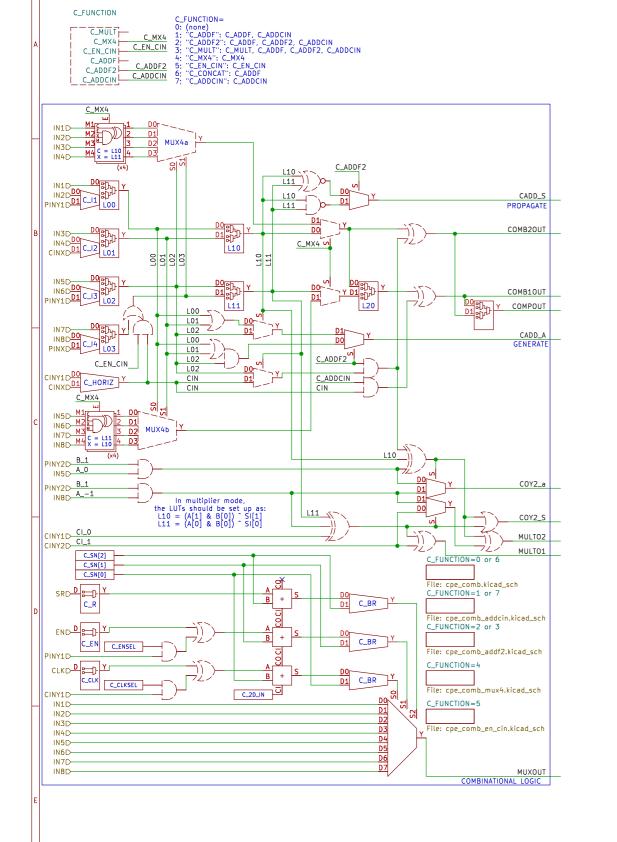
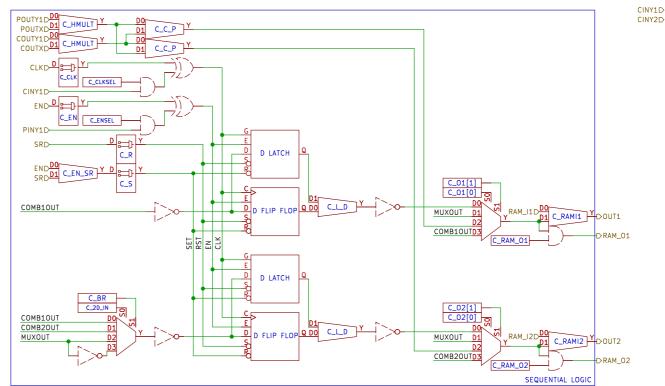
Cologne Processing Element File: cpe.kicad_sch YosysHQ
Sheet: /
File: prjpeppercorn.kicad_sch
Title: Size: A3 Date: KiCad E.D.A. 9.0.2





This diagram is intended to be functionally correct, but when given a choice between ease of understanding and physical accuracy, I always chose the former.

