### Initialization

<table>
<thead>
<tr>
<th>( k )</th>
<th>0001 0011 0011 0100 0101 0111 0110 1001 1001 1011 1011 0110 1101 1111 1000 1001</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \zeta, \delta )</td>
<td>1110000110101100101010101111 * 0101010110001100111000111</td>
</tr>
<tr>
<td>( \tau )</td>
<td>01010101010101010101010101010101010101010101010101</td>
</tr>
<tr>
<td>( \Pi_{[2]} )</td>
<td>11111111 11111111 11111111 11111111 00000000 00000000 00000000 00000000</td>
</tr>
<tr>
<td>( (L[0], R[0]) )</td>
<td>11111111 11111111 11111111 11111111 11111111 00000000 00000000 00000000</td>
</tr>
</tbody>
</table>

### Round 1

<table>
<thead>
<tr>
<th>( (L[0], R[0]) )</th>
<th>11111111 11111111 11111111 11111111 * 00000000 00000000 00000000 00000000</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \zeta, \delta )</td>
<td>1110000110101100101010101111 * 0101010110001100111000111</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>1110000110101100101010101111 * 0101010110001100111000111</td>
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<tr>
<td>( \Pi_{[1]} )</td>
<td>11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111</td>
</tr>
<tr>
<td>( SBOX )</td>
<td>0001 0101 0100 0100 0101 1101 0110</td>
</tr>
<tr>
<td>( PBOX )</td>
<td>0000 0010 0011 0111 0100 0000 1111 0011</td>
</tr>
<tr>
<td>( L[0] )</td>
<td>1111 1111 1111 1111 1111 1111 1111 1111</td>
</tr>
<tr>
<td>( PBOX + L[0] )</td>
<td>1111 1111 1100 1000 1111 1111 0000 1100</td>
</tr>
<tr>
<td>( (PBOX + L[0], R[0]) )</td>
<td>11111111 11001000 10111111 00001100 * 00000000 00000000 00000000 00000000</td>
</tr>
<tr>
<td>( (L[1], R[1]) )</td>
<td>00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000</td>
</tr>
</tbody>
</table>

### Round 2

<table>
<thead>
<tr>
<th>( (L[1], R[1]) )</th>
<th>00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \zeta, \delta )</td>
<td>1110000110101100101010101111 * 0101010110001100111000111</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>1110000110101100101010101111 * 0101010110001100111000111</td>
</tr>
<tr>
<td>( \Pi_{[2]} )</td>
<td>11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111</td>
</tr>
<tr>
<td>( SBOX )</td>
<td>0000 1101 0000 0000 1011 1101 1110 0101</td>
</tr>
<tr>
<td>( PBOX )</td>
<td>0011 0001 0001 1000 0110 1100 1011 0010</td>
</tr>
<tr>
<td>( L[1] )</td>
<td>0000 0000 0000 0000 0000 0000 0000 0000</td>
</tr>
<tr>
<td>( PBOX + L[1] )</td>
<td>0011 0001 0001 1000 0110 1100 1011 0010</td>
</tr>
<tr>
<td>( (PBOX + L[1], R[1]) )</td>
<td>00110001 00011000 01101100 10111001 * 11111111 1101000 10111111 00001100</td>
</tr>
<tr>
<td>( (L[2], R[2]) )</td>
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### Round 3

<table>
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<tr>
<th>( (L[2], R[2]) )</th>
<th>11111111 11001000 10111111 00011000 00110001 00011000 01011000 10111001</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \zeta, \delta )</td>
<td>1110000110101100101010101111 * 0101010110001100111000111</td>
</tr>
<tr>
<td>( \gamma )</td>
<td>1110000110101100101010101111 * 0101010110001100111000111</td>
</tr>
<tr>
<td>( \Pi_{[3]} )</td>
<td>11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111</td>
</tr>
<tr>
<td>( SBOX )</td>
<td>1011 1110 0110 0010 1000 0001 0001 1010</td>
</tr>
<tr>
<td>( PBOX )</td>
<td>0100 1011 1100 1010 0010 0110 0011 0110</td>
</tr>
<tr>
<td>( L[2] )</td>
<td>1111 1101 1100 1000 1011 1111 0000 1100</td>
</tr>
<tr>
<td>( PBOX + L[2] )</td>
<td>1101 0110 0000 0010 1001 1101 0001 1010</td>
</tr>
<tr>
<td>( (PBOX + L[2], R[2]) )</td>
<td>10110110 0000010 10011101 0011010 * 00110001 00011000 01011001 10111001</td>
</tr>
<tr>
<td>( (L[3], R[3]) )</td>
<td>00110001 00011000 01101100 10111001 * 10111010 00000010 10011101 00011010</td>
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### Round 4

