X = 0.0111 0011 1001 (1849/4096)

S = 0.1010 1100 0000 (2752/4096)

	X	0000.0111 0011 1001		$S_0 = $ 0001.0000 0000 0000
	$WS_0 = 2(X-1)$	1110.1110 0111 0010		$SM_0 = $ 0000.0000 0000 0000
	WC_0	0000.0000 0000 0000		$K_0 = $ 0001.0000 0000 0000
				$C_0 = $ 1111.0000 0000 0000

Step 1:	WS_0	1110.1110 0111 0010		
	WC_0	0000.0000 0000 0000		$(W_{msbs} = 1110$ so $s_1 = -1)$
	$F_1 = 2S_0 - K_1$	0001.1000 0000 0000		$S_1 = $ 0000.1000 0000 0000
				$SM_1 = $ 0000.0000 0000 0000
	sum	1111.0110 0111 0010	$\ll 1$	$K_1 = $ 0000.1000 0000 0000
	$carry$	0001.0000 0000 0000	$\ll 1$	$C_1 = $ 1111.1000 0000 0000

Step 2:	WS_1	1110.1100 1110 0100		
	WC_1	0010.0000 0000 0000		$(W_{msbs} = 0000$ so $s_2 = 1)$
	$F_2 = -2S_1 - K_2$	1110.1100 0000 0000		$S_2 = $ 0000.1100 0000 0000
				$SM_2 = $ 0000.1000 0000 0000
	sum	0010.0000 1110 0100	$\ll 1$	$K_2 = $ 0000.0100 0000 0000
	$carry$	1101.1000 0000 0000	$\ll 1$	$C_2 = $ 1111.1100 0000 0000

Step 3:	WS_2	0100.0001 1100 1000		
	WC_2	1011.0000 0000 0000		$(W_{msbs} = 1111$ so $s_3 = 0)$
	$F_3 = 0$	0000.0000 0000 0000		$S_3 = $ 0000.1100 0000 0000
				$SM_3 = $ 0000.1010 0000 0000
	sum	1111.0001 1100 1000	$\ll 1$	$K_3 = $ 0000.0010 0000 0000
	$carry$	0000.0000 0000 0000	$\ll 1$	$C_3 = $ 1111.1110 0000 0000

Step 4:	WS_3	1110.0011 1001 0000		
	WC_3	0000.0000 0000 0000		$(W_{msbs} = 1110$ so $s_4 = -1)$
	$F_4 = 2S_3 - K_4$	0001.0111 0000 0000		$S_4 = $ 0000.1011 0000 0000
				$SM_4 = $ 0000.1010 0000 0000
	sum	1111.0100 1001 0000	$\ll 1$	$K_4 = $ 0000.0001 0000 0000
	$carry$	0000.0110 0000 0000	$\ll 1$	$C_4 = $ 1111.1111 0000 0000

Step 5:	WS_4	1110.1001 0010 0000		
	WC_4	0000.1100 0000 0000		$(W_{msbs} = 1110$ so $s_5 = -1)$
	$F_5 = 2S_4 - K_5$	0001.0101 1000 0000		$S_5 = $ 0000.1010 1000 0000
				$SM_5 = $ 0000.1010 0000 0000
	sum	1111.0000 1010 0000	$\ll 1$	$K_5 = $ 0000.0000 1000 0000
	$carry$	0001.1010 0000 0000	$\ll 1$	$C_5 = $ 1111.1111 1000 0000

Step 6:	WS_5	1110.0001 0100 0000		
	WC_5	0011.0100 0000 0000		$(W_{msbs} = 0001$ so $s_6 = 1)$
	$F_6 = -2S_5 - K_6$	1110.1010 1100 0000		$S_6 = $ 0000.1010 1100 0000
				$SM_6 = $ 0000.1010 1000 0000
	sum	0011.1111 1000 0000	$\ll 1$	$K_6 = $ 0000.0000 0100 0000
	$carry$	1100.0000 1000 0000	$\ll 1$	$C_6 = $ 1111.1111 1100 0000
				$sum + carry = 0$, terminate

| Terminate | Square Root | 0.101011 |

- -

Step 6: WS 0111.1111 0000 00
         WC 1000.0001 0000 00 $(W_{msbs} = 1111$ so $s_6 = 0)$
          F 0000.0000 0000 00 $S_6 = \mathbf{1.0101\ 10}00\ 00$
                                     $SM_6 = \mathbf{1.0101\ 01}00\ 00$
         _____
         $\overline{WS}$ 1111.1110 0000 00 $\ll 1$
         WC 0000.0010 0000 00 $\ll 1$
- -

