

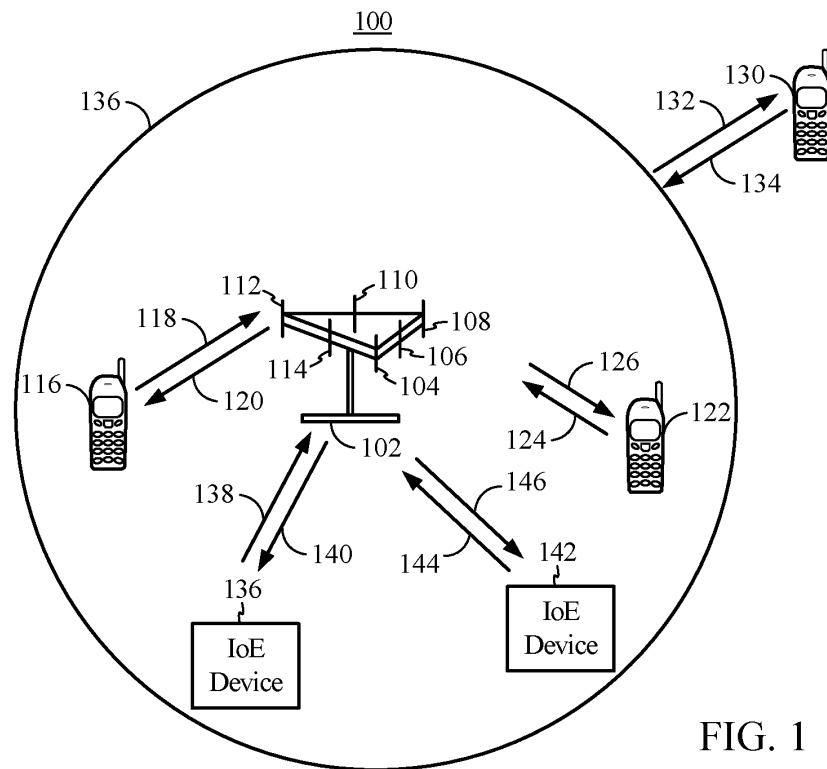


FIG. 1

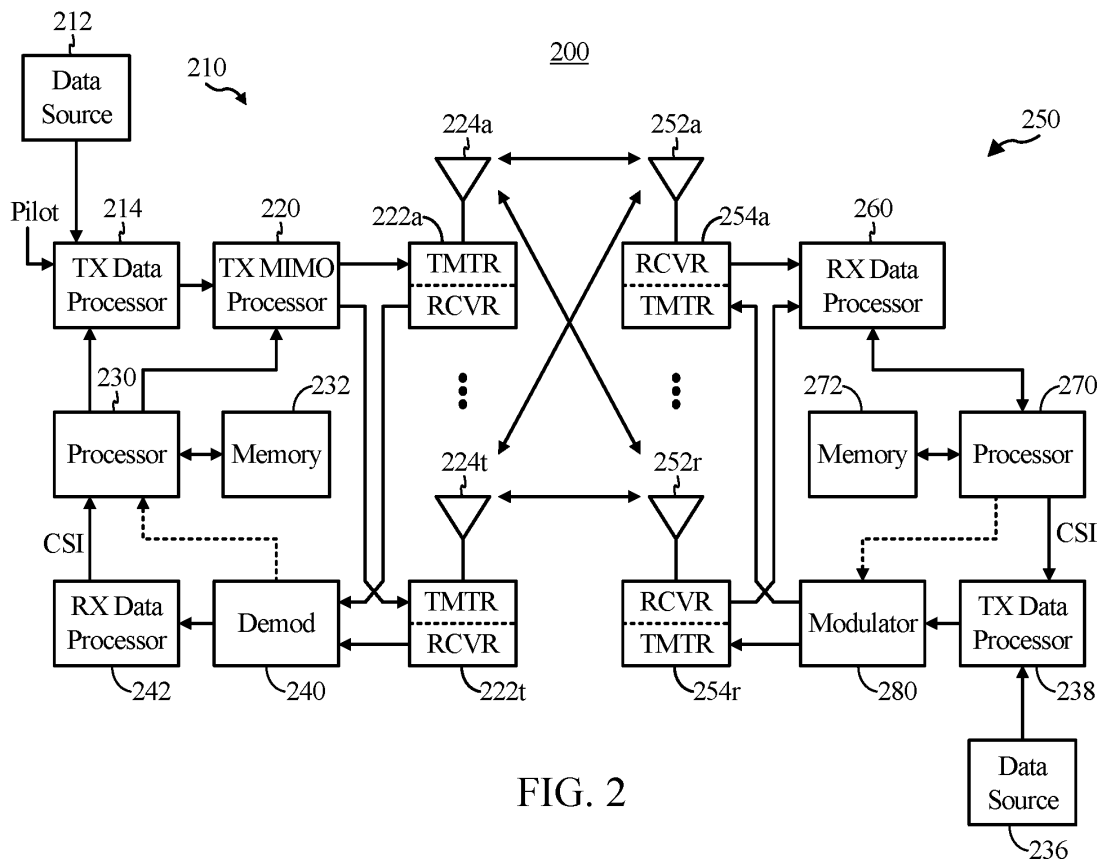


FIG. 2

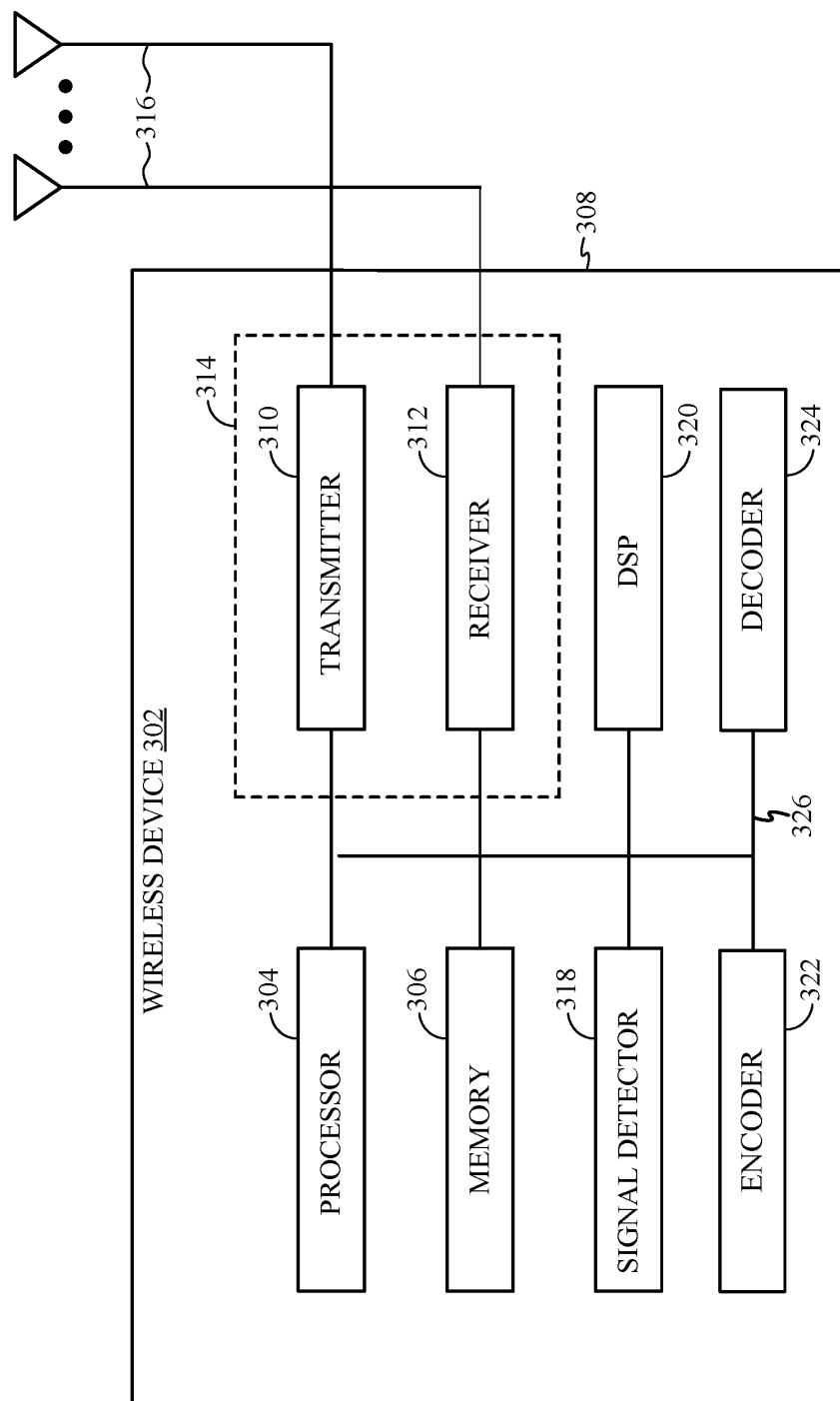


FIG. 3

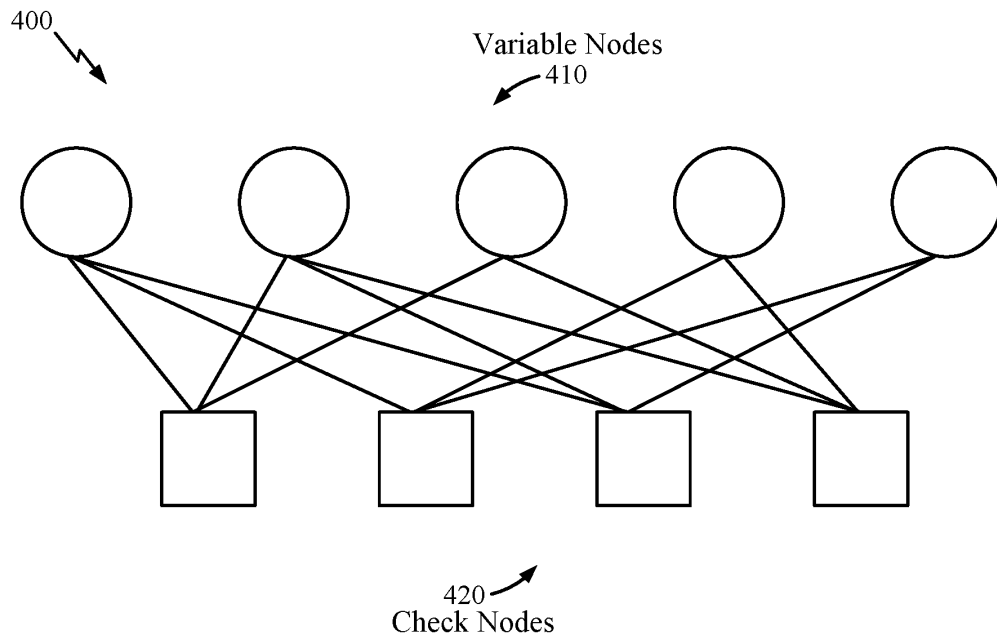


FIG. 4

400A

$$H = \begin{bmatrix} 1 & 1 & 1 & 0 & 0 \\ 1 & 0 & 0 & 1 & 1 \\ 1 & 1 & 0 & 0 & 1 \\ 0 & 1 & 1 & 1 & 0 \end{bmatrix} \quad x = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \end{bmatrix}$$

