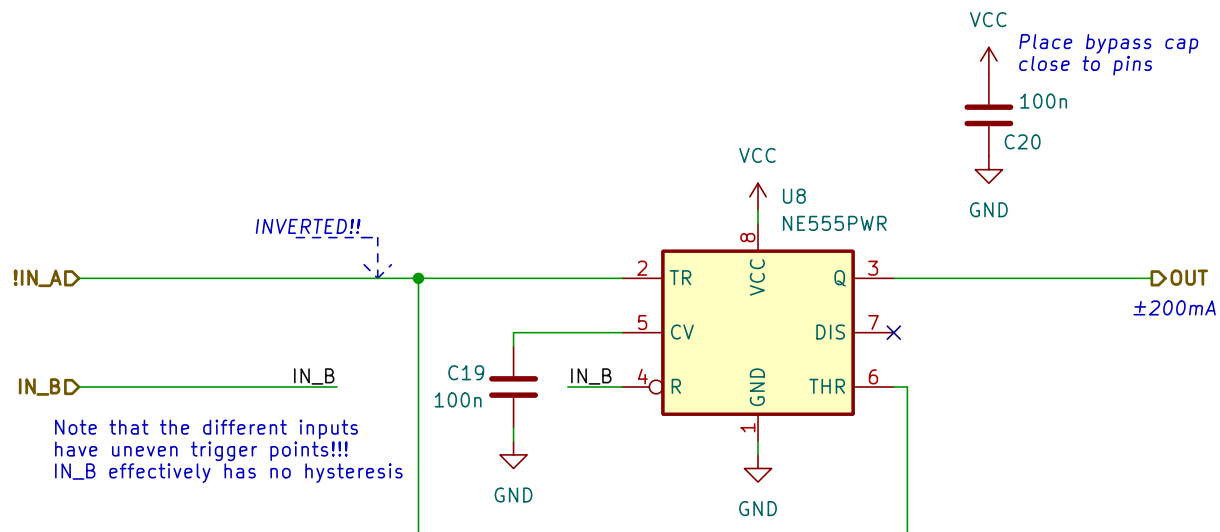
Date: 2022-05-08

Rev: 0

KiCad E.D.A. kicad (6.0.5)

Id: 4/39

555 AND Gate (inv. input)



jessefarrell92@gmail.com
AND gate based on a single 555, note inverting input

Sheet: /555_AND1/
File: block_555AND.kicad_sch

Title: Single 555 AND Gate

Size: A5 Date: 2022-05-04

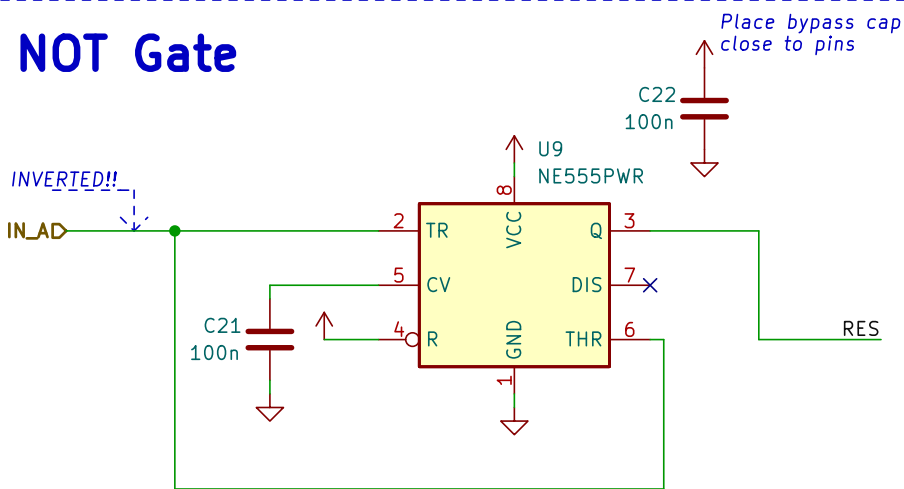
KiCad E.D.A. kicad (6.0.5)

Rev: 0

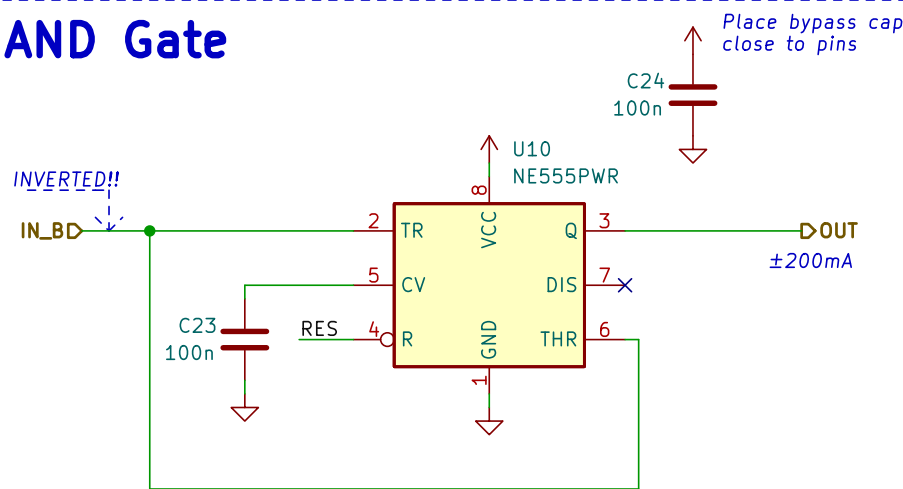
Id: 5/39

555 NOR Gate

NOT Gate

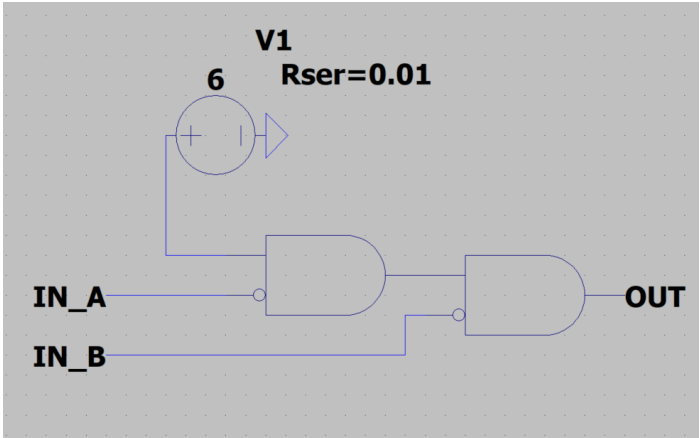


AND Gate



Truth Table

0	0	->	1
1	0	->	0
0	1	->	0
1	1	->	0



jessefarrell92@gmail.com

Sheet: /555_NOR1/
File: block_555nor.kicad_sch

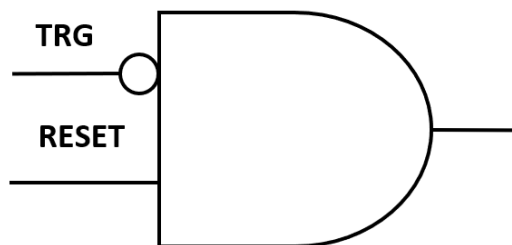
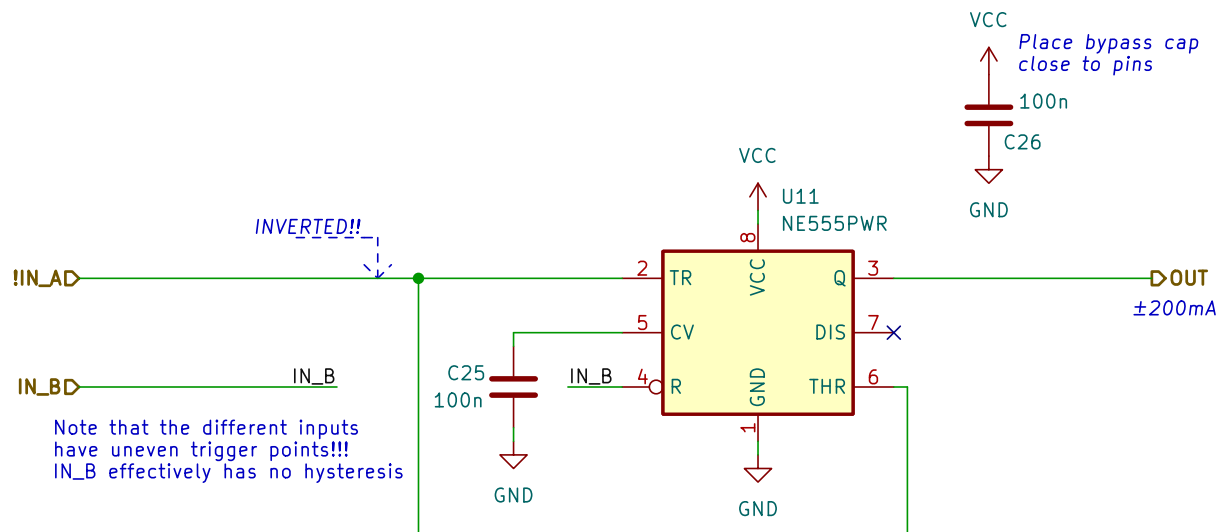
Title: 555 NOR Gate

Size: A5
KiCad E.D.A. kicad (6.0.5)

Date: 2022-05-05

Rev: o
Id: 6/39

555 AND Gate (inv. input)



jessefarrell92@gmail.com
AND gate based on a single 555, note inverting input

Sheet: /555_AND2/
File: block_555AND.kicad_sch

Title: Single 555 AND Gate

Size: A5 Date: 2022-05-04

Rev: 0

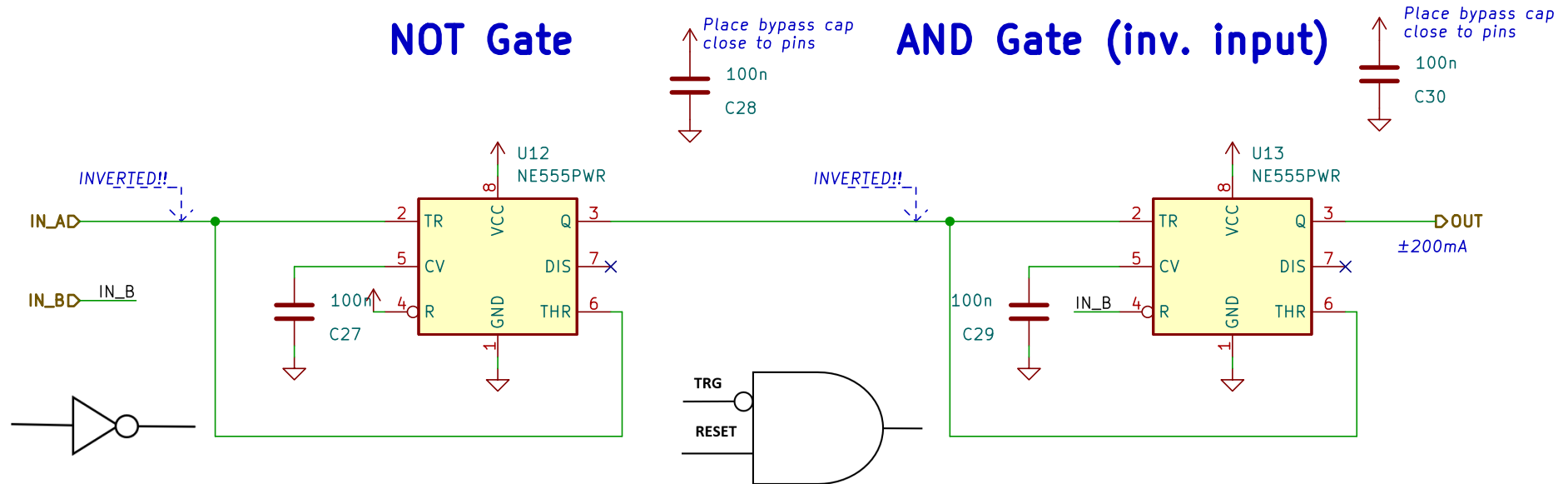
KiCad E.D.A. kicad (6.0.5)