<table>
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<tr>
<th>Expression</th>
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<tbody>
<tr>
<td>((L[3], R[3]))</td>
<td>00110001 00011000 01101100 10111001 * 10110110 00000100 10011101 00011010</td>
</tr>
<tr>
<td>(c_3 \cdot d_3)</td>
<td>000110101101010101111111 * 0101010001011110111010101</td>
</tr>
<tr>
<td>(c_4 \cdot d_4)</td>
<td>0011001010101010111111100 * 010110001011100011110101</td>
</tr>
<tr>
<td>(KEY[4])</td>
<td>011100 101010 110110 010110 110110110011 010100 011001</td>
</tr>
<tr>
<td>(E[R[3]])</td>
<td>010110 101100 000000 001010 010011 110101 100011 110101</td>
</tr>
<tr>
<td>(E[R[3]] + KEY[4])</td>
<td>001101 001010 110111 010011 100110 001001 110111 101100</td>
</tr>
<tr>
<td>(SBOX)</td>
<td>1111 1110 0011 0111 1100 0111 1111 1110</td>
</tr>
<tr>
<td>(PBOX)</td>
<td>1100 1111 1111 1110 1011 0110 0011 1111</td>
</tr>
<tr>
<td>(L[3])</td>
<td>0011 0001 0001 1000 0110 1100 1011 0010</td>
</tr>
<tr>
<td>(PBOX + L[3])</td>
<td>1111 1110 1110 0110 1101 1010 1000 0110</td>
</tr>
<tr>
<td>((PBOX + L[3]), R[3])</td>
<td>11111110 11100110 11011010 10000110 * 10110110 00000010 10011101 00011010</td>
</tr>
<tr>
<td>((L[4], R[4]))</td>
<td>10110110 00000010 10011101 00011010 * 11111110 11100110 11011010 10000110</td>
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### Round 5

<table>
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<td>((L[4], R[4]))</td>
<td>10110110 00000010 10011101 00011010 * 11111110 11100110 11011010 10000110</td>
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<tr>
<td>(c_4 \cdot d_4)</td>
<td>00110010101010101011111100 * 010110001011100011110101</td>
</tr>
<tr>
<td>(c_5 \cdot d_5)</td>
<td>11001001010101111111101000 * 010110001011100011110101</td>
</tr>
<tr>
<td>(KEY[5])</td>
<td>011111 001110 110000 000111 11101011101 001100 101000</td>
</tr>
<tr>
<td>(E[R[4]])</td>
<td>011111 111101 011100 001010 011011 110101 010000 001010</td>
</tr>
<tr>
<td>(E[R[4]] + KEY[5])</td>
<td>000000 110011 101100 001010 100001 000000 011100 101001</td>
</tr>
<tr>
<td>(SBOX)</td>
<td>1110 0110 0011 0110 1100 0110 1110 1110</td>
</tr>
<tr>
<td>(PBOX)</td>
<td>0111 1101 1101 0010 1001 0110 1011 1100</td>
</tr>
<tr>
<td>(L[4])</td>
<td>1111 1110 0000 0010 1001 1101 0001 1101</td>
</tr>
<tr>
<td>(PBOX + L[4])</td>
<td>1100 1101 1101 0000 0000 1011 1010 0110</td>
</tr>
<tr>
<td>((PBOX + L[4]), R[4])</td>
<td>11001011 11010000 00000111 10100110 * 11111110 11100110 11011010 10000110</td>
</tr>
<tr>
<td>((L[5], R[5]))</td>
<td>11111110 11100110 11011010 10000110 * 11001011 11010000 00001011 10100110</td>
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### Round 6