FIG. 4A

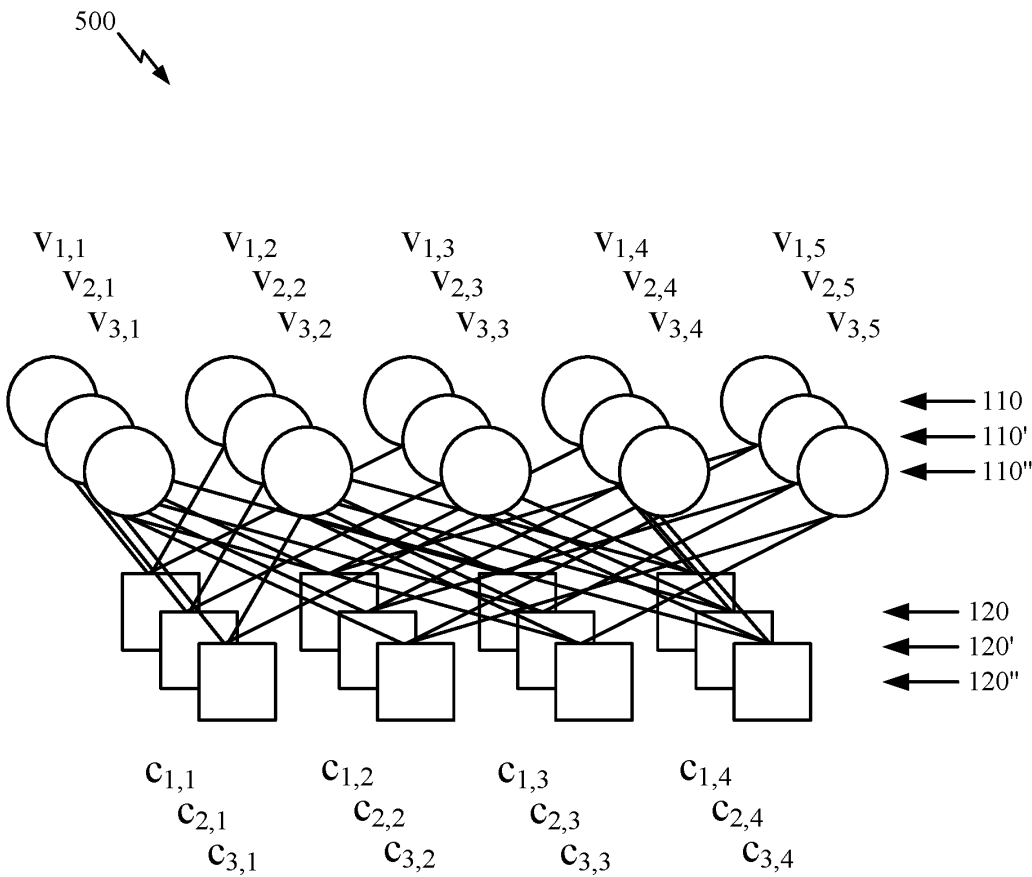


FIG. 5

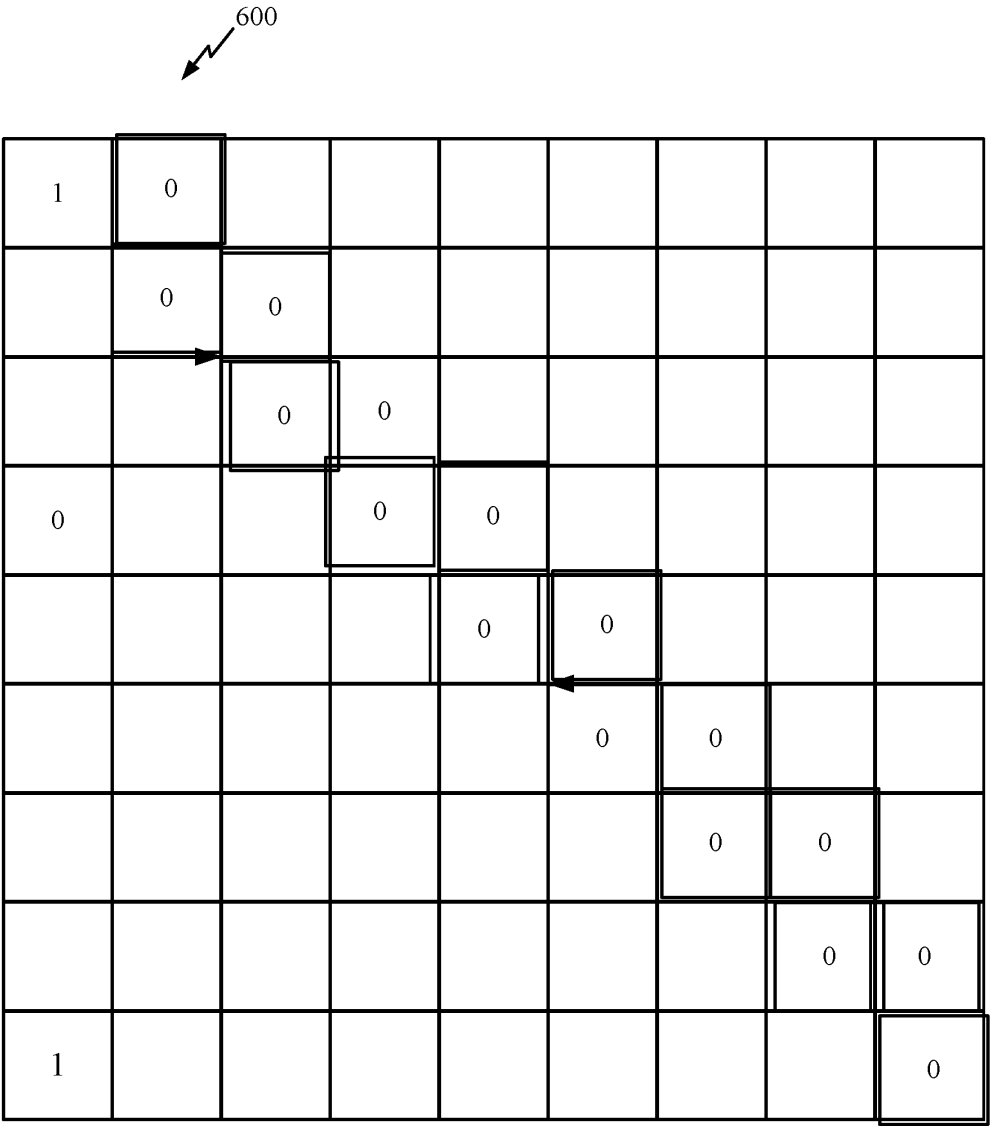


FIG. 6

