

----- PROOF -----

Length of proof is 125. Level of proof is 38 .

2 []  $\overline{c1Uc2Uc3} \neq \overline{c3}$

3 []  $xUy = yUx$

4 []  $xU(yUz) = xUyUz$

6,5 [copy,4,flip.1]  $xUyUz = xU(yUz)$

7 []  $\overline{xUyUxUy} = x$

21 []  $c3Uc2 = c2$

25 [para\_from,3.1.1,2.1.1]  $\overline{c3Uc1Uc2} \neq \overline{c3}$

33,32 [para\_into,21.1.1,3.1.1]  $c2Uc3 = c2$

36,35 [para\_into,5.1.1.1,32.1.1,flip.1]  $c2U(c3Ux) = c2Ux$

39 [para\_into,5.1.1.1,3.1.1,demod,6]  $xU(yUz) = yU(xUz)$

41 [para\_into,5.1.1,3.1.1]  $xU(yUz) = yU(zUx)$

42 [copy,41,flip.1]  $xU(yUz) = zU(xUy)$

45,44 [para\_into,35.1.1.2,3.1.1]  $c2U(xUc3) = c2Ux$

46 [para\_into,35.1.1,3.1.1,demod,6]  $c3U(xUc2) = c2Ux$

53 [para\_from,44.1.1,5.1.1.1,demod,6,6,flip.1]  $c2U(xU(c3Uy)) = c2U(xUy)$

63 [para\_into,7.1.1.1.1,3.1.1]  $\overline{xUyUyUx} = y$

65 [para\_into,7.1.1.2.1,7.1.1]  $\overline{\overline{\overline{xUyU(xUy)}}}U\overline{x}=\overline{xUy}$   
 67 [para\_into,7.1.1.2.1,3.1.1]  $\overline{\overline{\overline{xUyUyU\overline{x}}}}=x$   
 69 [para\_into,7.1.1,3.1.1]  $\overline{\overline{\overline{xUyU\overline{xUy}}}}=x$   
 71 [para\_from,7.1.1,5.1.1.1,flip.1]  $\overline{\overline{\overline{xUyU(\overline{xUyUz})}}}=xUz$   
 136 [para\_into,39.1.1,3.1.1,demod,6]  $xU(yUz)=xU(zUy)$   
 145 [para\_into,41.1.1.2,3.1.1]  $xU(yUz)=zU(yUx)$   
 233 [para\_into,145.1.1.2,136.1.1,demod,6]  $xU(yU(zUu))=uU(zU(yUx))$   
 241 [para\_from,145.1.1,42.1.1.2,demod,6]  $xU(yU(zUu))=zU(yU(xUu))$   
 488 [para\_into,63.1.1.2.1,3.1.1]  $\overline{\overline{\overline{xUyU\overline{xUy}}}}=y$   
 490 [para\_into,63.1.1,3.1.1]  $\overline{\overline{\overline{xUyUyU\overline{x}}}}=x$   
 499 [para\_from,63.1.1,42.1.1.2,flip.1]  $\overline{\overline{\overline{xUyU(zUyU\overline{x})}}}=zUx$   
 523 [para\_into,67.1.1.1.1,41.1.1]  $\overline{\overline{\overline{xU(yU\overline{z})U\overline{xUyU\overline{z}}}}}=z$   
 526,525 [para\_into,67.1.1.1.1,39.1.1]  $\overline{\overline{\overline{xU(\overline{yUz})U\overline{xUzU\overline{y}}}}}=y$   
 535 [para\_into,67.1.1,3.1.1]  $\overline{\overline{\overline{xUyUyUx}}}=y$   
 549,548 [para\_from,67.1.1,42.1.1.2,flip.1]  $\overline{\overline{\overline{xUyU(zU\overline{yUx})}}}=zUy$   
 588 [para\_from,69.1.1,63.1.1.2.1,demod,6]  $\overline{\overline{\overline{xU(yU\overline{xU\overline{y}})}U\overline{x}}}=xU\overline{y}$   
 1072,1071 [para\_into,488.1.1.2.1,488.1.1,demod,6]  $xU(\overline{yU\overline{xU\overline{y}}})U\overline{y}=\overline{xUy}$   
 1079 [para\_into,488.1.1,3.1.1]  $\overline{\overline{\overline{xU\overline{yUxU\overline{y}}}}}=y$   
 1198,1197 [para\_into,65.1.1.1.1,39.1.1]  $\overline{\overline{\overline{xU(\overline{xUyU\overline{y}})}U\overline{x}}}=xUy$