<table>
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</thead>
<tbody>
<tr>
<td>((L[5], R[5]))</td>
<td>11111110 11100110 11011010 10000110 * 11001011 11010000 00001011 10100110</td>
</tr>
<tr>
<td>(c_5 \cdot d_5)</td>
<td>11001001010101011111111000 * 0101000101110001111010101</td>
</tr>
<tr>
<td>(c_6 \cdot d_6)</td>
<td>0011000101010111111111000011 * 1000100111000011111010101</td>
</tr>
<tr>
<td>(KEY[6])</td>
<td>011000 111010 010010 111110 101000 000111 101100 101110</td>
</tr>
<tr>
<td>(E[R[5]])</td>
<td>011001 010111 111010 100000 000001 010111 110100 001101</td>
</tr>
<tr>
<td>(E[R[5]] + KEY[6])</td>
<td>000001 101101 101110 011110 010101 010000 011000 100011</td>
</tr>
<tr>
<td>(SBOX)</td>
<td>0000 0100 0000 1111 1111 0000 0101 0001</td>
</tr>
<tr>
<td>(PBOX)</td>
<td>1010 0011 0101 0100 0001 1000 1101 0000</td>
</tr>
<tr>
<td>(L[5])</td>
<td>1111 1110 1101 0110 1010 1000 0110</td>
</tr>
<tr>
<td>(PBOX + L[5])</td>
<td>0101 1101 1011 0010 1100 0010 0110 0110</td>
</tr>
<tr>
<td>((PBOX + L[5]), R[5])</td>
<td>01011101 10101010 110000010 01010110 * 11001011 11100000 00001011 10100110</td>
</tr>
<tr>
<td>((L[6], R[6]))</td>
<td>11001011 11010000 00001011 10100110 * 01011101 11010010 11000010 01010110</td>
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### Round 7

<table>
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<th>Equation</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>( (L[6], R[6]) )</td>
<td>( 1101011 \ 11010000 \ 00001011 \ 10100110 \ * \ 01011101 \ 10110010 \ 11000010 \ 01010110 )</td>
</tr>
<tr>
<td>( \omega \ \delta )</td>
<td>( 001001100101011111111100011011 \ * \ 1000101111110110101101 )</td>
</tr>
<tr>
<td>( \omega \ \delta )</td>
<td>( 00100110010111111100001100 \ * \ 00100111100011110101010100 )</td>
</tr>
<tr>
<td>KEY[7]</td>
<td>( 111011 \ 010100 \ 010110 \ 110111 \ 111011 \ 0000010 \ 100010 \ 111000 )</td>
</tr>
<tr>
<td>( E[R[6]] )</td>
<td>( 00101111001101011001 \ 011001 \ 000100 \ 001010 \ 011010 )</td>
</tr>
<tr>
<td>( E[R[6]] + KEY[7] )</td>
<td>( 110000 \ 110100 \ 101010 \ 010101 \ 010101 \ 010100 \ 010000 )</td>
</tr>
<tr>
<td>( SBOX )</td>
<td>( 00111 \ 0110 \ 0100 \ 0010 \ 1100 \ 0100 \ 1100 \ 1010 )</td>
</tr>
<tr>
<td>( PBOX )</td>
<td>( 0100 \ 1001 \ 1101 \ 0111 \ 1000 \ 0010 \ 0100 \ 1101 )</td>
</tr>
<tr>
<td>( L[6] )</td>
<td>( 110 \ 1011 \ 1101 \ 0000 \ 0000 \ 1011 \ 1010 \ 0110 )</td>
</tr>
<tr>
<td>( PBOX + L[6] )</td>
<td>( 1000 \ 0010 \ 0000 \ 0111 \ 1000 \ 1001 \ 1011 \ 1101 )</td>
</tr>
<tr>
<td>( (PBOX + L[6], R[6]) )</td>
<td>( 10000010 \ 00001111 \ 1001001 \ 10111101 \ * \ 01011101 \ 10110010 \ 11000010 \ 01010110 )</td>
</tr>
<tr>
<td>( (L[7], R[7]) )</td>
<td>( 01011101 \ 10110101 \ 11000010 \ 01010110 \ * \ 10000010 \ 00001111 \ 1001001 \ 10111101 )</td>
</tr>
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</table>