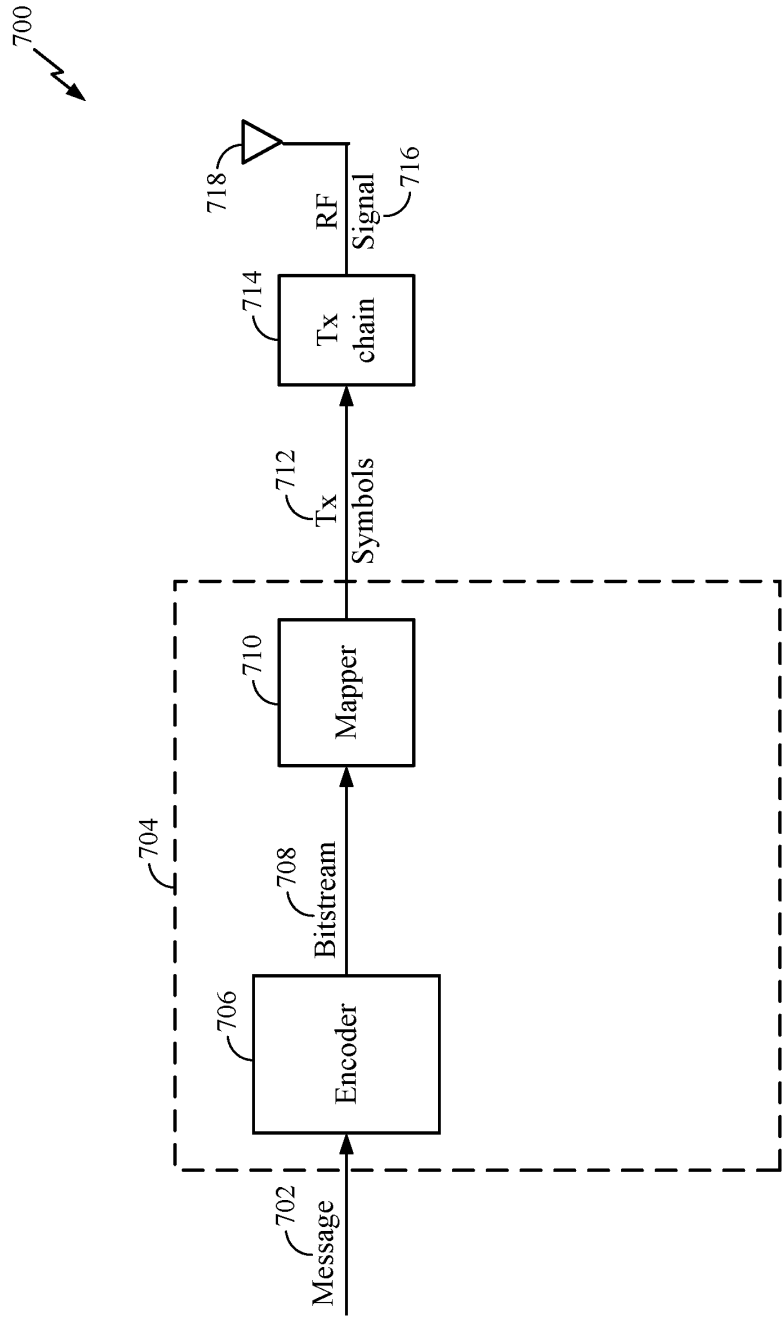


FIG. 7

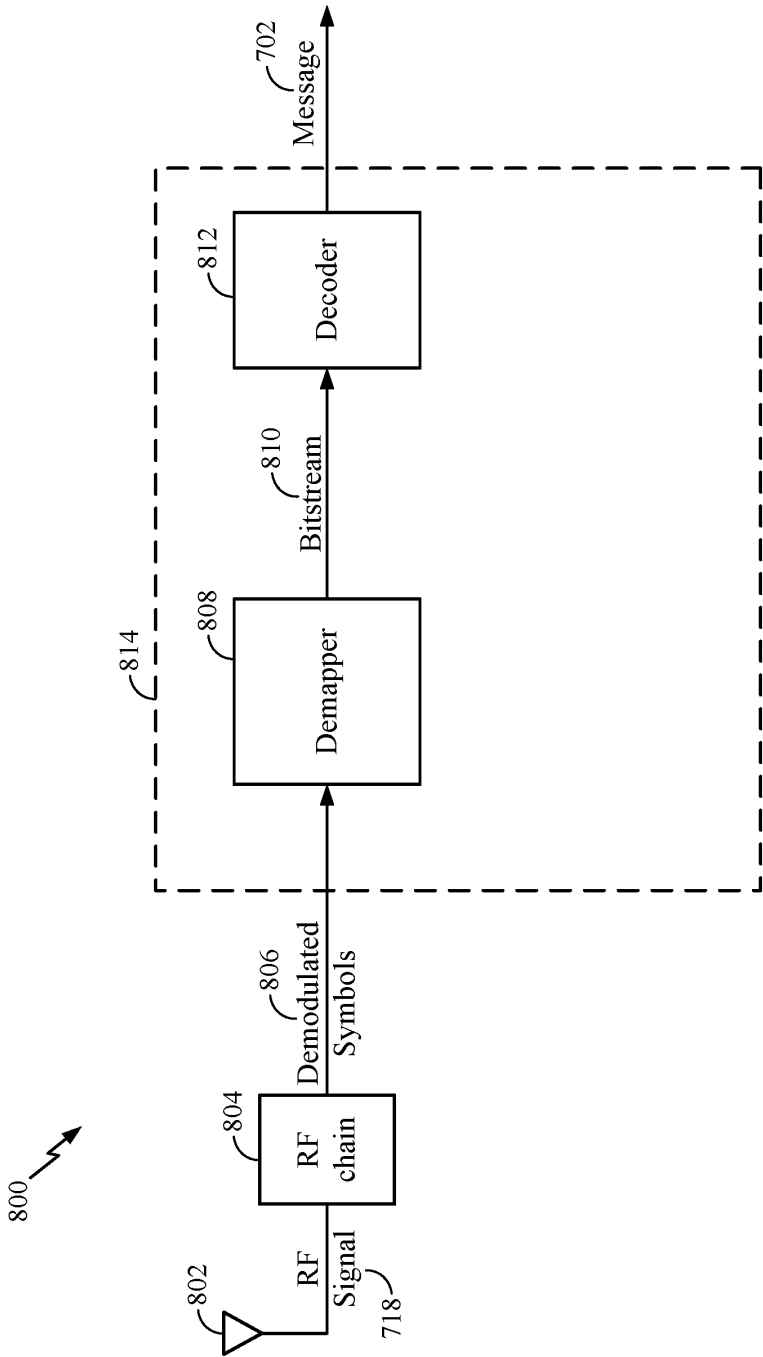


FIG. 8