1393 [para\_into,71.1.1.2,535.1.1]  $\overline{\overline{x}}UyUy = xU\overline{\overline{y}}Ux$   
 1394 [para\_into,71.1.1.2,490.1.1]  $\overline{\overline{x}}UyUx = xUyU\overline{\overline{x}}$   
 1396,1395 [para\_into,71.1.1.2,488.1.1,flip.1]  $xU\overline{\overline{x}}U\overline{\overline{y}} = \overline{\overline{x}}UyUy$   
 1409 [para\_into,71.1.1.2,7.1.1,flip.1]  $xU\overline{\overline{x}}U\overline{\overline{y}} = \overline{\overline{x}}UyUx$   
 1411 [copy,1393,flip.1]  $xU\overline{\overline{y}}Ux = \overline{\overline{x}}UyUy$   
 1412 [copy,1394,flip.1]  $xUyU\overline{\overline{x}} = \overline{\overline{x}}UyUx$   
 1649 [para\_from,1079.1.1,71.1.1.2]  $\overline{\overline{x}}UyUy = xUxU\overline{\overline{y}}$   
 1672 [copy,1649,flip.1]  $xUxU\overline{\overline{y}} = \overline{\overline{x}}UyUy$   
 4268 [para\_into,1393.1.1.1.1,3.1.1]  $\overline{\overline{x}}U\overline{\overline{y}}Ux = yU\overline{\overline{x}}Uy$   
 4270 [copy,4268,flip.1]  $xU\overline{\overline{y}}Ux = yU\overline{\overline{x}}Uy$   
 4281 [para\_into,1411.1.1,3.1.1]  $\overline{\overline{x}}UyUy = \overline{\overline{y}}UxUx$   
 4288 [para\_into,1649.1.1.1.1,3.1.1]  $\overline{\overline{x}}U\overline{\overline{y}}Ux = yUyU\overline{\overline{x}}$   
 4290 [para\_into,1649.1.1,3.1.1]  $\overline{\overline{x}}U\overline{\overline{y}}Ux = yUyU\overline{\overline{x}}$   
 4291 [copy,4288,flip.1]  $xUxU\overline{\overline{y}} = yU\overline{\overline{x}}Uy$   
 4293 [copy,4290,flip.1]  $xUxU\overline{\overline{y}} = yU\overline{\overline{x}}Uy$   
 4309 [para\_into,1672.1.1,3.1.1]  $\overline{\overline{x}}U\overline{\overline{y}}Ux = \overline{\overline{x}}UyUy$   
 4310 [copy,4309,flip.1]  $\overline{\overline{x}}UyUy = xU\overline{\overline{y}}Ux$   
 4438 [para\_into,4270.1.1,1411.1.1]  $\overline{\overline{x}}UyUy = yU\overline{\overline{x}}Uy$   
 4451 [para\_into,4281.1.1,1649.1.1]  $xUxU\overline{\overline{y}} = \overline{\overline{y}}UxUx$