Step 7: WS 1111.1100 0000 00
         WC 0000.0100 0000 00 $(W_{msbs} = 1111$ so $s_7 = 0)$
          F 0000.0000 0000 00 $S_7 = \mathbf{1.0101\ 100}0\ 00$
                                     $SM_7 = \mathbf{1.0101\ 011}0\ 00$
         _____
         $\overline{WS}$ 1111.1000 0000 00 $\ll 1$
         WC 0000.1000 0000 00 $\ll 1$
- -

Step 8: WS 1111.0000 0000 00
         WC 0001.0000 0000 00 $(W_{msbs} = 0000$ so $s_8 = 1)$
          F 1110.1010 0111 10 $S_8 = \mathbf{1.0101\ 1001}\ 00$
                                     $SM_8 = \mathbf{1.0101\ 1000}\ 00$
         _____
         $\overline{WS}$ 0000.1010 0111 10 $\ll 1$
         WC 1110.0000 0000 00 $\ll 1$
- -

Step 9: WS 0001.0100 1111 00
         WC 1100.0000 0000 00 $(W_{msbs} = 1101$ so $s_9 = -1)$
          F 0001.0101 1000 11 $S_9 = \mathbf{1.0101\ 1000}\ 10$
                                     $SM_9 = \mathbf{1.0101\ 1000\ 0}0$
         _____
         $\overline{WS}$ 1100.0001 0111 11 $\ll 1$
         WC 0010.1001 0000 00 $\ll 1$
- -

Step 10: WS 1000.0010 1111 10
          WC 0101.0010 0000 00 $(W_{msbs} = 1101$ so $s_{10} = -1)$
           F 0001.0101 1000 01 $S_{10} = \mathbf{1.0101\ 1000\ 01}$
                                      $SM_{10} = \mathbf{1.0101\ 1000\ 00}$
          _____
          $\overline{WS}$ 1100.0001 0111 11 $\ll 1$
          WC 0010.0101 0000 00 $\ll 1$
- -

Step 11: WS 1000.0010 1111 10
          WC 0100.1010 0000 00 $(W_{msbs} = 1101$ so $s_{11} = -1)$
           F 0001.0101 1000 00 $S_{11} = \mathbf{1.0101\ 1000\ 00}$
                                      $SM_{11} = \mathbf{1.0101\ 1000\ 00}$
          _____
          $\overline{WS}$ 1101.1101 0111 10 $\ll 1$
          WC 0000.0101 0000 00 $\ll 1$
- -

Step 12: WS 1101.1000 0111 10
          WC 0000.1010 0000 00 $(W_{msbs} = 1101$ so $s_{12} = -1)$
           F 0001.0101 1000 00 $S_{12} = \mathbf{1.0101\ 1000\ 00}$
                                      $SM_{12} = \mathbf{1.0101\ 1000\ 00}$
          _____
          $\overline{WS}$ 1100.0111 1111 10 $\ll 1$
          WC 0011.0000 0000 00 $\ll 1$

Step 13: WS 1000.1111 1111 00
          WC 0110.0000 0000 00 $(W_{msbs} = 1110$ so $s_{13} = -1)$
           F 0001.0101 1000 00 $S_{13} = $ **1.0101 1000 00**
                                           $SM_{13} = $ **1.0101 1000 00**
          WS 1111.1010 0111 10 $\ll 1$
          WC 0000.1011 0000 00 $\ll 1$

	X	0000.1100 0000		$S_0 = $ 0001.0000 0000 00
	$WS = X - 1$	1111.1100 0000		$SM_0 = $ 0000.0000 0000 00
	WC	0000.0000 0000		$K_0 = $ 0000.0100 0000 00
				$C_0 = $ 1111.1100 0000 00

Step 1:

	WS	1111.1100 0000		
	WC	0000.0000 0000		($W_{msbs} = 1111$ so $s_1 = 0$)
	$F_1 = 0$	0000.0000 0000		$S_1 = $ 0001.0000 0000 00
				$SM_1 = $ 0000.1000 0000 00
	WS	1111.1100 0000	$\ll 1$	$K_1 = $ 0000.0010 0000 00
	WC	0000.0000 0000	$\ll 1$	$C_1 = $ 1111.1110 0000 00