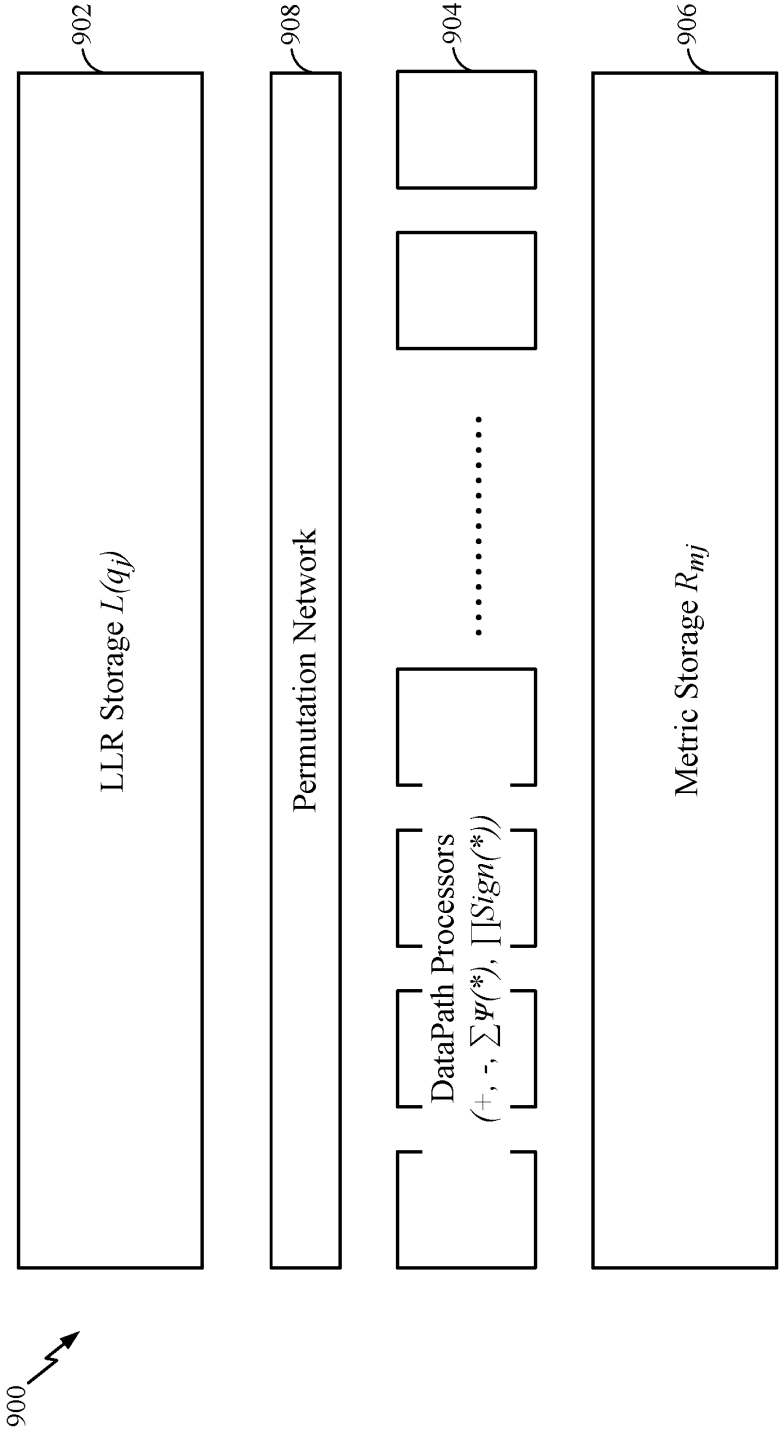
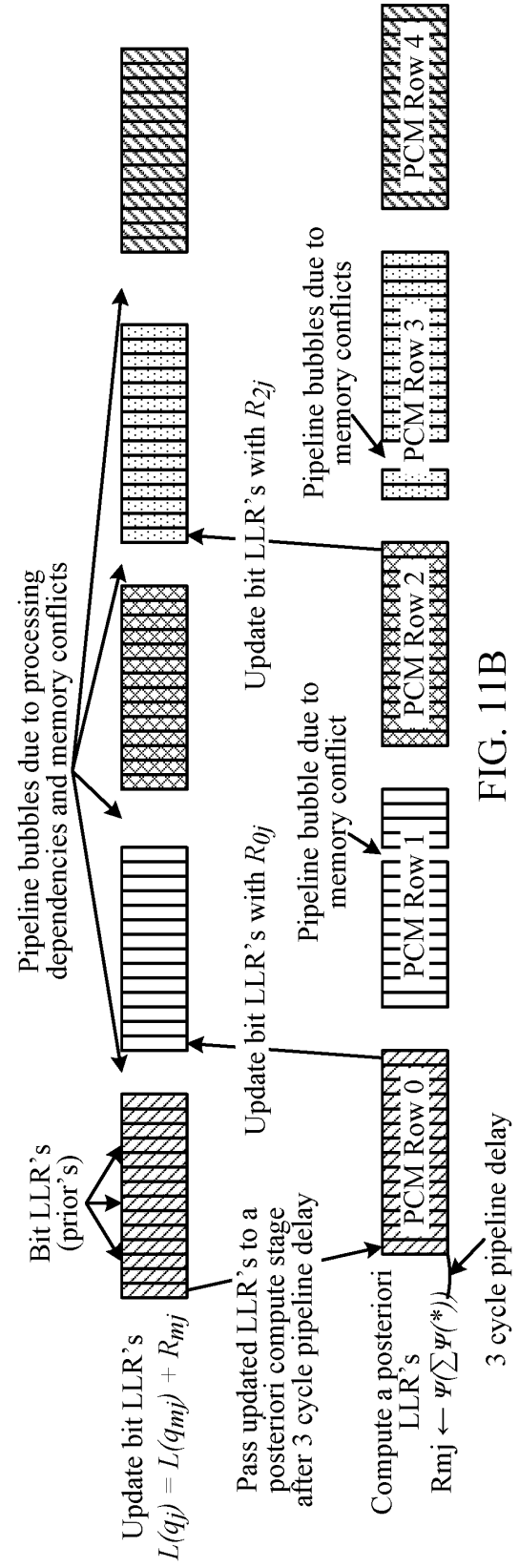
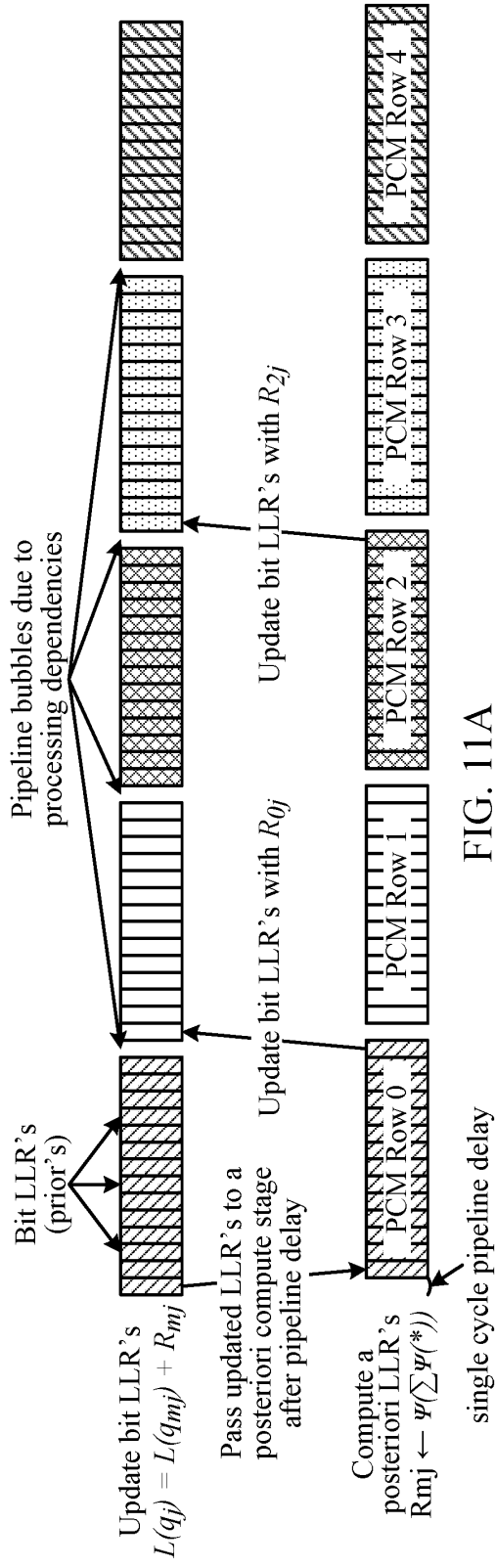