4453 [para\_into,4288.1.1,3.1.1]  $\overline{x \cup x \cup y} = \overline{y \cup y \cup x}$   
 4462 [para\_into,4291.1.1,3.1.1]  $\overline{x \cup y \cup x} = \overline{y \cup x \cup y}$   
 5406,5405 [para\_into,588.1.1.1.1.2,1409.1.1,demod,1198,flip.1]  $\overline{\overline{x \cup x}} = \overline{\overline{x \cup x}}$   
 5416 [para\_from,5405.1.1,42.1.1.2]  $x \cup (\overline{y \cup y}) = \overline{\overline{y \cup (x \cup \overline{y})}}$   
 5419 [para\_from,5405.1.1,5.1.1.1,demod,6,flip.1]  $\overline{\overline{x \cup (\overline{x \cup y})}} = \overline{\overline{x \cup (x \cup y)}}$   
 5623,5622 [para\_into,5416.1.1,145.1.1,flip.1]  $\overline{\overline{x \cup (y \cup \overline{x})}} = \overline{\overline{x \cup (\overline{x \cup y})}}$   
 5624 [para\_from,5419.1.1,588.1.1.1.1,demod,1396,5623,1072,flip.1]  $\overline{\overline{\overline{x \cup x}}} = \overline{\overline{\overline{x \cup x}}}$   
 5631,5630 [para\_from,5624.1.1,499.1.1.2.2.1,demod,5406,549,flip.1]  $x \cup \overline{\overline{y}} = x \cup y$   
 5633,5632 [para\_from,5624.1.1,523.1.1.1.1.2,demod,5631,5631,5631,526,flip.1]  $\overline{\overline{x}} = x$   
 5669,5668 [para\_from,5624.1.1,4281.1.1.1.1,demod,5633,5633,5633,5633]  $\overline{\overline{x \cup x \cup x}} = \overline{\overline{x \cup x \cup x}}$   
 5690,5689 [para\_from,5632.1.1,4290.1.1.2.1.1,flip.1]  $\overline{\overline{x \cup \overline{x \cup y}}} = \overline{\overline{y \cup \overline{x \cup y}}}$   
 5700 [para\_from,5632.1.1,535.1.1.2.1.1,demod,5633]  $\overline{\overline{x \cup y \cup y \cup x}} = \overline{\overline{y}}$   
 5718 [para\_from,5632.1.1,63.1.1.2.1.1,demod,5633]  $\overline{\overline{x \cup y \cup y \cup \overline{x}}} = \overline{\overline{y}}$   
 5727 [para\_from,5632.1.1,4453.1.1.2.1.2,demod,5690]  $x \cup \overline{x \cup y} = x \cup y \cup \overline{x}$   
 5728 [para\_from,5632.1.1,4451.1.1.2.1.2,demod,5633]  $x \cup \overline{x \cup y} = \overline{y \cup x \cup x}$   
 5738 [para\_from,5632.1.1,1079.1.1.2.1.2,demod,5633]  $\overline{\overline{x \cup y \cup x \cup y}} = \overline{\overline{y}}$   
 5744 [para\_from,5632.1.1,488.1.1.1.1.2,demod,5633]  $\overline{\overline{x \cup y \cup \overline{x \cup y}}} = \overline{\overline{y}}$   
 5791 [para\_from,5632.1.1,1412.1.1.2.1.2,demod,5633]  $\overline{\overline{x \cup y \cup x}} = \overline{\overline{x \cup y \cup \overline{x}}}$   
 5797,5796 [para\_from,5632.1.1,490.1.1.2.1.2,demod,5633]  $\overline{\overline{x \cup y \cup y \cup x}} = \overline{\overline{x}}$