Id: 7/39

AND Gate (non inverting inputs)

NOT Gate

AND Gate (inv. input)



jessefarrell92@gmail.com

Sheet: /AND1/

File: block_2x555and.kicad_sch

Title: AND Gate (2x 555)

Size: A5

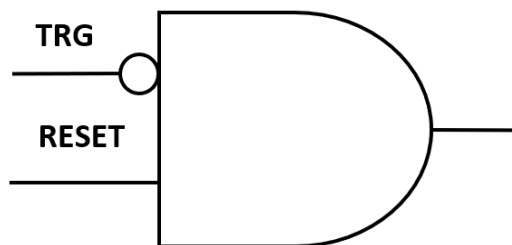
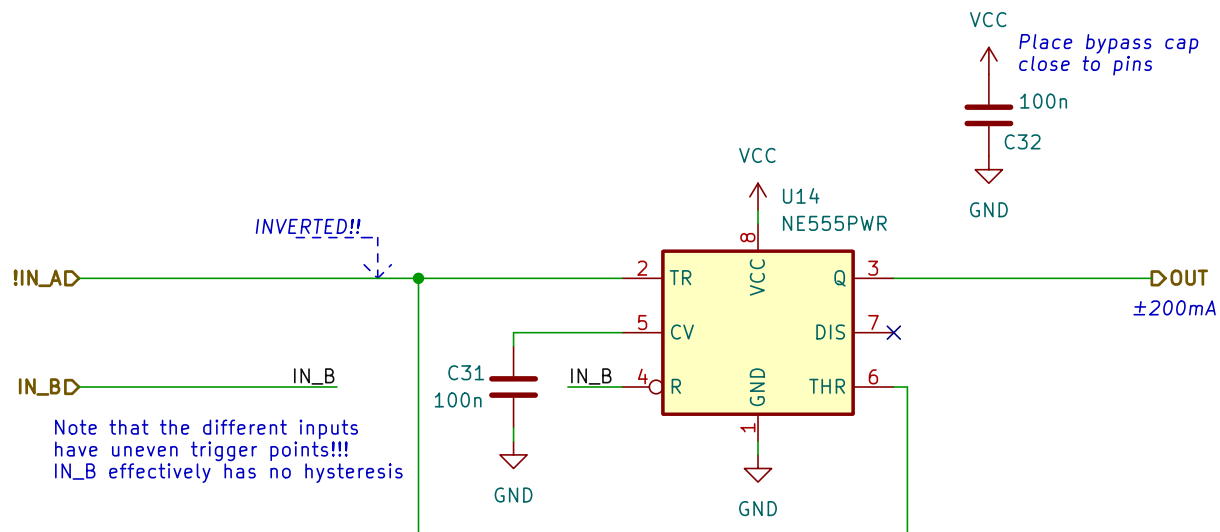
Date: 2022-05-05

Rev: 0

KiCad E.D.A. kicad (6.0.5)

Id: 8/39

555 AND Gate (inv. input)



jessefarrell92@gmail.com
AND gate based on a single 555, note inverting input

Sheet: /555_AND3/
File: block_555AND.kicad_sch

Title: Single 555 AND Gate

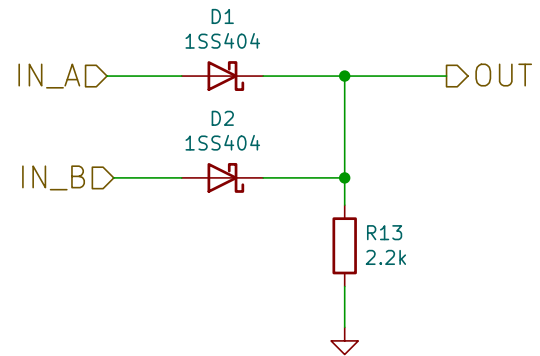
Size: A5 Date: 2022-05-04

Rev: 0

KiCad E.D.A. kicad (6.0.5)

Id: 9/39

Diode OR Gate



jessefarrell92@gmail.com

Sheet: /OR1/
File: block_2inOR.kicad_sch

Title: Diode 2in OR Gate

Size: A5 Date: 2022-05-05

Rev: 0

KiCad E.D.A. kicad (6.0.5)

Id: 10/39

Very simple or gate
do not cascade these

1234

AND Gate (non inverting inputs)

A

NOT Gate

Place bypass cap close to pins

100n
C34

IN_AD

INVERTED!!

IN_BD IN_B

U15
NE555PWR

2 TR VCC Q 3

5 CV DIS 7 X

4 R GND THR 6

100n
C33

1 GND

B

AND Gate (inv. input)

Place bypass cap close to pins

100n
C36

IN_B

INVERTED!!

U16
NE555PWR

2 TR VCC Q 3

5 CV DIS 7 X

4 R GND THR 6

100n
C35

1 GND

OUT ±200mA

TRG
RESET

jessefarrell92@gmail.com

Sheet: /AND2/
File: block_2x555and.kicad_sch

Title: AND Gate (2x 555)

Size: A5	Date: 2022-05-05	Rev: 0
KiCad E.D.A. kicad (6.0.5)		Id: 11/39

C

1234

Sheet: /AND2/
File: block_2x555and.kicad_sch

Size: A5	Date: 2022-05-05
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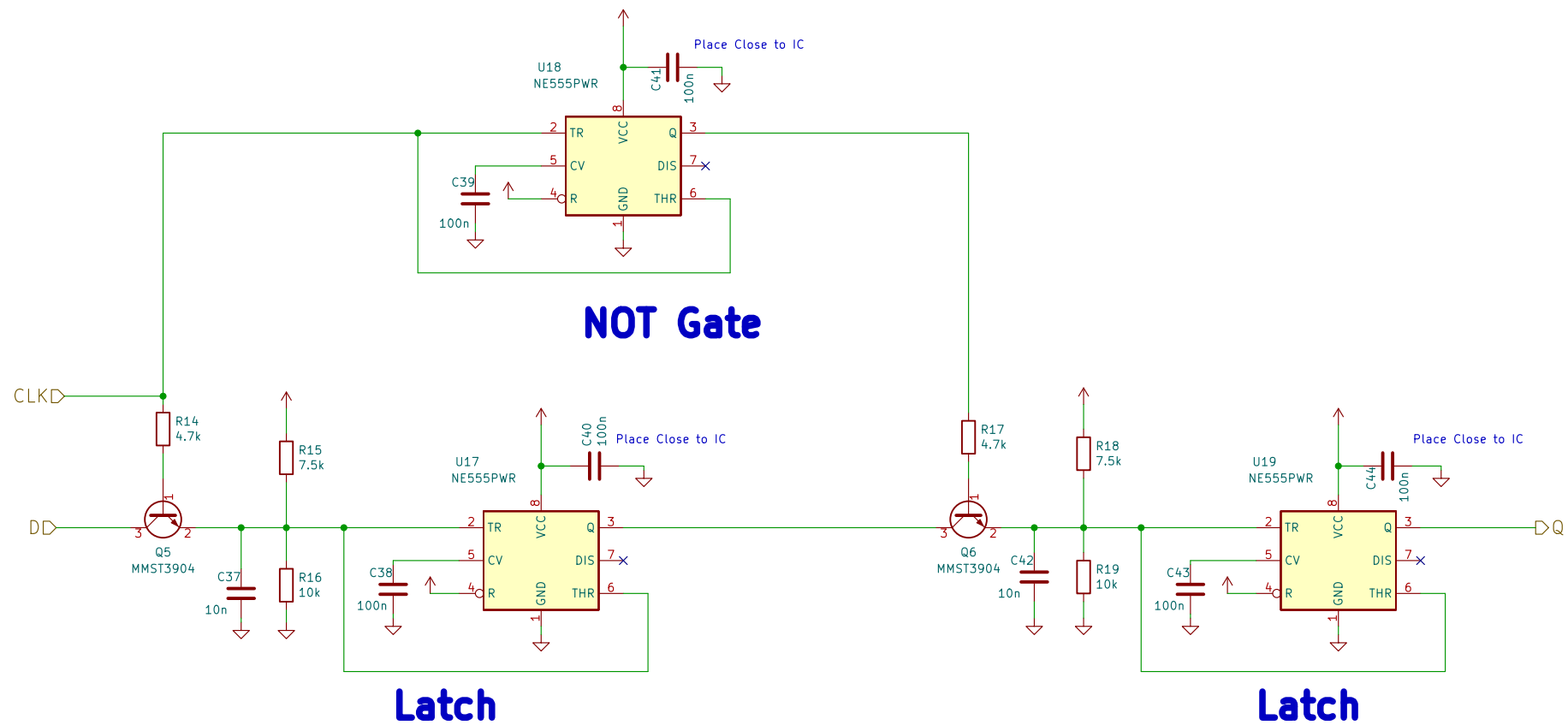
KiCad E.D.A.	kicad (6.0.5)
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Rev: 0

Id: 11/39

Note that this flip flop will trigger on the falling edge of CLK. Also the input D is flipped twice, hence output Q is D

555 FLIP FLOP



jessefarrell92@gmail.com

Sheet: /Flip Flop2/
File: block_555flipflop.kicad_sch

Title: 555 Flip Flop

Size: A4 Date: 2022-05-14

KiCad E.D.A. kicad (6.0.5)

Rev: 1

Id: 12/39

1 2 3 4

A

555 Buffer

IND — RES

INVERTED!!