D0 C_Y12 Y

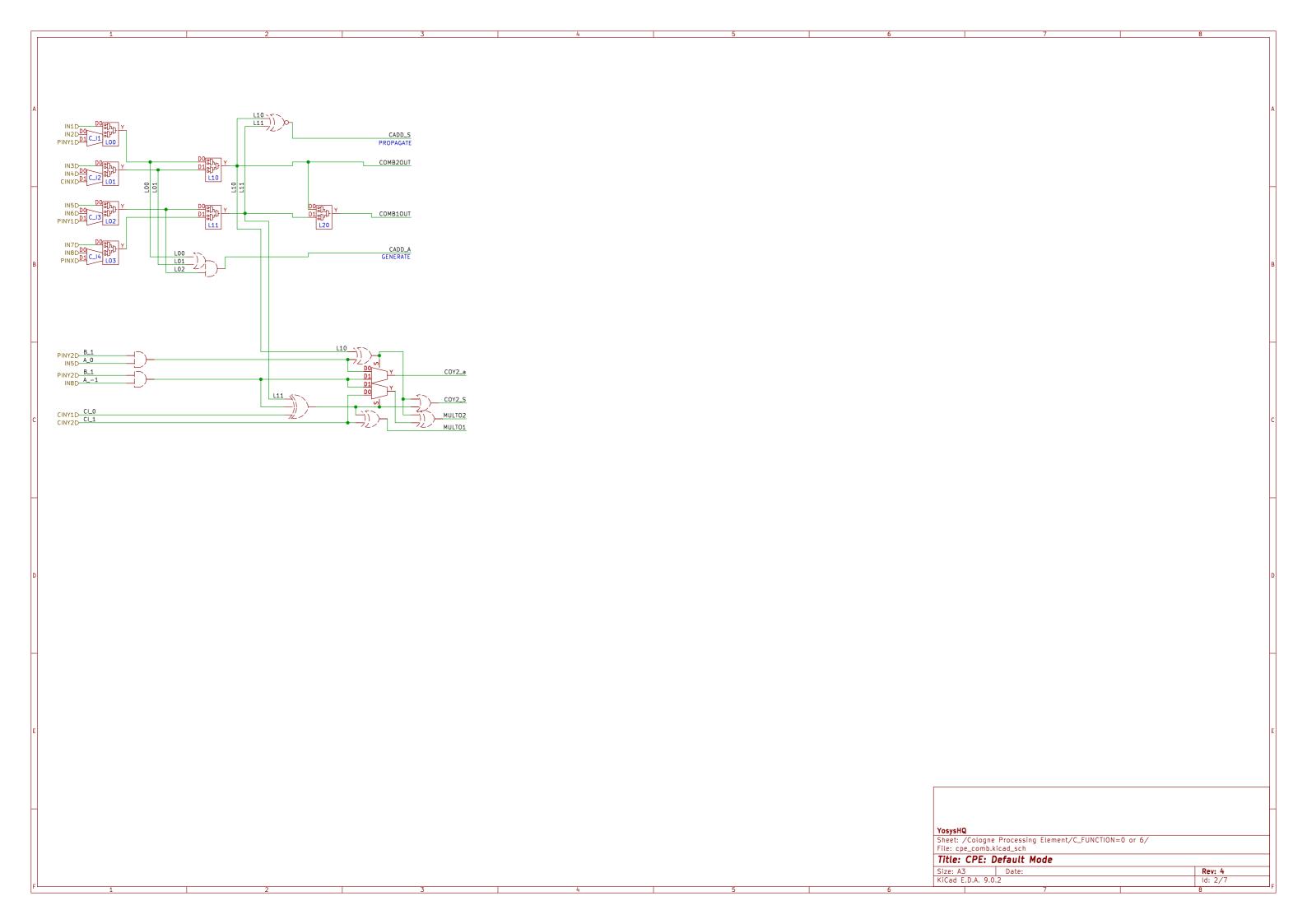
C_SELX

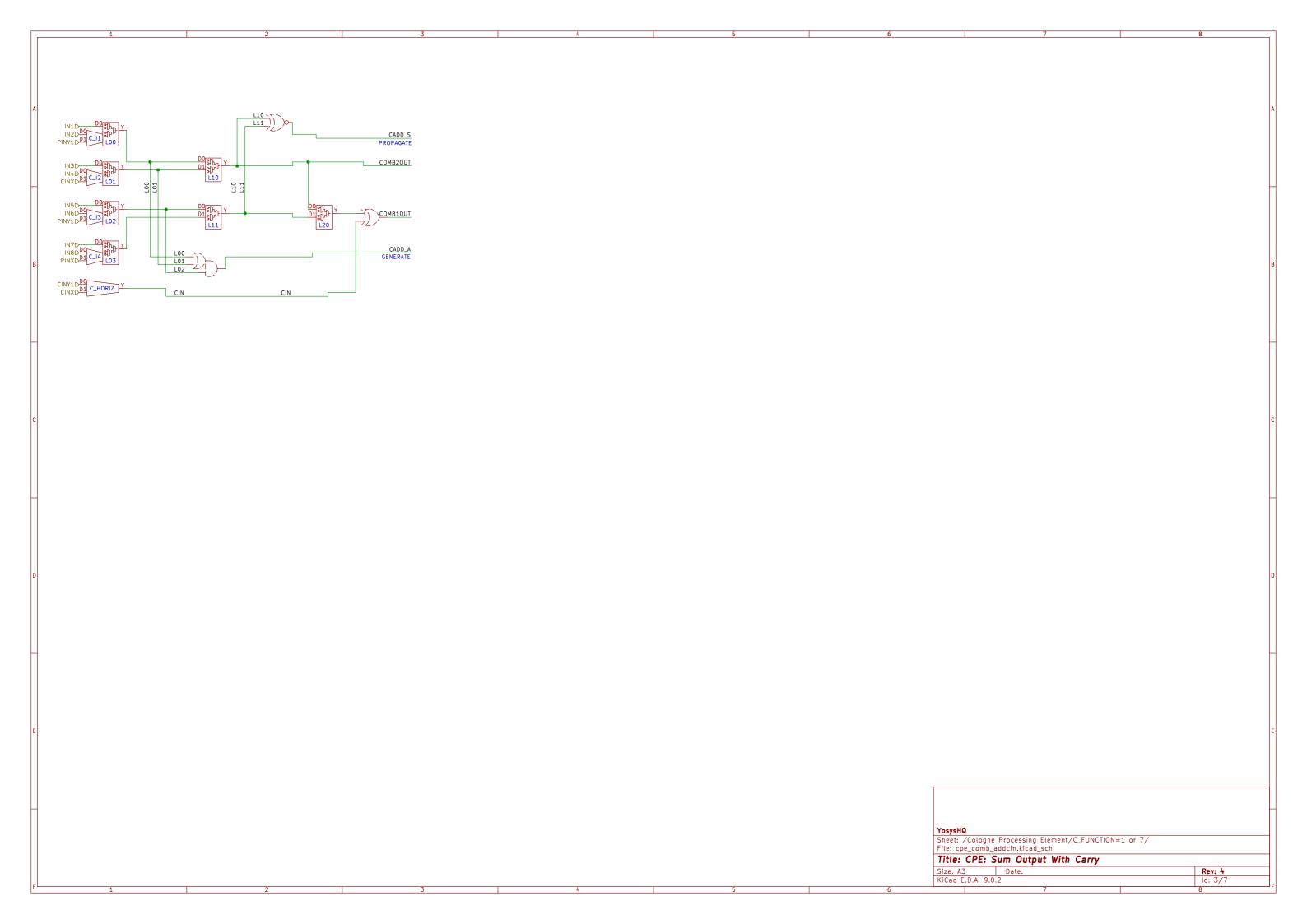
Dashed symbols represent where I'm describing something physically inaccurate. — Hannah Ravensloft