5808 [para\_from,5632.1.1,67.1.1.2.1.2,demod,5633]  $\overline{xUyUyUx}=\overline{x}$   
 5822 [para\_from,5632.1.1,69.1.1.1.1.1,demod,5633]  $\overline{xUyUxUy}=\overline{x}$   
 5825,5824 [para\_from,5632.1.1,7.1.1.2.1.1,demod,5633]  $\overline{xUyUxUy}=\overline{x}$   
 5836 [para\_from,5632.1.1,4438.1.1.1.1.1,demod,5633]  $\overline{xUyUy}=\overline{yUxUy}$   
 5940 [para\_into,5700.1.1.2.1,32.1.1]  $\overline{\overline{c3Uc2Uc2}}=\overline{c2}$   
 5942 [para\_into,5700.1.1.2.1,21.1.1]  $\overline{c2Uc3Uc2}=\overline{c3}$   
 5949 [para\_into,5940.1.1.1.1,3.1.1]  $\overline{c2Uc3Uc2}=\overline{c2}$   
 5961 [para\_from,5940.1.1,5700.1.1.2.1,demod,5633,5633,5633]  $\overline{\overline{\overline{c2Uc3Uc2Uc2}}}=\overline{\overline{c3Uc2}}$   
 5970,5969 [para\_from,5940.1.1,4293.1.1.2.1,demod,5633,5633,6,flip.1]  $\overline{c2Uc3U(c2Uc2)}=\overline{\overline{c3Uc2Uc2}}$   
 5973 [para\_from,5940.1.1,1649.1.1.1.1,demod,5633,5633,6,6,5970,flip.1]  $\overline{c3U(c3Uc2Uc2)}=\overline{c2Uc2}$   
 5979 [para\_from,5940.1.1,39.1.1.2,flip.1]  $\overline{\overline{c3Uc2U(xUc2)}}=\overline{xUc2}$   
 5987,5986 [para\_into,5942.1.1.1.1,3.1.1]  $\overline{c3Uc2Uc2}=\overline{c3}$   
 6030 [para\_into,5949.1.1,3.1.1]  $\overline{c2Uc2Uc3}=\overline{c2}$   
 6046 [para\_from,5949.1.1,5700.1.1.1.1,demod,5633,5633]  $\overline{c2Uc2U(c2Uc3)}=\overline{c2}$   
 6074,6073 [para\_from,5986.1.1,4462.1.1.1.1,demod,5633,5633,36]  $\overline{c3Uc3Uc2}=\overline{c2Uc2Uc2}$   
 6170 [para\_into,6046.1.1,3.1.1]  $\overline{c2U(c2Uc3)Uc2}=\overline{c2}$   
 6353 [para\_into,5727.1.1.2.1,46.1.1,demod,6,33]  $\overline{c3Uc2Ux}=\overline{c3UxUc2}$   
 6354 [copy,6353,flip.1]  $\overline{c3UxUc2}=\overline{c3Uc2Ux}$   
 6355 [para\_into,5728.1.1.2.1,46.1.1,demod,6,33]  $\overline{c3Uc2Ux}=\overline{xUc2Uc3}$

6356 [copy,6355,flip.1]  $\overline{xUc2Uc3} = c3Uc2Ux$

6413 [para\_into,5796.1.1.2.1,6030.1.1,demod,5633,5633,5633]  $\overline{c2Uc3Uc2Uc2} = c2Uc3$

6437 [para\_from,5822.1.1,5738.1.1.1.1,demod,5633,6,5633]  $xUxU(\overline{yUxUy}) = xUy$

6458,6457 [para\_from,6354.1.1,5718.1.1.2.1,demod,6,33]  $\overline{xUc2Uc3Uc2Ux} = \overline{c3}$

6463 [para\_from,6356.1.1,5727.1.1.2.1,demod,6458,flip.1]  $\overline{\overline{xUc2Uc3UxUc2}} = \overline{c3}$

6518,6517 [para\_into,5961.1.1.1.1,4290.1.1,demod,6074]  $c2Uc2Uc2Uc2 = \overline{c3}Uc2$

6531 [para\_into,5973.1.1,145.1.1]  $c2U(\overline{c3Uc2Uc3}) = c2Uc2$

6552,6551 [para\_into,5979.1.1.2,5986.1.1,demod,5987]  $\overline{c3Uc2Uc3} = \overline{c3}$

6554,6553 [back\_demod,6531,demod,6552]  $c2Uc3 = c2Uc2$

6556,6555 [back\_demod,6413,demod,6554,6518,6554]  $\overline{c3}Uc2 = c2Uc2$

6563 [back\_demod,6170,demod,6554]  $\overline{c2}U(c2Uc2)Uc2 = c2$

6582,6581 [back\_demod,6030,demod,6554]  $\overline{c2}Uc2Uc2 = \overline{c2}$

6584,6583 [back\_demod,5949,demod,6554]  $c2Uc2Uc2 = \overline{c2}$

6585 [back\_demod,6551,demod,6556]  $c2Uc2Uc3 = \overline{c3}$

6626 [para\_into,6585.1.1.1.1,3.1.1]  $\overline{c2}Uc2Uc3 = \overline{c3}$

6630 [para\_from,6585.1.1,4290.1.1.2.1,demod,5633,5633,6,45,6,6582]  $\overline{c3}Uc3 = c2Uc2$