U20
NE555PWR

Q
DIS
THR

OUT
±200mA

Place bypass cap close to pins

100n
C46

C45
100n

Basic Buffer, note there is no hysteresis on reset... threshold is about 0.6V

jessefarrell92@gmail.com

Sheet: /BUFFER2/
File: block_555Buffer.kicad_sch

Title: 555 BUFFER

Size: A5	Date: 2022-05-08	Rev: 0
KiCad E.D.A. kicad (6.0.5)		Id: 13/39

B

C

1 2 3 4

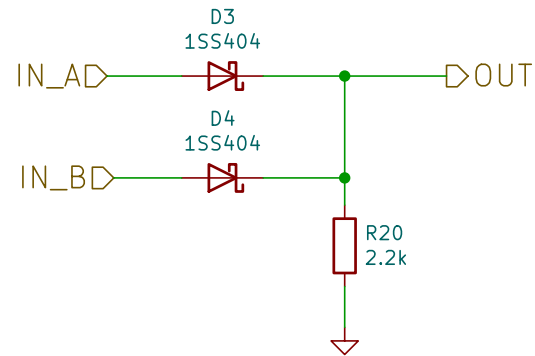
Sheet: /BUFFER2/
File: block_555Buffer.kicad_sch

Size: A5	Date: 2022-05-08
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Rev: 0

Id: 13/39

Diode OR Gate



jessefarrell92@gmail.com

Sheet: /OR2/
File: block_2inOR.kicad_sch

Title: Diode 2in OR Gate

Size: A5 Date: 2022-05-05

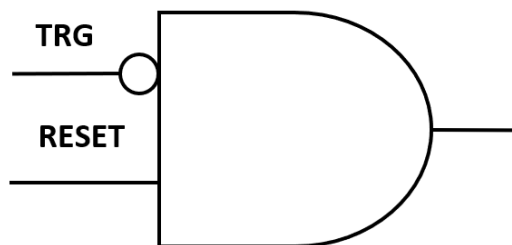
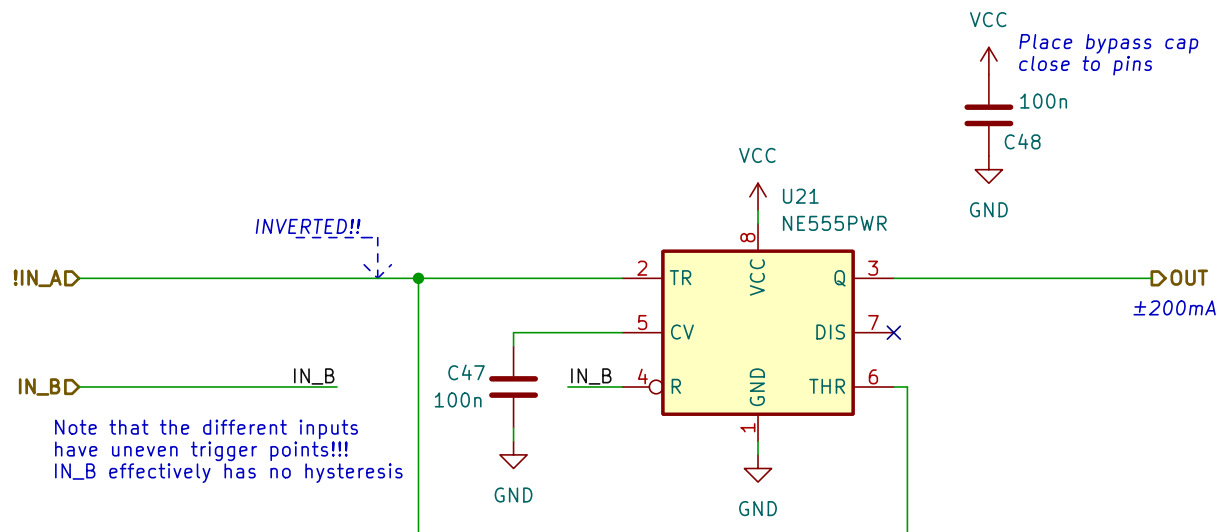
Rev: 0

KiCad E.D.A. kicad (6.0.5)

Id: 14/39

Very simple or gate
do not cascade these

555 AND Gate (inv. input)



jessefarrell92@gmail.com
AND gate based on a single 555, note inverting input

Sheet: /555_AND4/
File: block_555AND.kicad_sch

Title: Single 555 AND Gate

Size: A5 Date: 2022-05-04

Rev: 0

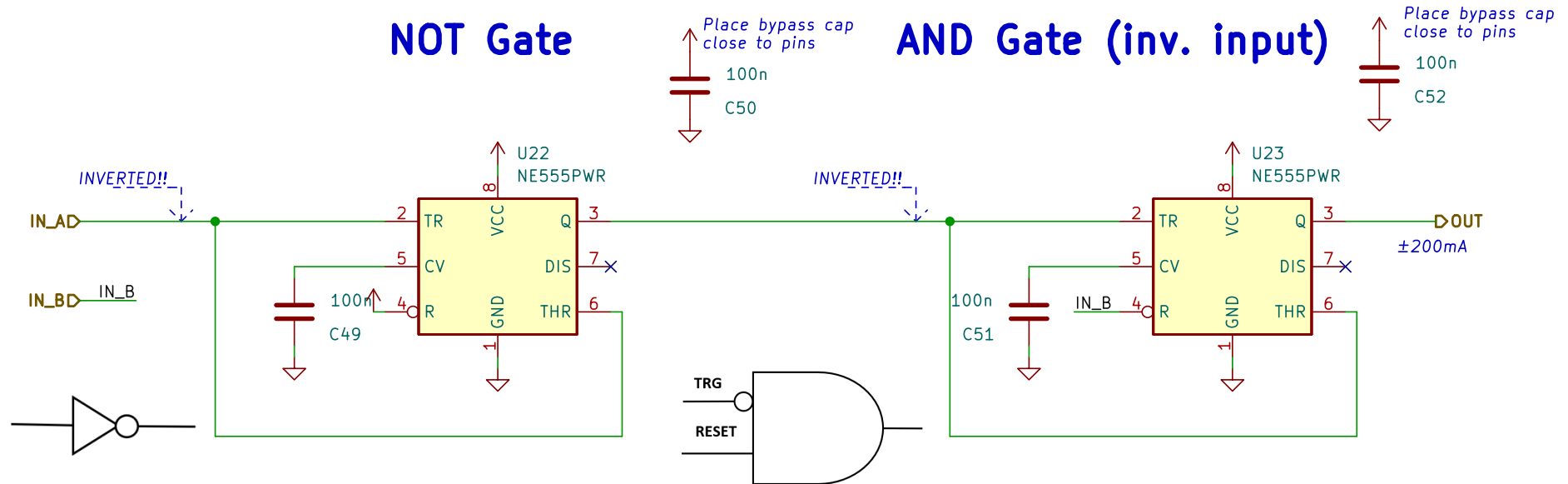
KiCad E.D.A. kicad (6.0.5)

Id: 15/39

AND Gate (non inverting inputs)

NOT Gate

AND Gate (inv. input)



jessefarrell92@gmail.com

Sheet: /AND3/

File: block_2x555and.kicad_sch

Title: AND Gate (2x 555)

Size: A5

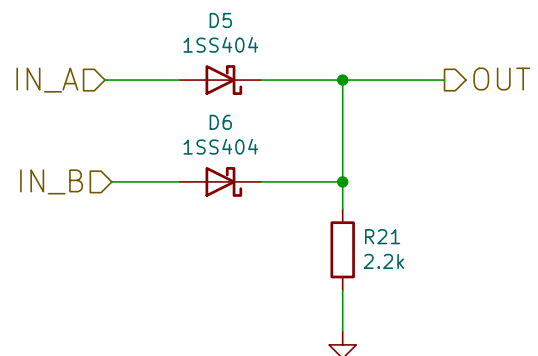
Date: 2022-05-05

Rev: 0

KiCad E.D.A. kicad (6.0.5)

Id: 16/39

Diode OR Gate



jessefarrell92@gmail.com

Sheet: /OR3/
File: block_2inOR.kicad_sch

Title: Diode 2in OR Gate

Size: A5 Date: 2022-05-05

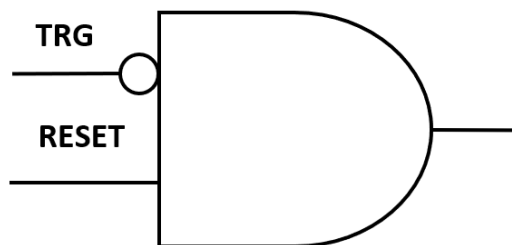
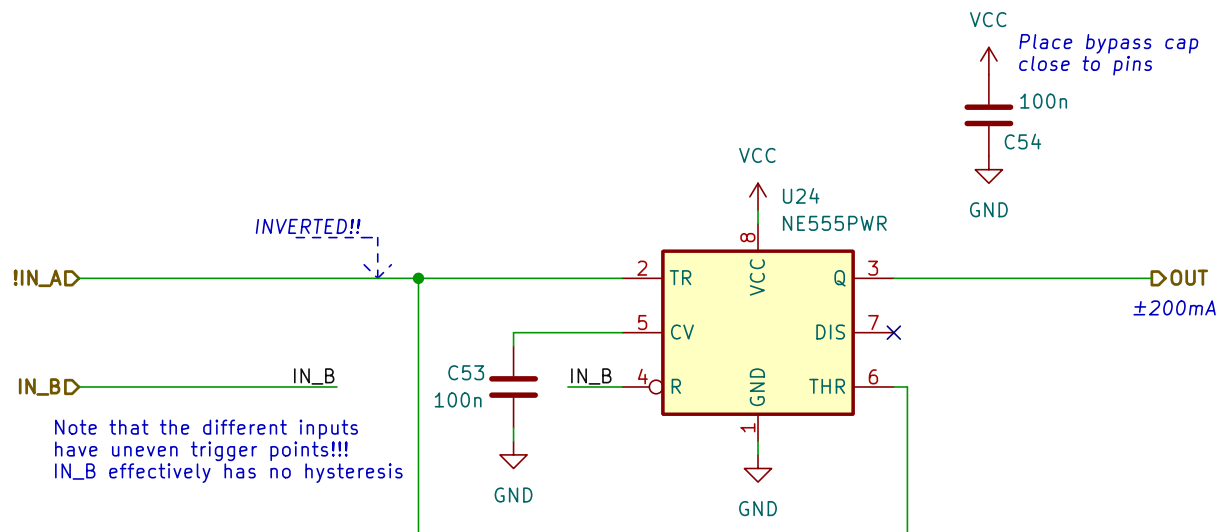
Rev: 0

KiCad E.D.A. kicad (6.0.5)