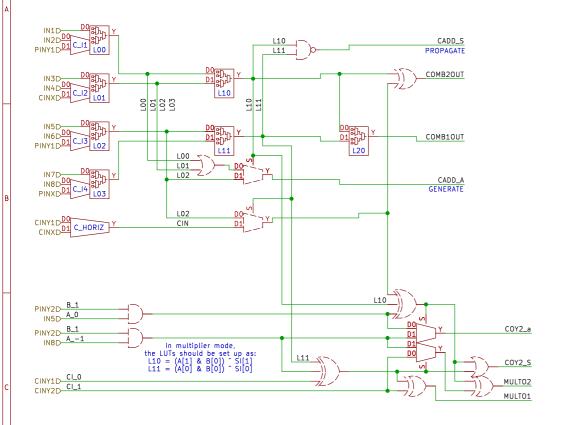
Sheet: /Cologne Processing Element/ File: cpe.kicad_sch

Title: Cologne Processing Element

Size: A3 Date: 2025-07-07
KiCad E.D.A. 9.0.2







 $C_FUNCTION = 2: ADDF2$

This provides a 2-bit full adder.

The addition is performed in propagate/generate style.

 $C_FUNCTION = 3: MULT$

This provides a 2x2-bit Booth multiplier.

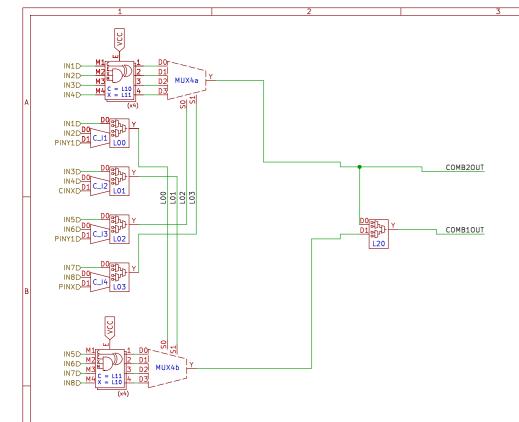
The dedicated logic performs multiplication by B[1], while multiplication by B[0] is performed within the soft logic.

(These functions differ by how they set up the downstream carry and propagation lines; from this part of the logic they function identically, thus have been grouped together)

YosysHQ
Sheet: /Cologne Processing Element/C_FUNCTION=2 or 3/
File: cpe_comb_addf2.kicad_sch

Title: CPE: 2-bit Adder/Multiplier Mode

Size: A3 Date: Rev: 4
KiCad E.D.A. 9.0.2 Id: 4/7



 $C_FUNCTION = 4: MUX4$

This provides a four-input multiplexer.

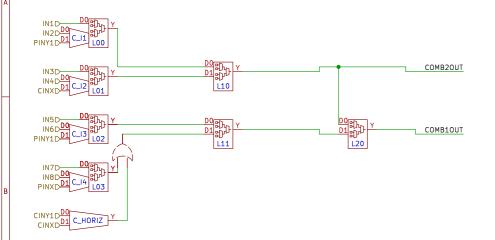
Input inversion is performed by setting the relevant config bit of the C input, while constant inputs are masked by clearing the relevant config bit of the X input.

YosysHQ
Sheet: /Cologne Processing Element/C_FUNCTION=4/
File: cpe_comb_mux4.kicad_sch

Title: CPE: 4—Input Multiplexer Mode

Size: A3 Date: Rev: 4

KiCad E.D.A. 9.0.2 Id: 5/7



$C_FUNCTION = 5: EN_CIN$

This is one of the more obscure CPE configurations.

The intended usecase of this is to source a signal from the carry lines to reduce routing delay.

YosysHQ
Sheet: /Cologne Processing Element/C_FUNCTION=5/
File: cpe_comb_en_cin.kicad_sch

Title: CPE: Sum Input With Carry

Size: A3 Date: Rev: 4

KiCad E.D.A. 9.0.2 Id: 6/7