### Round 8

<table>
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<tr>
<th>Equation</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>( (L[7], R[7]) )</td>
<td>( 01011101 \ 10110101 \ 11000010 \ 01010110 \ * \ 10000010 \ 00001111 \ 1001001 \ 10111101 )</td>
</tr>
<tr>
<td>( \omega \ \delta )</td>
<td>( 11001111001101111111110000110110 \ * \ 00100111100011110101010100 )</td>
</tr>
<tr>
<td>( \omega \ \delta )</td>
<td>( 0010011100111111100001100111 * 10011111000111110101010000 )</td>
</tr>
<tr>
<td>KEY[8]</td>
<td>( 111101 \ 110000 \ 110000 \ 110000 \ 110000 \ 110000 \ 110000 \ 110000 )</td>
</tr>
<tr>
<td>( E[R[7]] )</td>
<td>( 110000 \ 001010 \ 000000 \ 001111 \ 110010 \ 010111 \ 110111 \ 111011 )</td>
</tr>
<tr>
<td>( E[R[7]] + KEY[8] )</td>
<td>( 0011101 \ 111100 \ 101000 \ 110101 \ 000001 \ 000000 \ 011100 \ 000000 )</td>
</tr>
<tr>
<td>( SBOX )</td>
<td>( 1101 \ 0010 \ 1000 \ 0101 \ 1110 \ 0100 \ 1100 \ 1010 )</td>
</tr>
<tr>
<td>( PBOX )</td>
<td>( 1101 \ 1101 \ 0101 \ 1101 \ 1101 \ 0100 \ 1101 \ 1010 )</td>
</tr>
<tr>
<td>( L[7] )</td>
<td>( 0101 \ 1101 \ 1111 \ 0110 \ 1100 \ 0010 \ 0101 \ 0110 )</td>
</tr>
<tr>
<td>( PBOX + L[7] )</td>
<td>( 1000 \ 0010 \ 0010 \ 0101 \ 0101 \ 1111 \ 1111 \ 1100 )</td>
</tr>
<tr>
<td>( (PBOX + L[7], R[7]) )</td>
<td>( 10000100 \ 00110110 \ 01011111 \ 11111100 \ * \ 10000010 \ 00001111 \ 1001001 \ 10111101 )</td>
</tr>
<tr>
<td>( (L[8], R[8]) )</td>
<td>( 10000010 \ 00001111 \ 1001001 \ 10111101 \ * \ 10000010 \ 00001110 \ 01011111 \ 11111100 )</td>
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</table>

### Round 9

<table>
<thead>
<tr>
<th>Equation</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>( (L[8], R[8]) )</td>
<td>( 10000010 \ 00001111 \ 1001001 \ 10111101 \ * \ 10000100 \ 00101111 \ 11111100 )</td>
</tr>
<tr>
<td>( \omega \ \delta )</td>
<td>( 0010110111111111110001100111 * 10011111000111110101010000 )</td>
</tr>
<tr>
<td>( \omega \ \delta )</td>
<td>( 01010100111111110000101100 \ * \ 00111110001111010101010001 )</td>
</tr>
<tr>
<td>KEY[9]</td>
<td>( 111100 \ 001101 \ 101111 \ 101101 \ 110101 \ 111110 \ 111110 \ 000001 )</td>
</tr>
<tr>
<td>( E[R[8]] )</td>
<td>( 010100 \ 001000 \ 000010 \ 001100 \ 001101 \ 111111 \ 111111 \ 111100 )</td>
</tr>
<tr>
<td>( E[R[8]] + KEY[9] )</td>
<td>( 101000 \ 001010 \ 100101 \ 101111 \ 100001 \ 100001 \ 110000 )</td>
</tr>
<tr>
<td>( SBOX )</td>
<td>( 1101 \ 0100 \ 1001 \ 0110 \ 0110 \ 1111 \ 1111 \ 1111 )</td>
</tr>
<tr>
<td>( PBOX )</td>
<td>( 0000 \ 1100 \ 1101 \ 0110 \ 1101 \ 1101 \ 1010 \ 1010 )</td>
</tr>
<tr>
<td>( L[8] )</td>
<td>( 1000 \ 0010 \ 0000 \ 0111 \ 1000 \ 1001 \ 1101 \ 1101 )</td>
</tr>
<tr>
<td>( PBOX + L[8] )</td>
<td>( 1000 \ 1110 \ 1101 \ 0000 \ 0100 \ 0000 \ 1011 \ 0111 )</td>
</tr>
<tr>
<td>( (PBOX + L[8], R[8]) )</td>
<td>( 10001110 \ 11010000 \ 0010100 \ 00000111 \ * \ 10000100 \ 00100110 \ 01011111 \ 11111100 )</td>
</tr>
<tr>
<td>( (L[9], R[9]) )</td>
<td>( 10000010 \ 00001101 \ 01111111 \ 11111100 \ * \ 10001110 \ 1101001 \ 0010100 \ 00000111 )</td>
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### Round 13