Id: 17/39

Very simple or gate
do not cascade these

555 AND Gate (inv. input)



jessefarrell92@gmail.com
AND gate based on a single 555, note inverting input

Sheet: /555_AND5/
File: block_555AND.kicad_sch

Title: Single 555 AND Gate

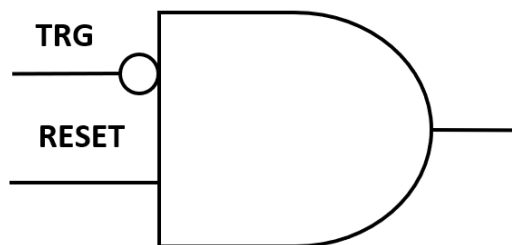
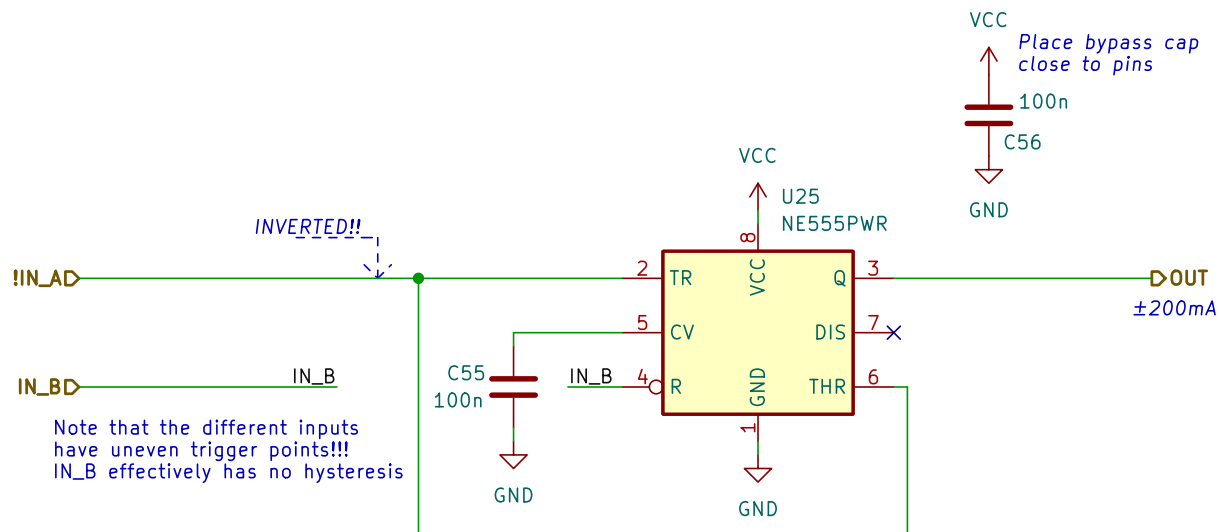
Size: A5 Date: 2022-05-04

Rev: 0

KiCad E.D.A. kicad (6.0.5)

Id: 18/39

555 AND Gate (inv. input)



jessefarrell92@gmail.com
AND gate based on a single 555, note inverting input

Sheet: /555_AND6/
File: block_555AND.kicad_sch

Title: Single 555 AND Gate

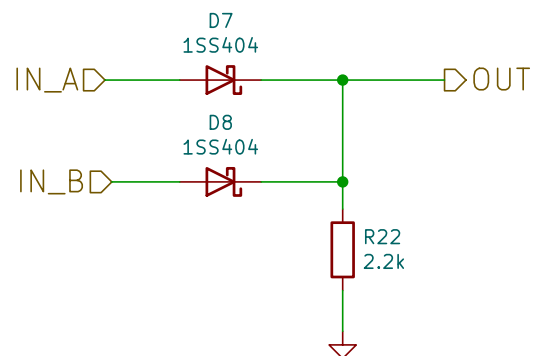
Size: A5 Date: 2022-05-04

KiCad E.D.A. kicad (6.0.5)

Rev: 0

Id: 19/39

Diode OR Gate



jessefarrell92@gmail.com

Sheet: /OR4/
File: block_2inOR.kicad_sch

Title: Diode 2in OR Gate

Size: A5 Date: 2022-05-05

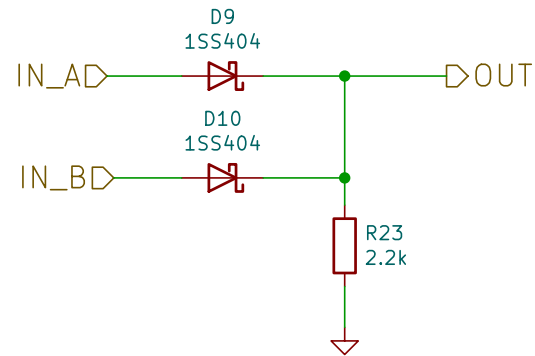
Rev: 0

KiCad E.D.A. kicad (6.0.5)

Id: 20/39

Very simple or gate
do not cascade these

Diode OR Gate



jessefarrell92@gmail.com

Sheet: /OR5/
File: block_2inOR.kicad_sch

Title: Diode 2in OR Gate

Size: A5 Date: 2022-05-05

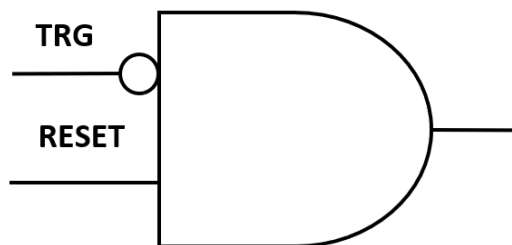
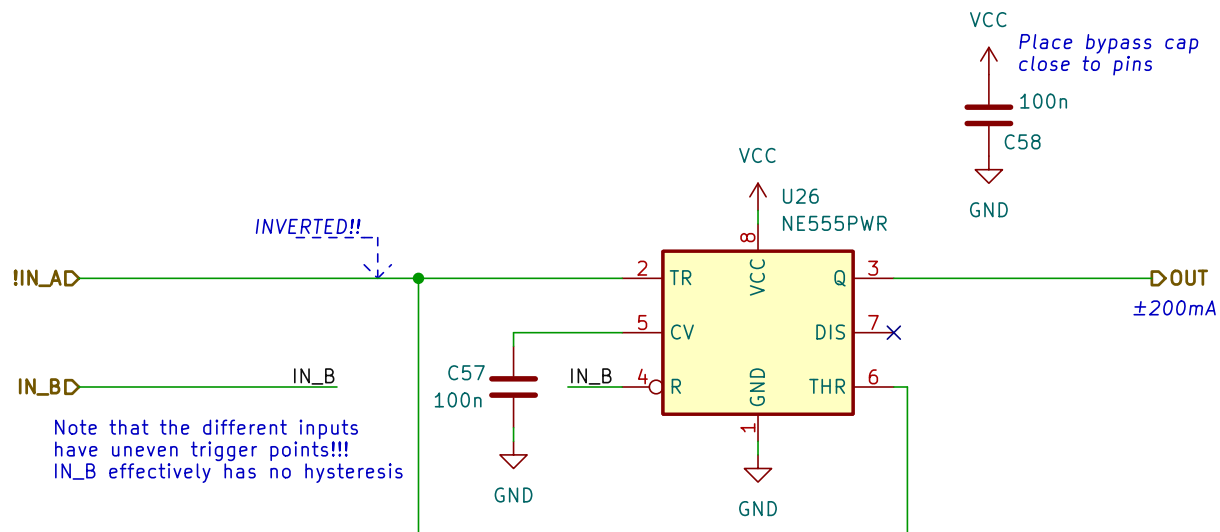
Rev: 0

KiCad E.D.A. kicad (6.0.5)

Id: 21/39

Very simple or gate
do not cascade these

555 AND Gate (inv. input)



jessefarrell92@gmail.com
AND gate based on a single 555, note inverting input

Sheet: /555_AND7/
File: block_555AND.kicad_sch

Title: Single 555 AND Gate

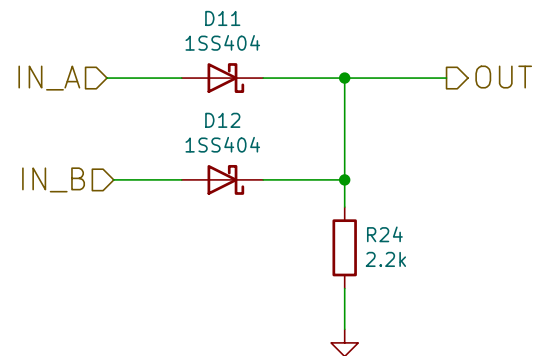
Size: A5 Date: 2022-05-04

KiCad E.D.A. kicad (6.0.5)

Rev: 0

Id: 22/39

Diode OR Gate



jessefarrell92@gmail.com

Sheet: /OR6/
File: block_2inOR.kicad_sch

Title: Diode 2in OR Gate

Size: A5

Date: 2022-05-05

Rev: 0

KiCad E.D.A. kicad (6.0.5)

Id: 23/39

Very simple or gate
do not cascade these

1 2 3 4

555 AND Gate (inv. input)

A

B

C

!IN_AD

IN_B

INVERTED!!

U27 NE555PWR

VCC

GND

C59 100n

C60 100n

DOUT ±200mA

Note that the different inputs have uneven trigger points!!!
IN_B effectively has no hysteresis

Place bypass cap close to pins

TRG

RESET

jessefarrell92@gmail.com

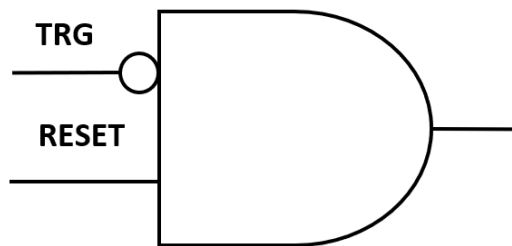
AND gate based on a single 555, note inverting input