FIG. 9

Bit Columns																								
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
0	48	29	28	39	9	61	-	-	-	63	45	80	-	-	-	37	32	22	1	0	-	-	-	-
1	4	49	42	48	11	30	-	-	-	49	17	41	37	15	-	54	-	-	-	0	0	-	-	-
2	35	76	78	51	37	35	21	-	17	64	-	-	-	59	7	-	-	32	-	-	0	0	-	-
3	9	65	44	9	54	56	73	34	42	-	-	-	35	-	-	-	46	39	0	-	-	0	0	-
4	3	62	7	80	68	26	-	80	55	-	36	-	26	-	9	-	72	-	-	-	-	0	0	0
5	26	75	33	21	69	59	3	38	-	-	-	35	-	62	36	26	-	-	1	-	-	-	-	0

FIG. 10



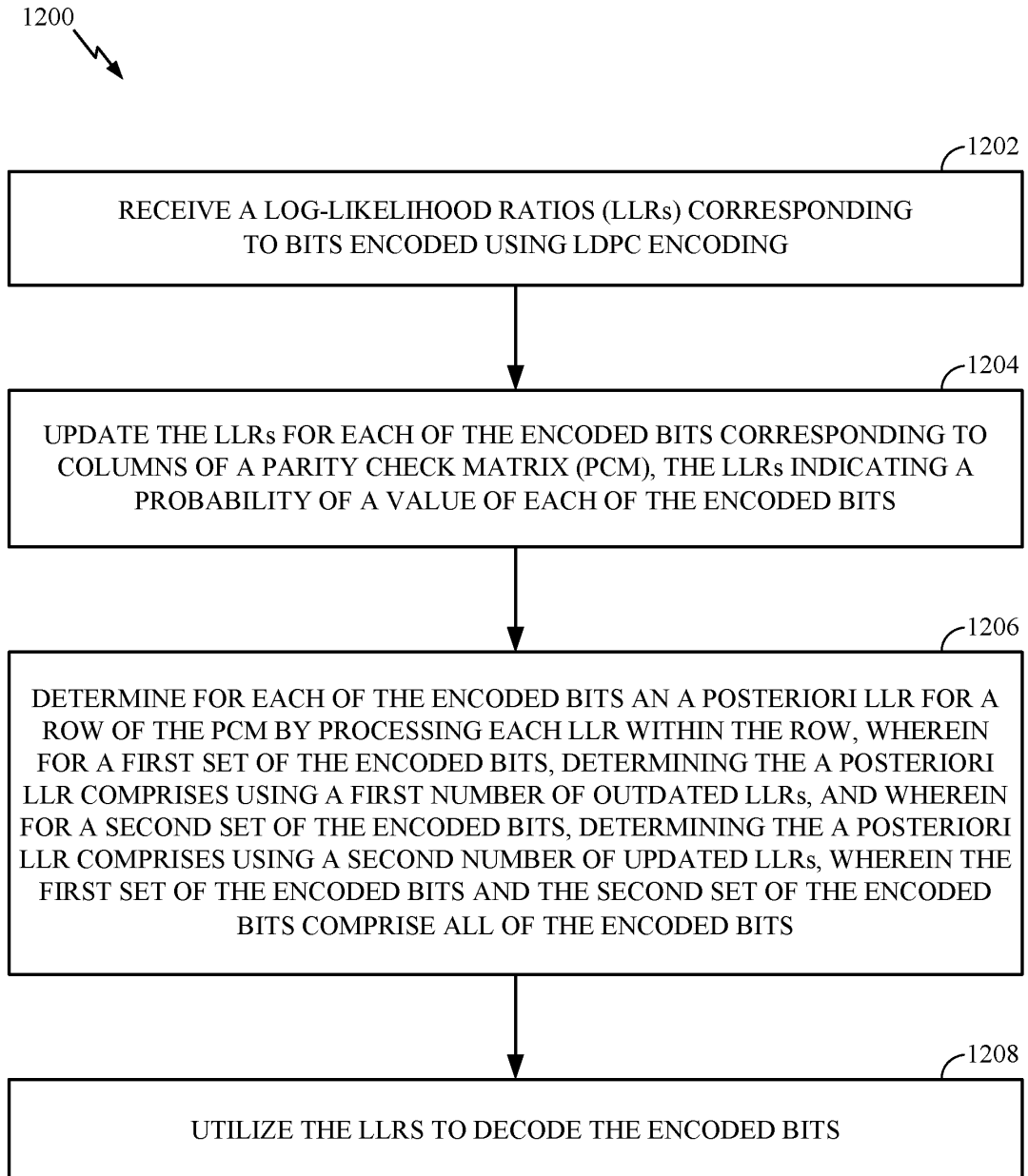


FIG. 12

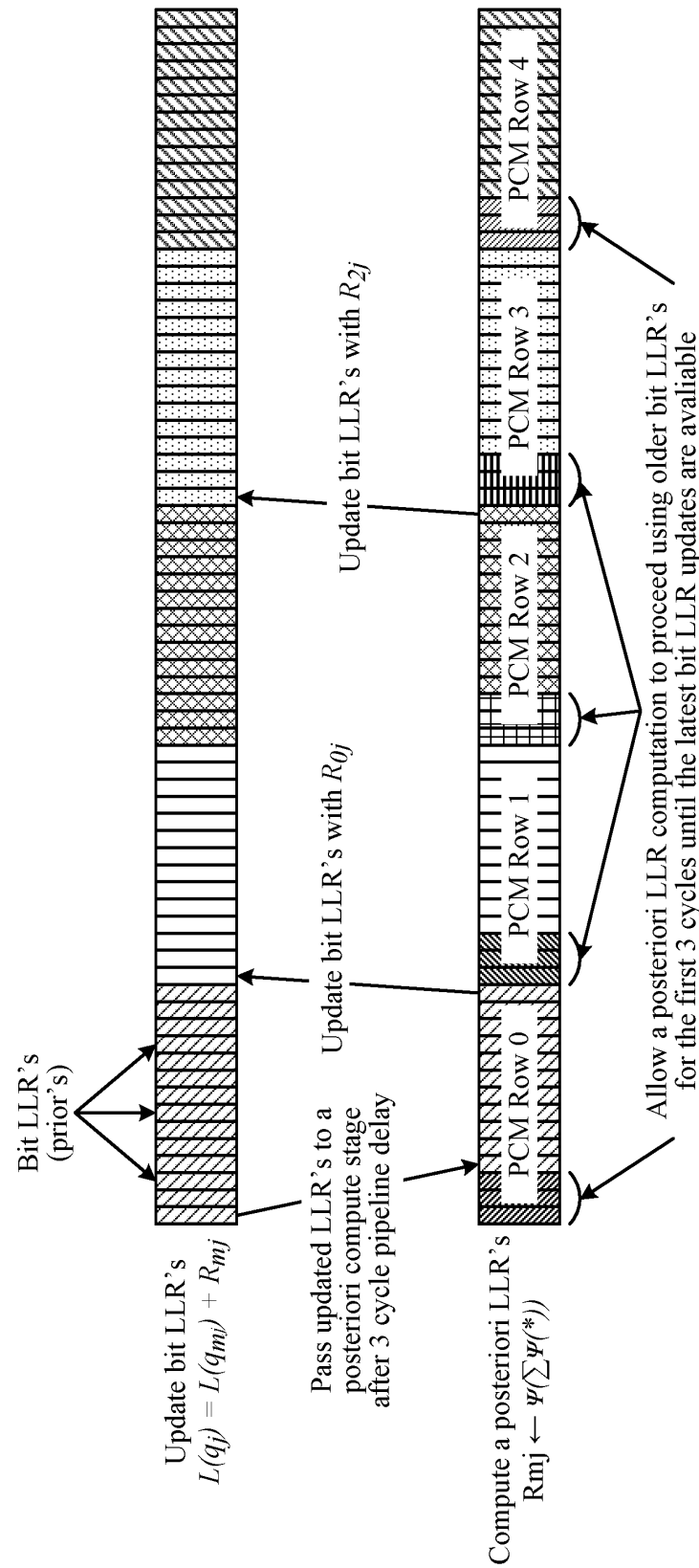


FIG. 13

0

1

2

3

4

5

...

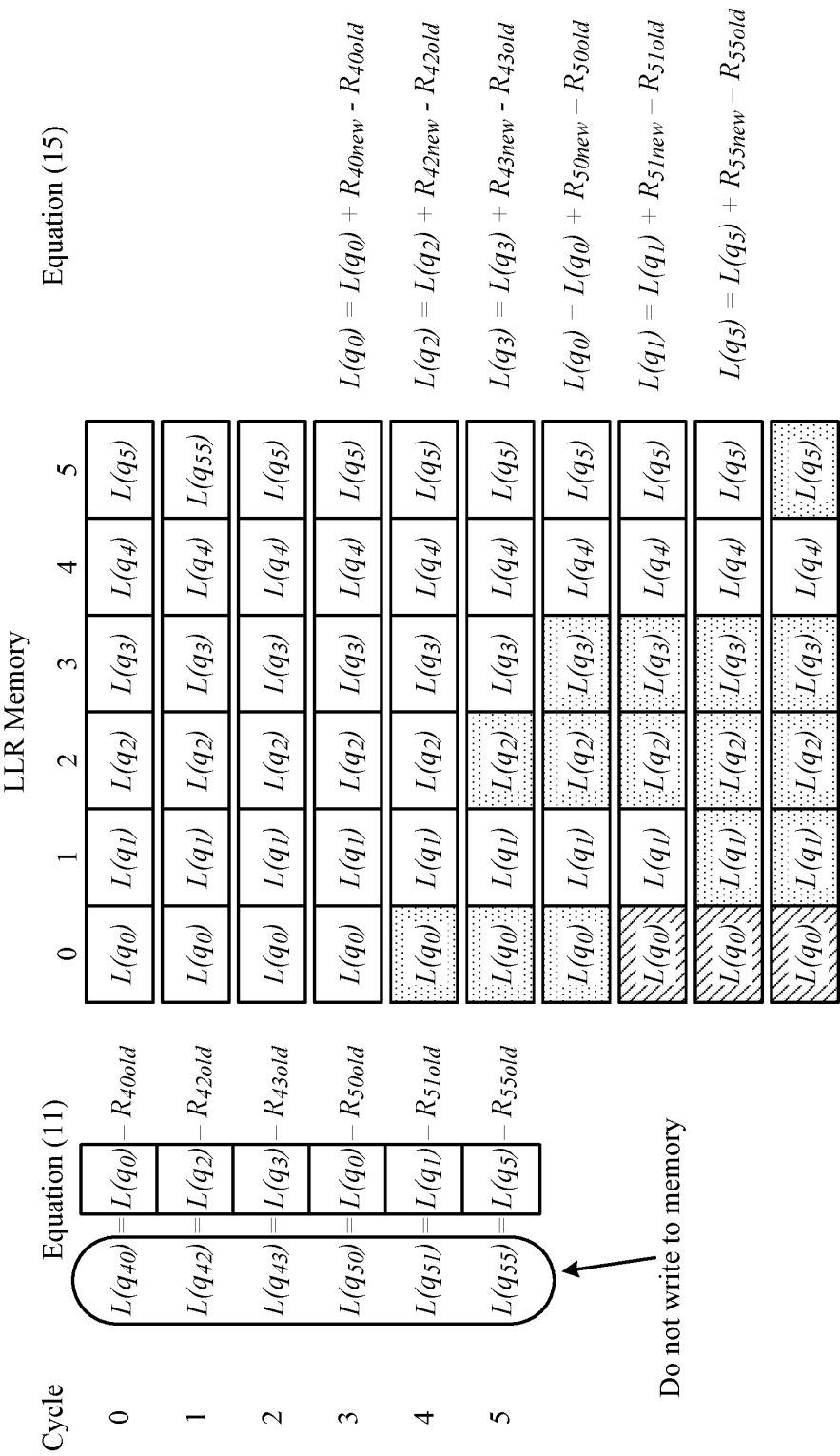
Row 4	1	0	1	1	0	0
Row 5	1	1	0	0	0	1

...