<table>
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</thead>
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<td>((L[12], R[12]))</td>
<td>(1111011 10010100 00111011 10000001 * 10110111 01100110 00100101 10110101)</td>
</tr>
<tr>
<td>(e_{12} \oplus d_{12})</td>
<td>(010111111000010110010101 * 000111110101010100010111)</td>
</tr>
<tr>
<td>(e_{13} \oplus d_{13})</td>
<td>(011111110000101001010101 * 011110100101100011100)</td>
</tr>
<tr>
<td><strong>KEY</strong></td>
<td>100101 111100 010111 010001 111100 101101 101001 000001</td>
</tr>
<tr>
<td><strong>E</strong></td>
<td>110110 101110 101100 001100 000100 001011 110110 101111</td>
</tr>
<tr>
<td>(E[R[12]] + \text{KEY})</td>
<td>010001 010001 011101 011101 111000 000111 110101 101010</td>
</tr>
<tr>
<td><strong>SBOX</strong></td>
<td>0110 0111 0101 1110 0110 1100</td>
</tr>
<tr>
<td><strong>PBOX</strong></td>
<td>0101 1100 0101 0101 1111 0110 0000</td>
</tr>
<tr>
<td><strong>L</strong></td>
<td>1111 1011 1001 0001 0011 1011 1000 0001</td>
</tr>
<tr>
<td><strong>P</strong></td>
<td>1010 0111 1100 0001 0011 1100 0001</td>
</tr>
<tr>
<td><strong>PBOX + L</strong></td>
<td>1010 0111 1100 0001 0011 1100 0001</td>
</tr>
<tr>
<td>((PBOX + L)[12], R[12])</td>
<td>10100111 11000001 11001100 01100001 * 10110111 01100110 00100101 10110101</td>
</tr>
<tr>
<td>((L[13], R[13]))</td>
<td>10101111 01100110 00100101 10110101 * 10100111 11000001 11011010 01110001</td>
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### Round 14

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<tr>
<td>((L[13], R[13]))</td>
<td>10110011 01100110 00110001 10110101 * 10100111 11000001 11011010 01110001</td>
</tr>
<tr>
<td>(e_{13} \oplus d_{13})</td>
<td>011111110000101001010101 * 011111110010101010010110011100</td>
</tr>
<tr>
<td>(e_{14} \oplus d_{14})</td>
<td>111111110000101001010101 * 11110100101001001100111100001</td>
</tr>
<tr>
<td><strong>KEY</strong></td>
<td>010111 110100 001110 110111 111100 101010 011100 111010</td>
</tr>
<tr>
<td><strong>E</strong></td>
<td>110100 001111 111000 000111 111001 010110 101101 100011</td>
</tr>
<tr>
<td>(E[R[13]] + \text{KEY})</td>
<td>100101 111011 110110 110100 000101 110000 110101 011010</td>
</tr>
<tr>
<td><strong>SBOX</strong></td>
<td>1100 0101 1100 0011 0010 0111 1111 0000</td>
</tr>
<tr>
<td><strong>PBOX</strong></td>
<td>1000 0010 1111 0001 1110 0101 1001 1001</td>
</tr>
<tr>
<td><strong>L</strong></td>
<td>1011 0111 0110 0110 0010 0101 1011 0101</td>
</tr>
<tr>
<td><strong>P</strong></td>
<td>1010 1111 1100 0001 0011 1100 0001</td>
</tr>
<tr>
<td><strong>PBOX + L</strong></td>
<td>1010 1111 1100 0001 0011 1100 0001</td>
</tr>
<tr>
<td>((PBOX + L)[13], R[13])</td>
<td>00110101 10010111 11000001 00101100 * 10100111 11000001 11011010 01110001</td>
</tr>
<tr>
<td>((L[14], R[14]))</td>
<td>10100111 11000001 11011011 01110001 * 00110111 10011111 11000001 00111010</td>
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### Round 15