Sheet: /555_AND8/
File: block_555AND.kicad_sch

Title: Single 555 AND Gate

Size: A5	Date: 2022-05-04	Rev: 0
KiCad E.D.A. kicad (6.0.5)	Id: 24/39	

1 2 3 4



jessefarrell92@gmail.com

Sheet: /555_AND8/
File: block_555AND.kicad_sch

Title: Single 555 AND Gate

Size: A5	Date: 2022-05-04
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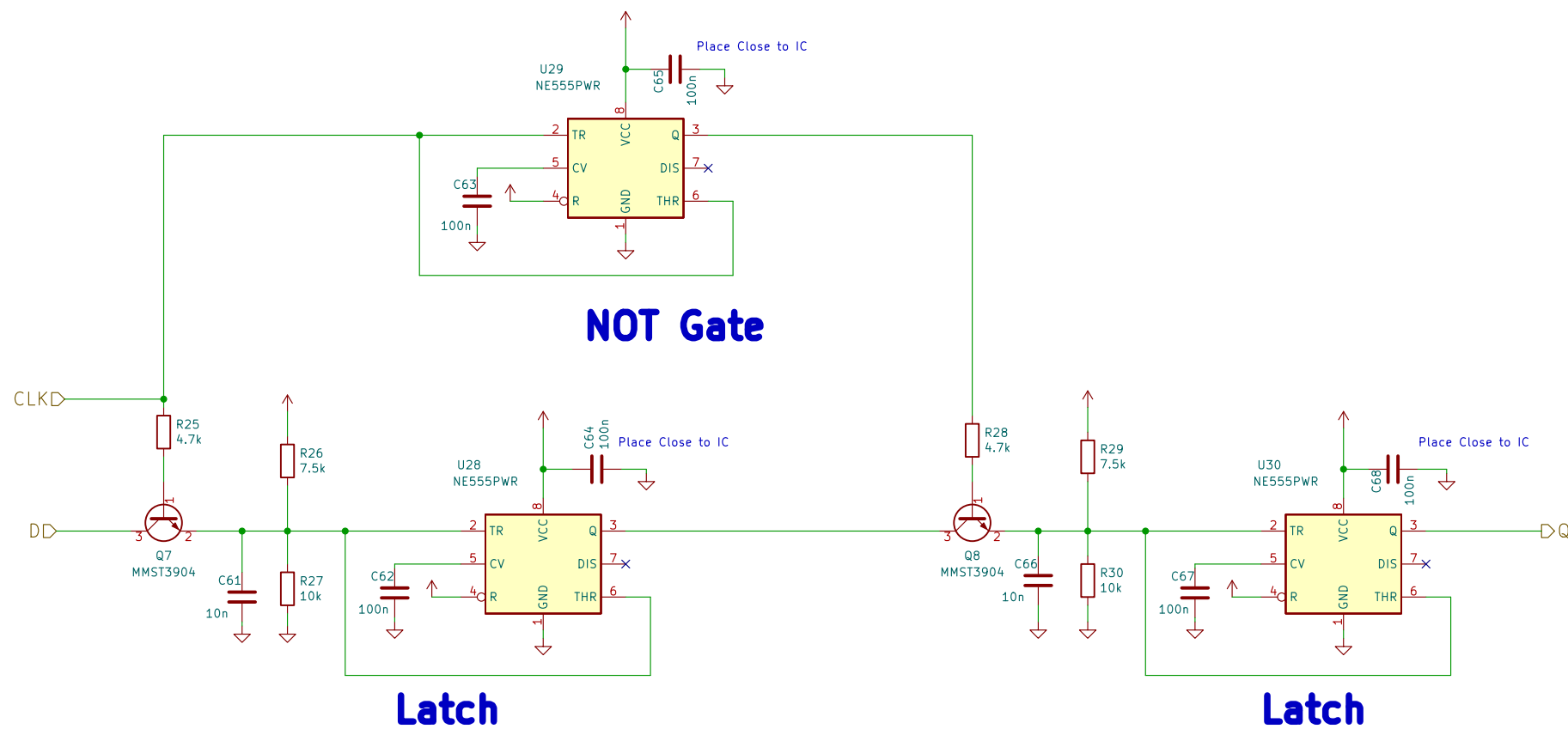
KiCad E.D.A.	kicad (6.0.5)
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Rev: 0

Id: 24/39

Note that this flip flop will trigger on the falling edge of CLK. Also the input D is flipped twice, hence output Q is D

555 FLIP FLOP



jessefarrell92@gmail.com

Sheet: /Flip Flop3/
File: block_555flipflop.kicad_sch

Title: 555 Flip Flop

Size: A4 Date: 2022-05-14

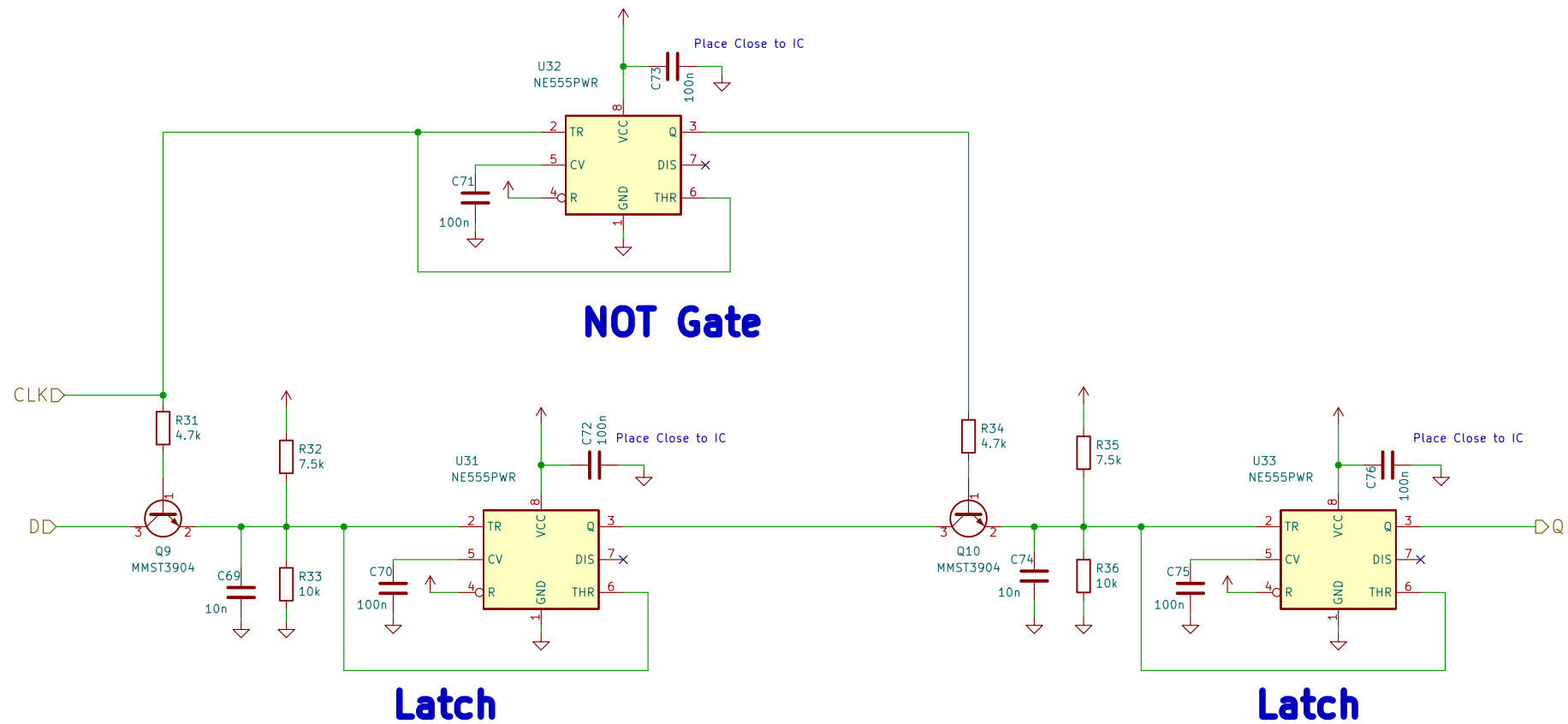
KiCad E.D.A. kicad (6.0.5)

Rev: 1

Id: 25/39

Note that this flip flop will trigger on the falling edge of CLK. Also the input D is flipped twice, hence output Q is D

555 FLIP FLOP



jessefarrell92@gmail.com

Sheet: /Flip Flop4/
File: block_555flipflop.kicad_sch

Title: 555 Flip Flop

Size: A4 Date: 2022-05-14

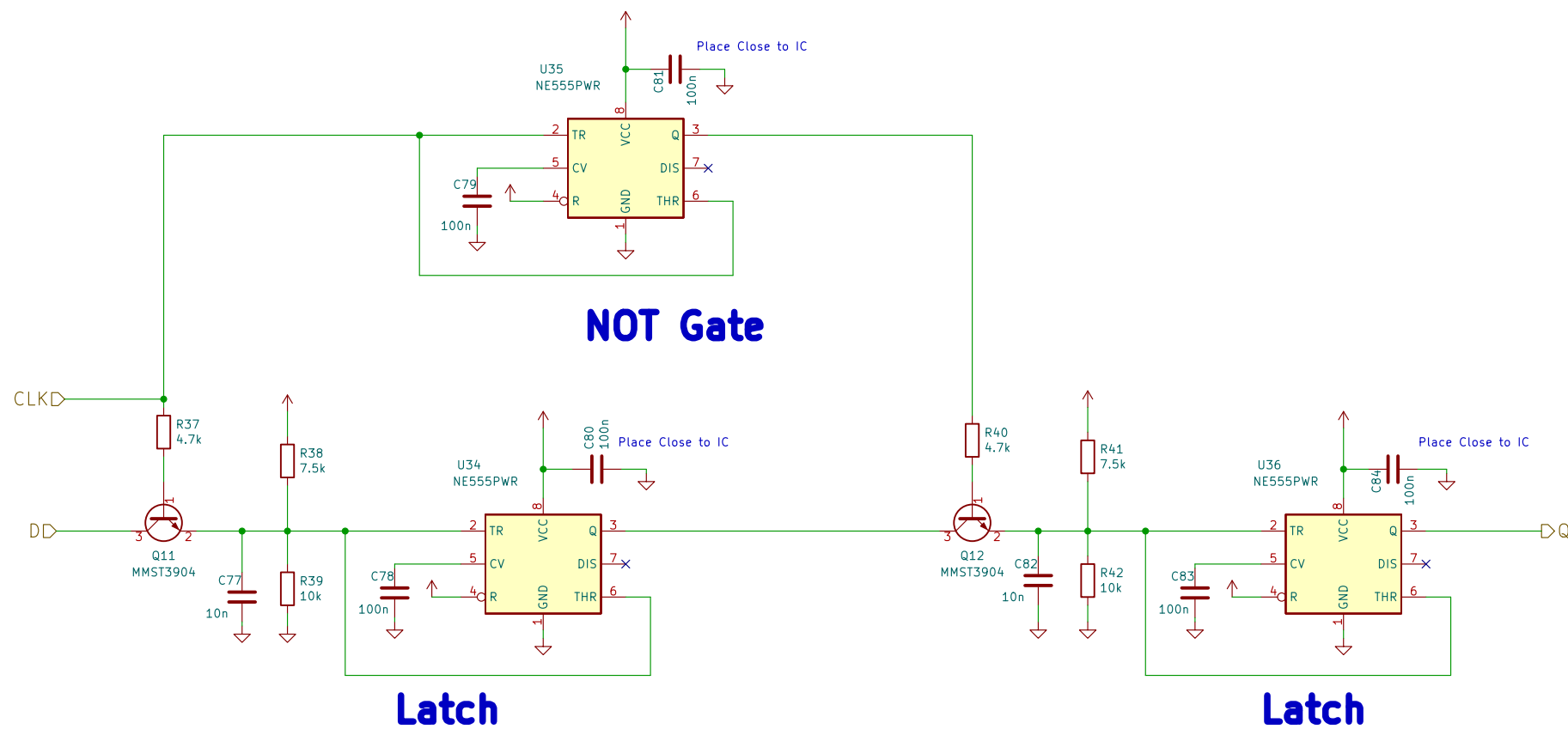
KiCad E.D.A. kicad (6.0.5)