6662 [para\_from,6630.1.1,44.1.1.2,demod,6554]  $c2U(c2Uc2) = c2Uc2$

6703 [para\_from,6626.1.1,5738.1.1.1.1,demod,5633,6,6554,5633]  $c3Uc2U(c2Uc2) = c3$

6721,6720 [para\_into,6662.1.1.2,3.1.1]  $c2U(\overline{c2}Uc2) = c2Uc2$

6760,6759 [para\_from,6563.1.1,5744.1.1.2.1,demod,6,6,6721]  $\overline{\overline{c^2}U(c^2Uc^2)}Uc^2=\overline{c^2}$

6764,6763 [para\_from,6563.1.1,5824.1.1.1.1,demod,6760,5633,5633,flip.1]  $\overline{c^2}U(c^2Uc^2)=\overline{c^2}Uc^2$

6771 [back\_demod,6703,demod,6764]  $c^3U\overline{c^2}Uc^2=c^3$

6798 [para\_from,6771.1.1,53.1.1.2.2,demod,45,flip.1]  $c^2U(xU\overline{c^2}Uc^2)=c^2Ux$

7342,7341 [para\_from,6798.1.1,5796.1.1.2.1,demod,6,5669,6584,5797,flip.1]  $xU\overline{\overline{c^2}Uc^2}=\overline{x}$

7389,7388 [para\_into,7341.1.1.1,5836.1.1,demod,7342,5633,7342,5633]  $\overline{c^2}Uc^2Ux=x$

7406 [para\_from,7341.1.1,5808.1.1.2,demod,7389,5633,5633]  $\overline{x}Ux=\overline{c^2}Uc^2$

7410,7409 [para\_from,7341.1.1,4270.1.1.2,demod,5633,7389,5633,flip.1]  $xU(\overline{c^2}Uc^2)Ux=x$

7427,7426 [para\_from,7341.1.1,4310.1.1.1,demod,5633,5633,7410]  $xU\overline{c^2}Uc^2=x$

7526 [para\_from,7406.1.1,5808.1.1.2.1,demod,7427]  $\overline{x}Ux=\overline{x}$

7599,7598 [para\_from,7526.1.1,5632.1.1.1,demod,5633,flip.1]  $xUx=x$

7647,7646 [para\_into,7598.1.1,241.1.1,demod,6,6,7599]  $xU(yU(yU(xUz)))=yU(xUz)$

7649,7648 [para\_into,7598.1.1,233.1.1,demod,7647]  $xU(yU(zUx))=yU(zUx)$

7653 [para\_into,7598.1.1,145.1.1,demod,7649]  $xU(xUy)=xUy$

7809,7808 [para\_into,7653.1.1.2,5824.1.1,demod,5825]  $\overline{x}UyU\overline{x}=\overline{x}$

7811,7810 [para\_into,7653.1.1.2,5791.1.1,demod,7809,7599,flip.1]  $\overline{x}Uy\overline{Ux}=\overline{x}$

7818,7817 [back\_demod,6437,demod,7811]  $xUxU\overline{y}=xUy$

7822,7821 [back\_demod,5689,demod,7818,flip.1]  $xUy\overline{Ux}=\overline{y}Ux$

7842 [back\_demod,6463,demod,7822]  $\overline{c^3}UxUc^2=\overline{c^3}$

7844 [binary,7842.1,25.1] *F*  
----- end of proof -----

Search stopped by max\_proofs option .

===== end of search =====

----- statistics -----

clauses given 1687  
clauses generated 945375  
clauses kept 6220  
clauses forward subsumed 110730  
clauses back subsumed 328  
Kbytes malloced 5875

----- times ( seconds ) -----

user CPU time 33.92 ( 0 hr,0 min,33 sec )  
system CPU time 0.0 ( 0 hr,0 min,0 sec )  
wall - clock time 34 ( 0 hr,0 min,34 sec )