Step 2:

	WS	1111.1000 0000		
	WC	0000.0000 0000		($W_{msbs} = 1111$ so $s_2 = 0$)
	$F_2 = 0$	0000.0000 0000		$S_2 = $ 0001.0000 0000 00
				$SM_2 = $ 0000.1100 0000 00
	WS	1111.1000 0000	$\ll 1$	$K_2 = $ 0000.0001 0000 00
	WC	0000.0000 0000	$\ll 1$	$C_2 = $ 1111.1111 0000 00

Step 3:

	WS	1111.0000 0000		
	WC	0000.0000 0000		($W_{msbs} = 1111$ so $s_3 = 0$)
	$F_3 = 0$	0000.0000 0000		$S_3 = $ 0001.0000 0000 00
				$SM_3 = $ 0000.1110 0000 00
	WS	1111.0000 0000	$\ll 1$	$K_3 = $ 0000.0000 1000 00
	WC	0000.0000 0000	$\ll 1$	$C_3 = $ 1111.1111 1000 00

Step 4:

	WS	1110.0000 0000		
	WC	0000.0000 0000		($W_{msbs} = 1110$ so $s_4 = -1$)
	$F_4 = S_3 - K_3$	0000.1111 1000		$S_4 = $ 0000.1111 0000 00
				$SM_4 = $ 0000.1110 0000 00
	WS	1110.1111 1000	$\ll 1$	$K_4 = $ 0000.0000 0100 00
	WC	0000.0000 0000	$\ll 1$	$C_4 = $ 1111.1111 1100 00

Step 5:

	WS	1101.1111 0000		
	WC	0000.0000 0000		($W_{msbs} = 1101$ so $s_5 = -1$)
	$F_5 = S_4 - K_4$	0000.1110 1100		$S_5 = $ 0000.1110 1000 00
				$SM_5 = $ 0001.1110 0000 00
	WS	1101.0001 1100	$\ll 1$	$K_5 = $ 0000.0000 0010 00
	WC	0001.1100 0000	$\ll 1$	$C_5 = $ 1111.1111 1110 00

Terminate

X = 0.1010101101(685/1024)

S = 0.1101000110(838/1024)

once R4 sslc gets here i can fill this in

X = 1.1001 (25/16)

S = 1.0100 (20/16)

Attempt 1: X is normalized   to $1/2 < X < 2$ W_{msbs} looks at Q4.0

	X	0001.1001	
	$WS = X - 1$	0000.1001	$s_0 = 1$
	WC	0000.0000	$S_0 = \mathbf{1}.0000,\quad SM_0 = \mathbf{0}.0000$

Step 1:	WS	0000.1001	
	WC	0000.0000	($W_{msbs} = 0000$ so $s_1 = 1$)
	F	1110.1100	$S_1 = \mathbf{1.1}000,\quad SM_1 = \mathbf{1.0}000$
	WS	1110.0101	$\ll 1$
	WC	0001.0000	$\ll 1$

Step 2:	WS	1100.1010	
	WC	0010.0000	($W_{msbs} = 1110$ so $s_2 = -1$)
	F	0001.0110	$S_2 = \mathbf{1.01}00,\quad SM_2 = \mathbf{1.00}00$
	WS	1111.1110	$\ll 1$
	WC	0000.0010	$\ll 1$

Step 3:	WS	1111.1100	
	WC	0000.0100	($W_{msbs} = 1111$ so $s_3 = 0$)
	$-q_3 D$	0000.0000	$S_3 = \mathbf{1.010}0,\quad SM_3 = \mathbf{1.001}0$
	WS	1111.1000	$\ll 1$
	WC	0000.1000	$\ll 1$

Step 4:	WS	1111.0000	
	WC	0001.0000	($W_{msbs} = 0000$ so $s_4 = 1$)
	F	0000.0000	$S_4 = \mathbf{1.0101},\quad SM_4 = \mathbf{1.0100}$