Rev: 1

Id: 26/39

Note that this flip flop will trigger on the falling edge of CLK. Also the input D is flipped twice, hence output Q is D

555 FLIP FLOP



jessefarrell92@gmail.com

Sheet: /Flip Flop5/
File: block_555flipflop.kicad_sch

Title: 555 Flip Flop

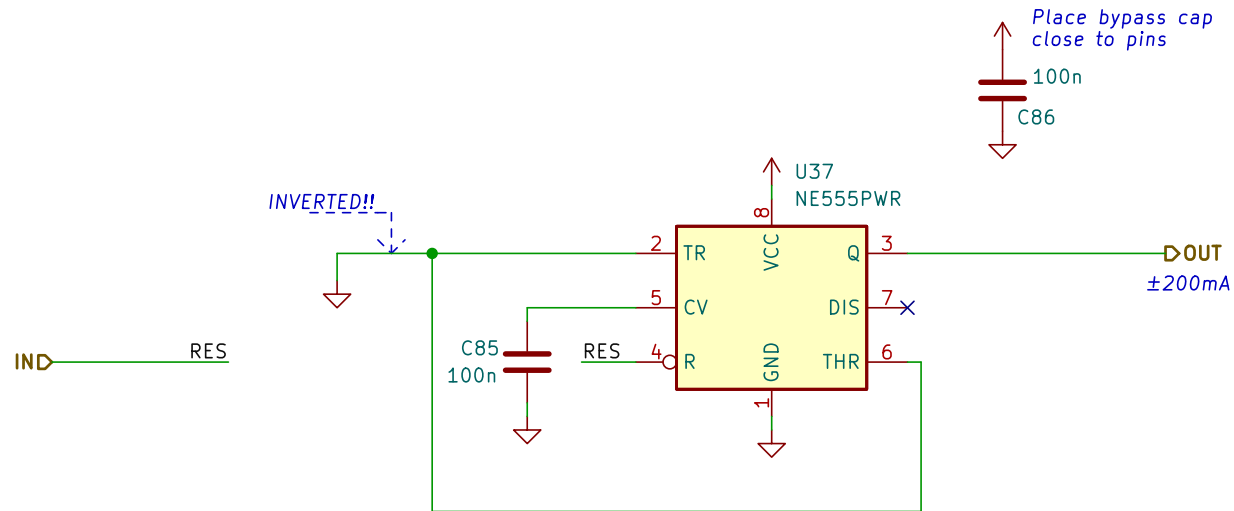
Size: A4 Date: 2022-05-14

KiCad E.D.A. kicad (6.0.5)

Rev: 1

Id: 27/39

555 Buffer



Basic Buffer, note there
is no hysteresis on reset...
threshold is about 0.6V

jessefarrell92@gmail.com

Sheet: /BUFFER3/

File: block_555Buffer.kicad_sch

Title: 555 BUFFER

Size: A5

Date: 2022-05-08

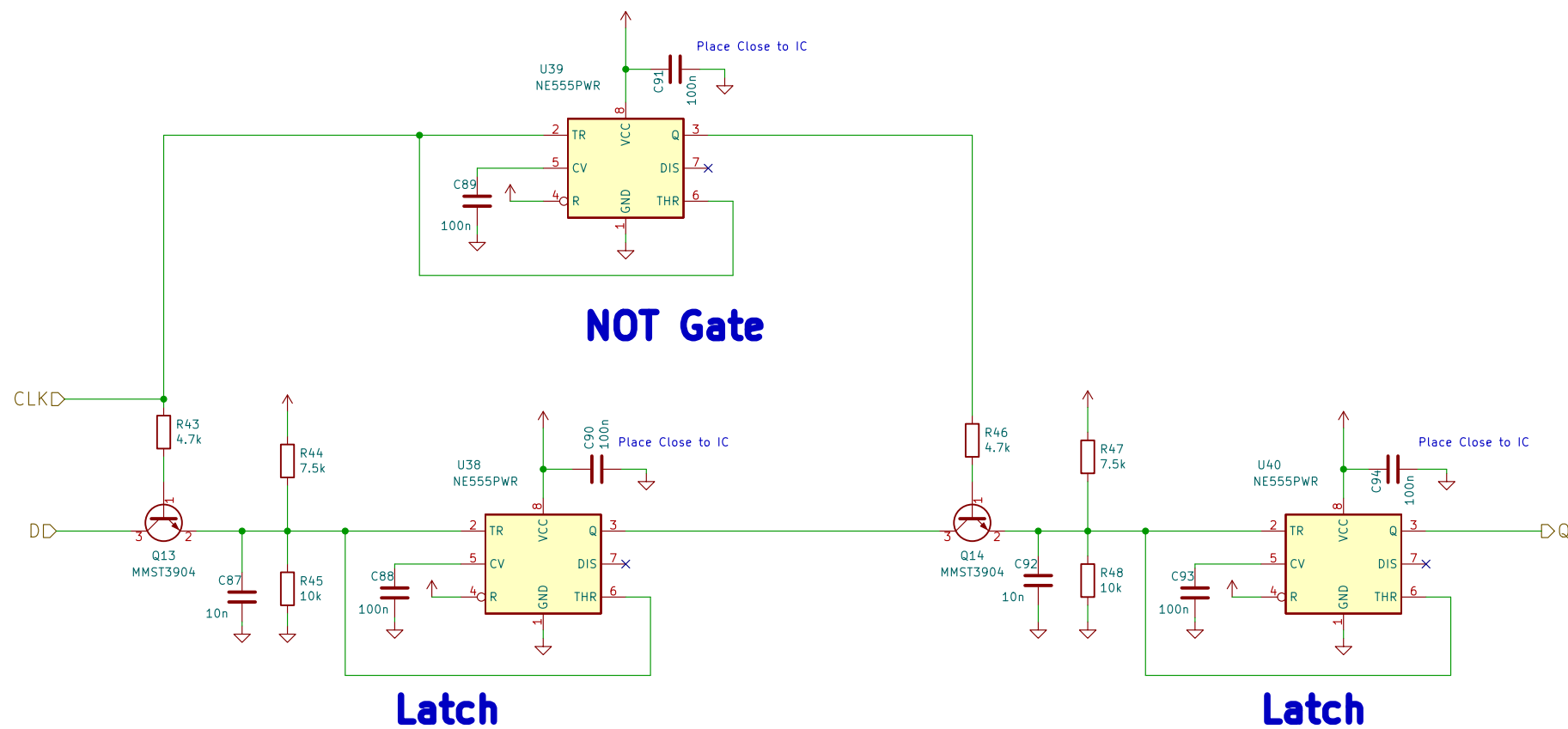
Rev: 0

KiCad E.D.A. kicad (6.0.5)

Id: 28/39

Note that this flip flop will trigger on the falling edge of CLK. Also the input D is flipped twice, hence output Q is D

555 FLIP FLOP



jessefarrell92@gmail.com

Sheet: /Flip Flop/
File: block_555flipflop.kicad_sch

Title: 555 Flip Flop

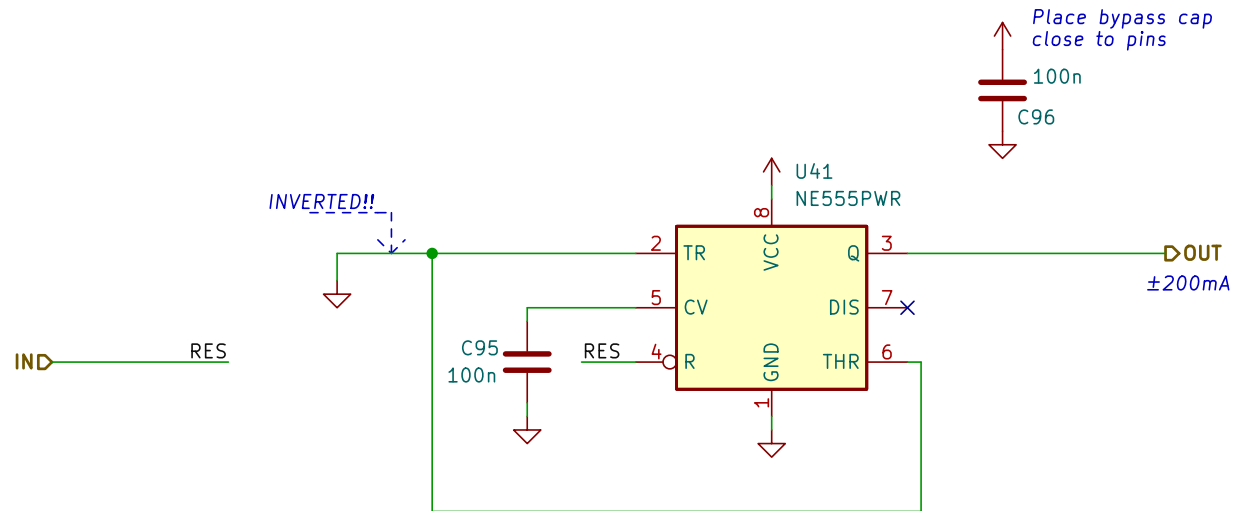
Size: A4 Date: 2022-05-14

KiCad E.D.A. kicad (6.0.5)