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</thead>
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<td>((L[14], R[14]))</td>
<td>10100111 11000001 11011011 01110001 * 00110101 10011111 11000001 00111010</td>
</tr>
<tr>
<td>(e_{14} \oplus d_{14})</td>
<td>11111100001100101010101 * 111010101010100100101110001</td>
</tr>
<tr>
<td>(e_{15} \oplus d_{15})</td>
<td>11110100011001100101010111 * 1010101010100101101001110001</td>
</tr>
<tr>
<td><strong>KEY</strong></td>
<td>110111 111000 001110 110111 001111 010011 111100 001010</td>
</tr>
<tr>
<td><strong>E</strong></td>
<td>000110 101011 110000 110111 111000 000000 000101 011000</td>
</tr>
<tr>
<td>(E[R[14]] + \text{KEY})</td>
<td>101001 010010 110100 100100 110111 010111 111001 010100</td>
</tr>
<tr>
<td><strong>SBOX</strong></td>
<td>0100 0111 0010 0110 1001 0001 1110 1001</td>
</tr>
<tr>
<td><strong>PBOX</strong></td>
<td>0110 1001 0101 0000 1111 1100 0001 0101</td>
</tr>
<tr>
<td><strong>L</strong></td>
<td>1010 0111 1100 0001 1100 1101 0111 0001</td>
</tr>
<tr>
<td><strong>P</strong></td>
<td>1101 1010 1110 0001 0011 0001 0110 0100</td>
</tr>
<tr>
<td><strong>PBOX + L</strong></td>
<td>1101 1110 1001 0001 0011 0001 0110 0100</td>
</tr>
<tr>
<td>((PBOX + L)[14], R[14])</td>
<td>11001110 10010001 00110001 01100001 * 00110101 10011111 11000001 00110100</td>
</tr>
<tr>
<td>((L[15], R[15]))</td>
<td>00110101 10010111 11000000 00101100 * 11001110 10010010 00110001 01100100</td>
</tr>
</tbody>
</table>
Round 16

\[(L_{15}, R_{15}) \times 00110101 \ 10010111 \ 11000000 \ 00101100 * 11001110 \ 10010001 \ 00110001 \ 01100100\]

\[L_{15} \ \ R_{15} + 1111100001 \ 11011001 \ 11010101 \ 11011111 * 10101010 \ 10101100 \ 01011001 \ 00110001 \ 01100011 \ 001111000111\]

\[L_{16} \ \ R_{16} + 1111000011011001 \ 10101100 \ 01011001 \ 01100001 \ 011111001001\]

\[\text{KEY}_{16} + 110010 \ 110011 \ 110110 \ 001011 \ 000011 \ 100001 \ 011111 \ 100101\]

\[E[R_{15}] + \text{KEY}_{16} + 101011 \ 101110 \ 100100 \ 101001 \ 001011 \ 000011 \ 110011 \ 101100\]

\[\text{SBOX} + 001 \ 0001 \ 0100 \ 1010 \ 1100 \ 1111 \ 0101 \ 1110\]

\[PBOX + 0001 \ 1011 \ 1111 \ 0111 \ 0110 \ 0000 \ 0110 \ 1010 \ 0000 \ 0100 \ 0110\]

\[L_{15} + 0011 \ 0101 \ 1001 \ 0111 \ 1100 \ 0000 \ 0010 \ 1100\]

\[PBOX + L_{15} + 0010 \ 1110 \ 0110 \ 0000 \ 1010 \ 0000 \ 0100 \ 0110\]

\[PBOX + L_{15} + 00101110 \ 01100000 \ 10100000 \ 01000110 \ 11001110 \ 10010001 \ 00110001 \ 01100100\]

\[(L_{16}, R_{16}) = 00101110 \ 01100000 \ 10100000 \ 01000110 \ 11001110 \ 10010001 \ 00110001 \ 01100100\]

\[\text{Output} + 00101000 \ 11000001 \ 11000011 \ 11000000 \ 00101000 \ 01011110 \ 10010011 \ 10100100\]