FIG. 14A

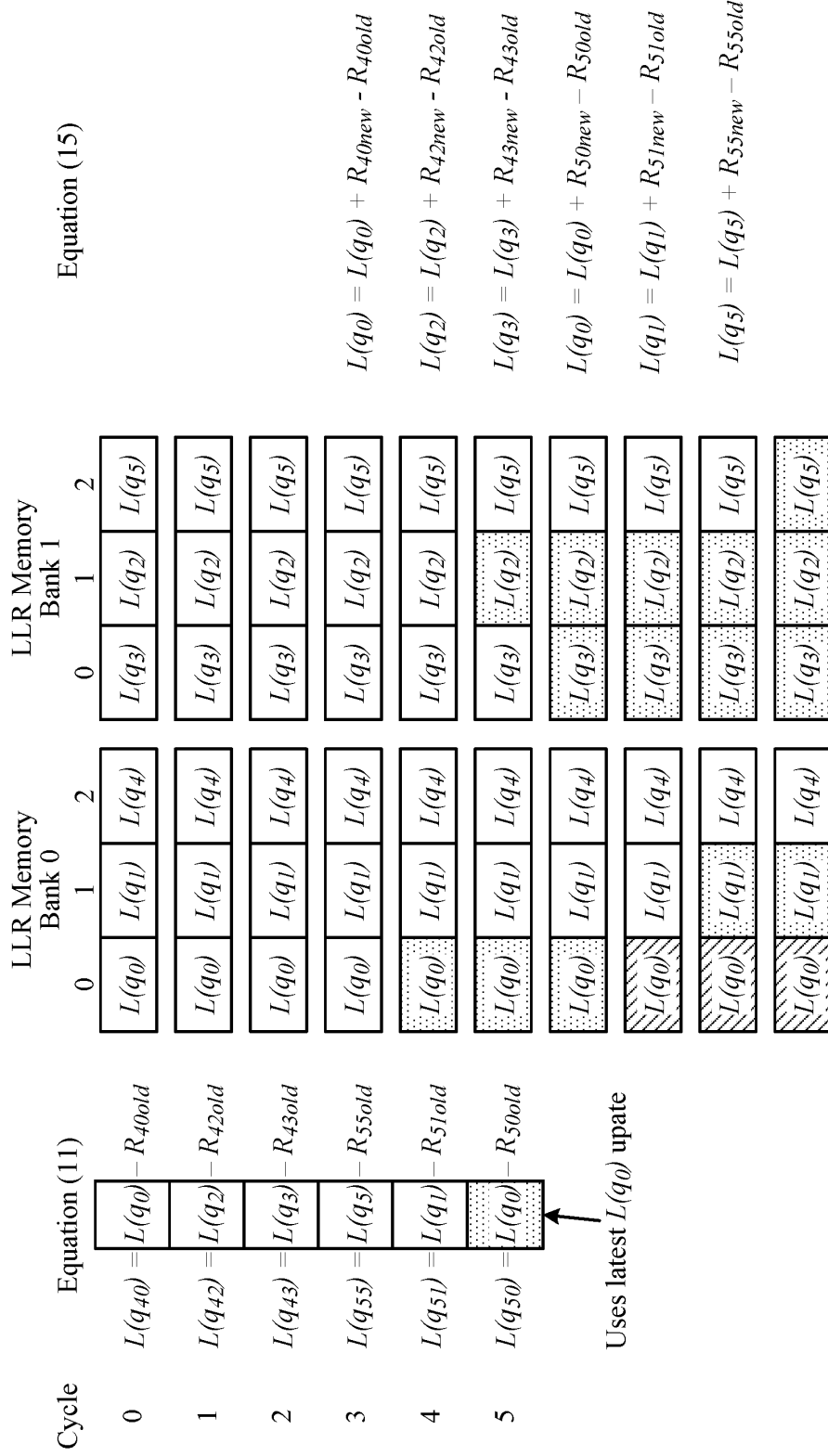
Cycle	Equation (6)	LLR Memory	Equation (10)						
0	$L(q_{40}) = L(q_0) - R_{40old}$	<table><tr><td>$L(q_0)$</td><td>$L(q_1)$</td><td>$L(q_2)$</td><td>$L(q_3)$</td><td>$L(q_4)$</td><td>$L(q_5)$</td></tr></table>	$L(q_0)$	$L(q_1)$	$L(q_2)$	$L(q_3)$	$L(q_4)$	$L(q_5)$	
$L(q_0)$	$L(q_1)$	$L(q_2)$	$L(q_3)$	$L(q_4)$	$L(q_5)$				
1		<table><tr><td>$L(q_{40})$</td><td>$L(q_1)$</td><td>$L(q_2)$</td><td>$L(q_3)$</td><td>$L(q_4)$</td><td>$L(q_5)$</td></tr></table>	$L(q_{40})$	$L(q_1)$	$L(q_2)$	$L(q_3)$	$L(q_4)$	$L(q_5)$	
$L(q_{40})$	$L(q_1)$	$L(q_2)$	$L(q_3)$	$L(q_4)$	$L(q_5)$				
2	$L(q_{42}) = L(q_2) - R_{42old}$	<table><tr><td>$L(q_{40})$</td><td>$L(q_1)$</td><td>$L(q_{42})$</td><td>$L(q_3)$</td><td>$L(q_4)$</td><td>$L(q_5)$</td></tr></table>	$L(q_{40})$	$L(q_1)$	$L(q_{42})$	$L(q_3)$	$L(q_4)$	$L(q_5)$	
$L(q_{40})$	$L(q_1)$	$L(q_{42})$	$L(q_3)$	$L(q_4)$	$L(q_5)$				
3	$L(q_{43}) = L(q_3) - R_{43old}$	<table><tr><td>$L(q_{40})$</td><td>$L(q_1)$</td><td>$L(q_{42})$</td><td>$L(q_{43})$</td><td>$L(q_4)$</td><td>$L(q_5)$</td></tr></table>	$L(q_{40})$	$L(q_1)$	$L(q_{42})$	$L(q_{43})$	$L(q_4)$	$L(q_5)$	
$L(q_{40})$	$L(q_1)$	$L(q_{42})$	$L(q_{43})$	$L(q_4)$	$L(q_5)$				
4	$L(q_{50}) = L(q_{40}) - R_{50old}$	<table><tr><td>$L(q_{40})$</td><td>$L(q_{11})$</td><td>$L(q_{42})$</td><td>$L(q_{43})$</td><td>$L(q_4)$</td><td>$L(q_5)$</td></tr></table>	$L(q_{40})$	$L(q_{11})$	$L(q_{42})$	$L(q_{43})$	$L(q_4)$	$L(q_5)$	$L(q_0) = L(q_{40}) + R_{40new}$
$L(q_{40})$	$L(q_{11})$	$L(q_{42})$	$L(q_{43})$	$L(q_4)$	$L(q_5)$				
	$\begin{pmatrix} L(q_{51}) = L(q_1) - R_{51old} \\ L(q_{55}) = L(q_5) - R_{55old} \end{pmatrix}$	<table><tr><td>X</td><td>$L(q_1)$</td><td>$L(q_{42})$</td><td>$L(q_{43})$</td><td>$L(q_4)$</td><td>$L(q_5)$</td></tr></table>	X	$L(q_1)$	$L(q_{42})$	$L(q_{43})$	$L(q_4)$	$L(q_5)$	$\begin{pmatrix} L(q_2) = L(q_{42}) + R_{42new} \\ L(q_3) = L(q_{43}) + R_{43new} \\ L(q_0) = L(q_{50}) + R_{50new} \\ L(q_1) = L(q_{51}) + R_{51new} \\ L(q_5) = L(q_{55}) + R_{55new} \end{pmatrix}$
X	$L(q_1)$	$L(q_{42})$	$L(q_{43})$	$L(q_4)$	$L(q_5)$				

FIG. 14B



Layered LDPC Pipeline (Update the bit LLR with the a posteriori difference)

FIG. 15



Layered LDPC Pipeline (Dual memory banks to resolve read conflicts)

FIG. 17