Rev: 1

Id: 29/39

555 Buffer



Basic Buffer, note there
is no hysteresis on reset...
threshold is about 0.6V

jessefarrell92@gmail.com

Sheet: /BUFFER4/

File: block_555Buffer.kicad_sch

Title: 555 BUFFER

Size: A5

Date: 2022-05-08

Rev: 0

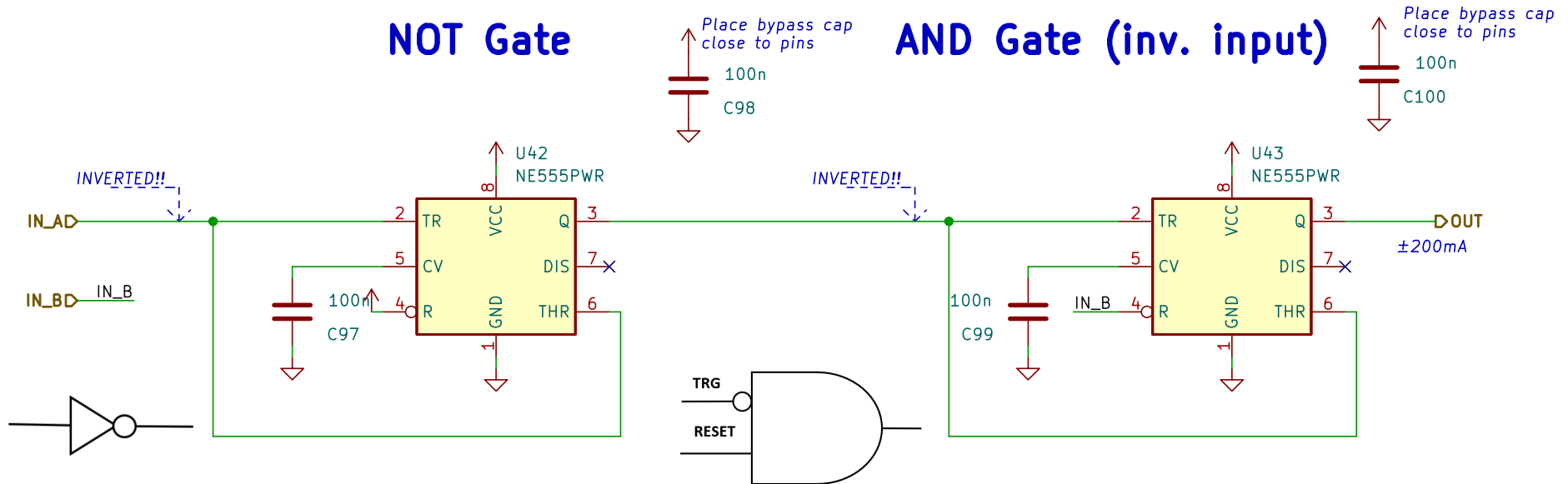
KiCad E.D.A. kicad (6.0.5)

Id: 30/39

AND Gate (non inverting inputs)

NOT Gate

AND Gate (inv. input)



jessefarrell92@gmail.com

Sheet: /AND4/

File: block_2x555and.kicad_sch

Title: AND Gate (2x 555)

Size: A5

Date: 2022-05-05

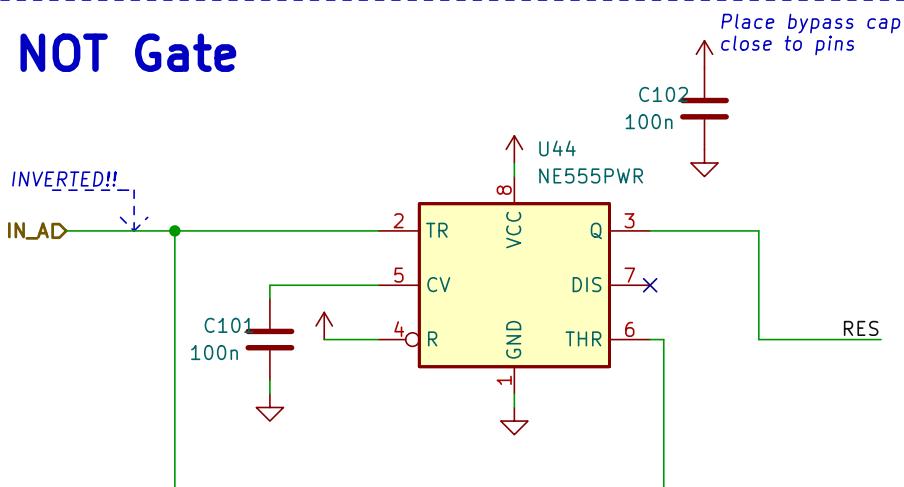
Rev: 0

KiCad E.D.A. kicad (6.0.5)

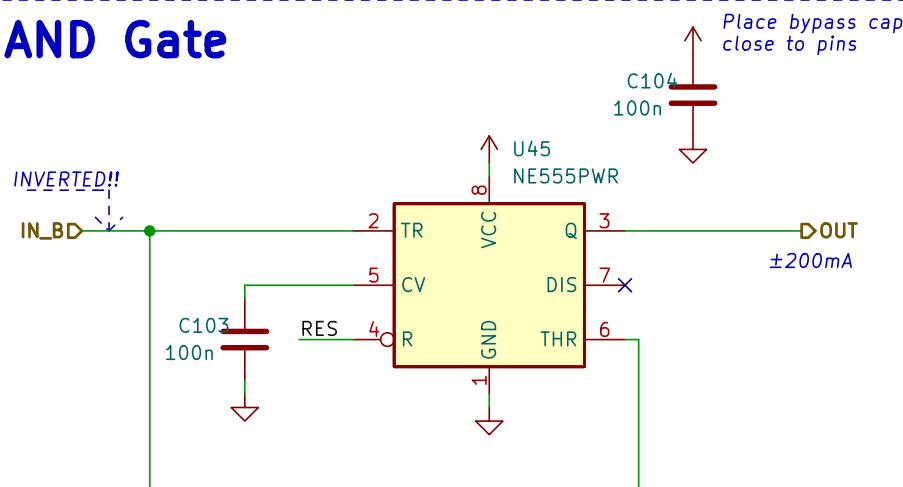
Id: 31/39

555 NOR Gate

NOT Gate

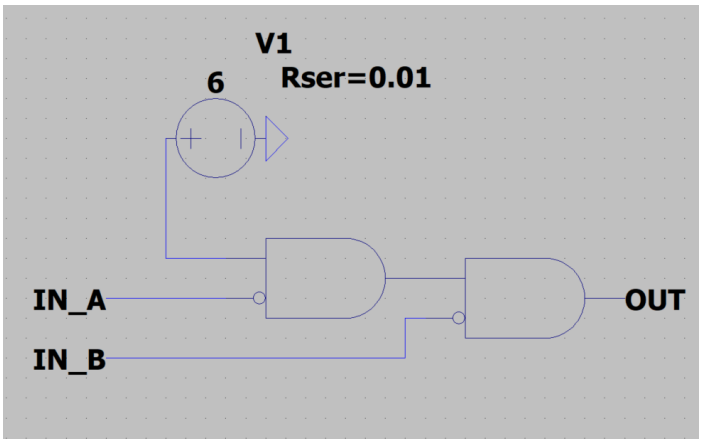


AND Gate



Truth Table

0	0	->	1
1	0	->	0
0	1	->	0
1	1	->	0



jessefarrell92@gmail.com

Sheet: /555_NOR/
File: block_555nor.kicad_sch

Title: 555 NOR Gate

Size: A5 Date: 2022-05-05

KiCad E.D.A. kicad (6.0.5)

Rev: o

Id: 32/39

1 2 3 4

A

555 Buffer

B

IND RES

INVERTED!!

U46 NE555PWR

Q OUT ±200mA

DIS

THR

TR

VCC

CV

R

RES

C105 100n

C106 100n

Place bypass cap close to pins

Basic Buffer, note there is no hysteresis on reset... threshold is about 0.6V

jessefarrell92@gmail.com

Sheet: /BUFFER/
File: block_555Buffer.kicad_sch

Title: 555 BUFFER

Size: A5	Date: 2022-05-08	Rev: 0
KiCad E.D.A. kicad (6.0.5)		Id: 32/39

C

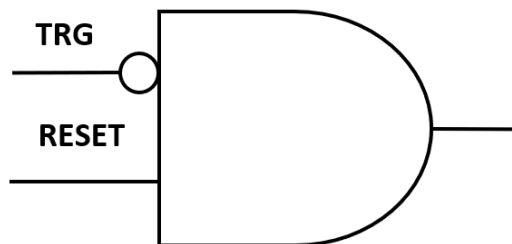
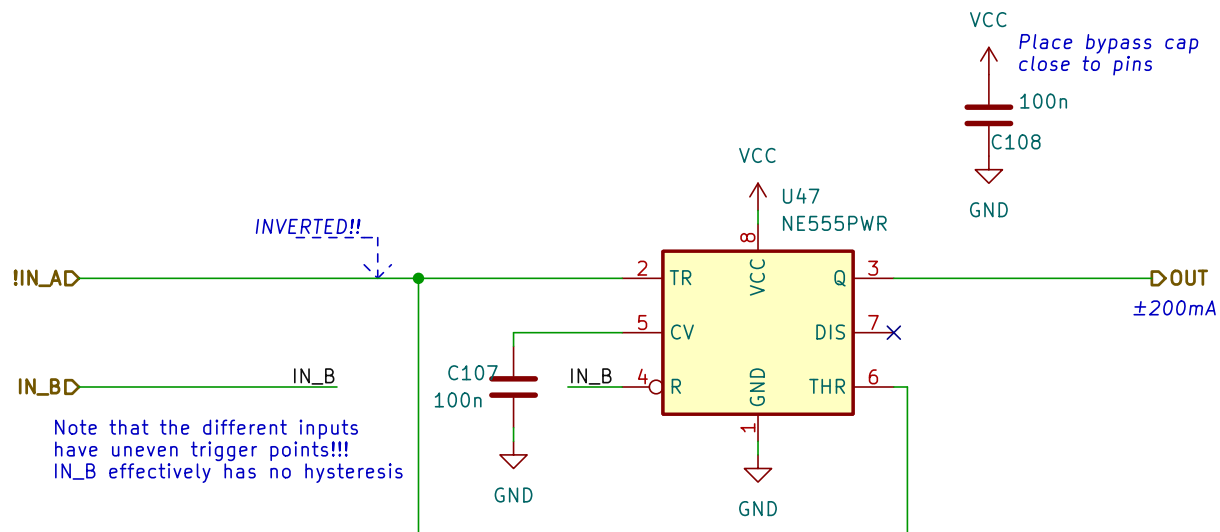
Sheet: /BUFFER/
File: block_555Buffer.kicad_sch

Size: A5

Rev: 0

Id: 32/39

555 AND Gate (inv. input)



jessefarrell92@gmail.com
AND gate based on a single 555, note inverting input

Sheet: /555_AND/
File: block_555AND.kicad_sch

Title: Single 555 AND Gate

Size: A5 Date: 2022-05-04

KiCad E.D.A. kicad (6.0.5)