Terminate

Attempt 2: X is normalized   to $1/2 < X < 2$ W_{msbs} looks at Q3.1

	X	001.1001	
	$WS = X - 1$	000.1001	$s_0 = 1$
	WC	000.0000	$S_0 = \mathbf{1}.0000, \quad SM_0 = \mathbf{0}.0000$
Step 1:	WS	000.1001	
	WC	000.0000	($W_{msbs} = 000.1$ so $s_1 = 1$)
	F	110.1000	$S_1 = \mathbf{1.1}000, \quad SM_1 = \mathbf{1.0}000$
	WS	110.0001	$\ll 1$
	WC	001.0000	$\ll 1$
Step 2:	WS	100.0010	
	WC	010.0000	($W_{msbs} = 110.0$ so $s_2 = -1$)
	F	001.0100	$S_2 = \mathbf{1.01}00, \quad SM_2 = \mathbf{1.00}00$
	WS	111.0110	$\ll 1$
	WC	000.0000	$\ll 1$
Step 3:	WS	110.1100	
	WC	000.0000	($W_{msbs} = 110.1$ so $s_3 = -1$)
	$-q_3 D$	001.0010	$S_3 = \mathbf{1.001}0, \quad SM_3 = \mathbf{1.000}0$
	WS	111.1110	$\ll 1$
	WC	000.0000	$\ll 1$
Step 4:	WS	111.1110	
	WC	000.0000	($W_{msbs} = 111.1$ so $s_4 = 0$)
	F	000.0000	$S_4 = \mathbf{1.001}0, \quad SM_4 = \mathbf{1.0001}$
Terminate			

Attempt 3: X is normalized   to $1 < X < 4$ W_{msbs} looks at Q4.0

	X	0001.1001	
	$WS = X - 2$	1111.1001	$s_{-1} = 10$
	WC	0000.0000	$S_{-1} = \mathbf{10}.0000, \quad SM_{-1} = \mathbf{0}0.0000$

Step 0:

	WS	1111.1001	
	WC	0000.0000	$(W_{msbs} = 1111$ so $s_0 = 0)$
	F	0000.0000	$S_0 = \mathbf{10}.0000, \quad SM_0 = \mathbf{01}.0000$
	WS	1111.1001	$\ll 1$
	WC	0000.0000	$\ll 1$

Step 1:

	WS	1111.0010	
	WC	0000.0000	$(W_{msbs} = 1111$ so $s_1 = 0)$
	F	0000.0000	$S_1 = \mathbf{10}.0000, \quad SM_1 = \mathbf{01}.1000$
	WS	1111.0010	$\ll 1$
	WC	0000.0000	$\ll 1$

Step 2:

	WS	1110.0100	
	WC	0000.0000	$(W_{msbs} = 1110$ so $s_2 = -1)$
	$-q_3 D$	0001.1100	$S_2 = \mathbf{01}.0100, \quad SM_2 = \mathbf{01}.0000$
	WS	1111.1000	$\ll 1$
	WC	0000.1000	$\ll 1$

Terminate

X = 0.011001 (25/64)

S = 0.101000 (40/64)

Attempt 4: X is normalized   to $1/4 < X < 1$ W_{msbs} looks at Q3.1

	X	000.0110 01	
	$WS = X - 1$	111.0110 01	$s_0 = 1$
	WC	000.0000 00	$S_0 = \mathbf{1}.000000,\quad SM_0 = \mathbf{0}.000000$

Step 1:	WS	111.0110 01	
	WC	000.0000 00	($W_{msbs} = 111.0$ so $s_1 = -1$)
	F	000.1000 00	$S_1 = \mathbf{0.1}00000,\quad SM_1 = \mathbf{0.0}00000$
	WS	111.1110 01	$\ll 1$
	WC	000.0000 00	$\ll 1$

Step 2:	WS	111.1100 10	
	WC	000.0000 00	($W_{msbs} = 111.1$ so $s_2 = 0$)
	F	000.0000 00	$S_2 = \mathbf{0.10}0000,\quad SM_2 = \mathbf{0.01}0000$
	WS	111.1100 10	$\ll 1$
	WC	000.0000 00	$\ll 1$

Step 3:	WS	111.1001 00	
	WC	000.0000 00	($W_{msbs} = 010.0$ so $s_3 = 1$)
	$-q_3 D$	111.0010 00	$S_3 = \mathbf{0.111}000,\quad SM_3 = \mathbf{0.110}000$
	WS	1111.1110	$\ll 1$
	WC	0000.0000	$\ll 1$

Step 4:	WS	1111.1110	
	WC	0000.0000	($W_{msbs} = 111.1$ so $s_4 = 0$)
	F	0000.0000	$S_4 = \mathbf{1.001}000,\quad SM_4 = \mathbf{1.0001}00$
Terminate			