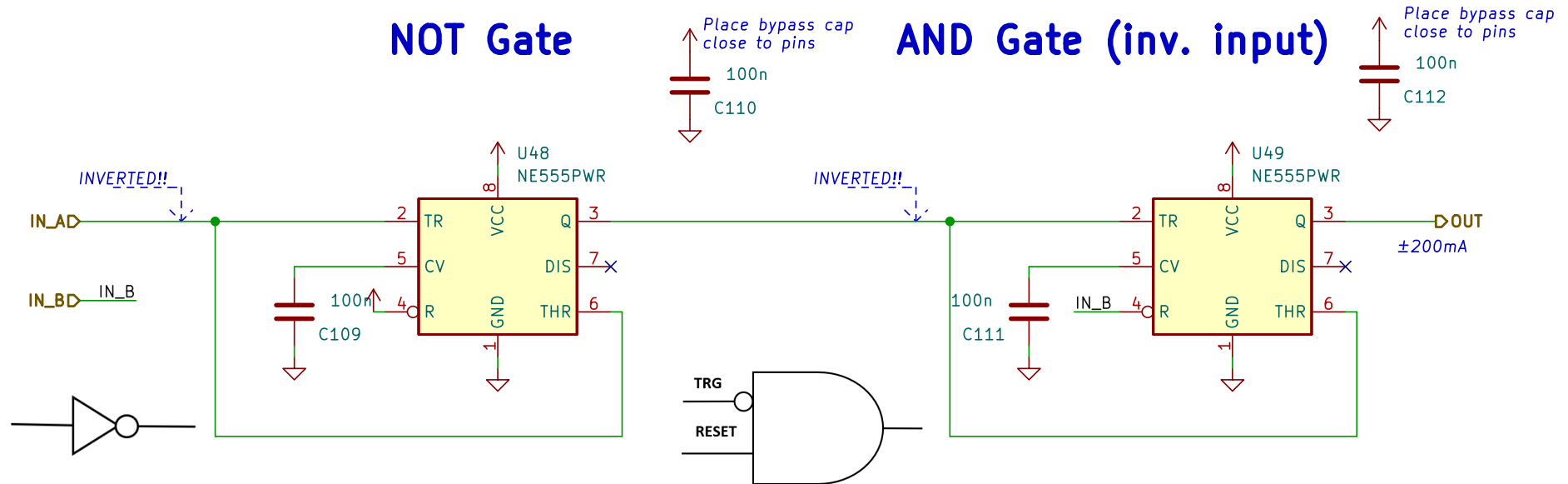
Rev: 0

Id: 33/39

AND Gate (non inverting inputs)

NOT Gate

AND Gate (inv. input)



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Sheet: /AND/

File: block_2x555and.kicad_sch

Title: AND Gate (2x 555)

Size: A5

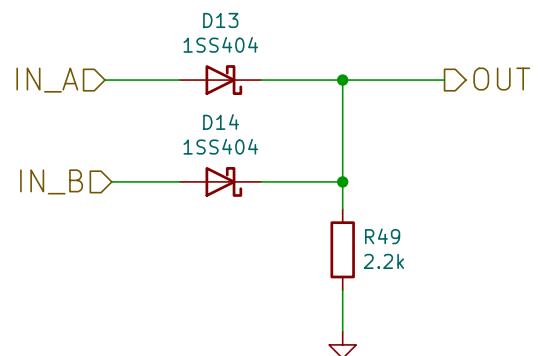
Date: 2022-05-05

Rev: 0

KiCad E.D.A. kicad (6.0.5)

Id: 34/39

Diode OR Gate



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Sheet: /OR/
File: block_2inOR.kicad_sch

Title: Diode 2in OR Gate

Size: A5 Date: 2022-05-05

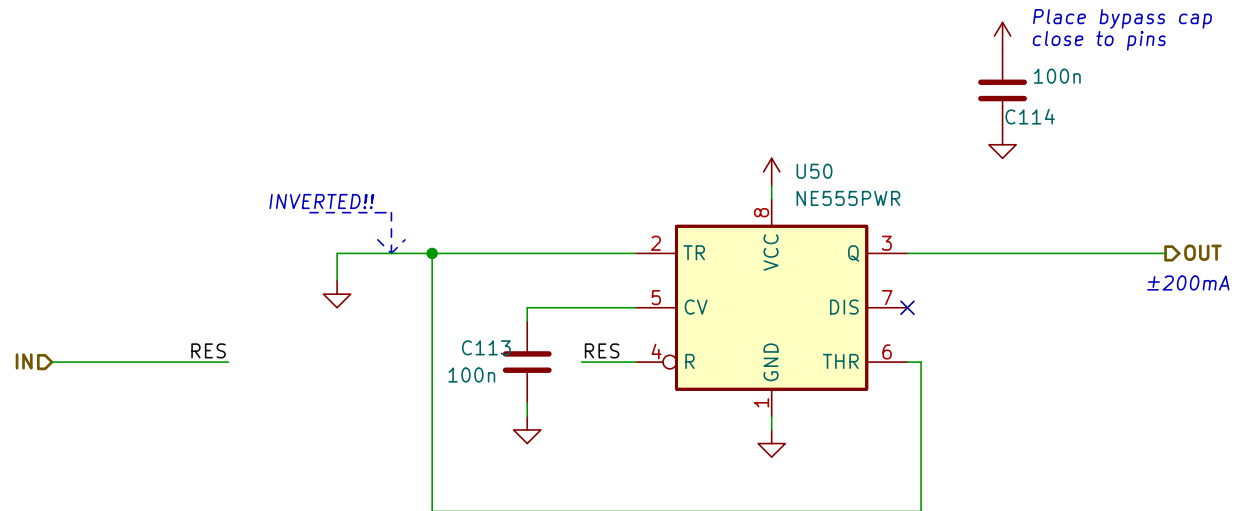
KiCad E.D.A. kicad (6.0.5)

Rev: 0

Id: 34/39

Very simple or gate
do not cascade these

555 Buffer



Basic Buffer, note there
is no hysteresis on reset...
threshold is about 0.6V

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Sheet: /BUFFER5/

File: block_555Buffer.kicad_sch

Title: 555 BUFFER

Size: A5

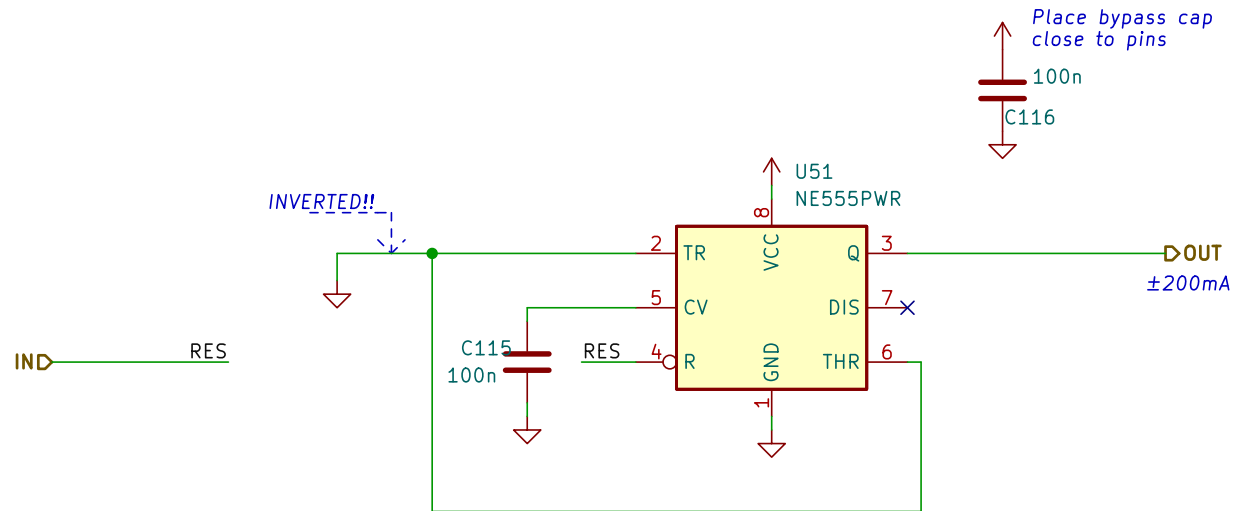
Date: 2022-05-08

Rev: 0

KiCad E.D.A. kicad (6.0.5)

Id: 35/39

555 Buffer



Basic Buffer, note there
is no hysteresis on reset...
threshold is about 0.6V

jessefarrell92@gmail.com

Sheet: /BUFFER6/

File: block_555Buffer.kicad_sch

Title: 555 BUFFER

Size: A5

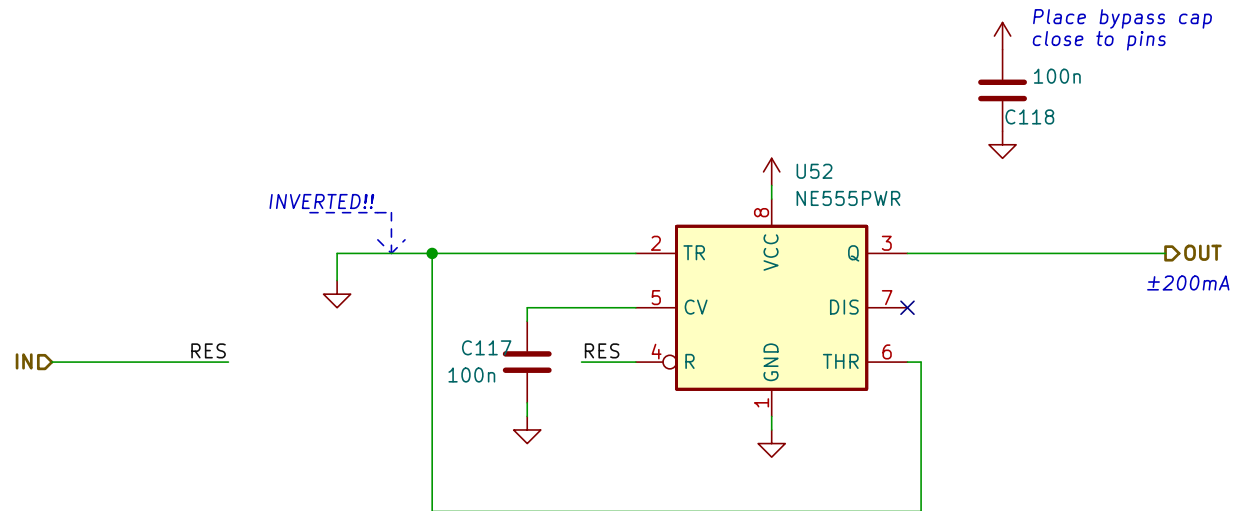
Date: 2022-05-08

Rev: 0

KiCad E.D.A. kicad (6.0.5)

Id: 36/39

555 Buffer



Basic Buffer, note there
is no hysteresis on reset...
threshold is about 0.6V

jessefarrell92@gmail.com

Sheet: /BUFFER7/

File: block_555Buffer.kicad_sch

Title: 555 BUFFER

Size: A5

Date: 2022-05-08

Rev: 0

KiCad E.D.A. kicad (6.0.5)

Id: 37/39