Design and Implementation of a Digital Mixer with Digital Logic
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1. INTRODUCTION

The digital mixer is realizable but has spurs, careful filtering is needed.

2. MIXER DESIGN

- Analogue mixer can be expressed
- Replace analogue signal by digital
- Multiplication is XOR
- Implement addition
- Implement phase shift - (using Dflip)

Addition

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<tr>
<th></th>
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<th>A+B</th>
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<tbody>
<tr>
<td>-1</td>
<td>-1</td>
<td>-2</td>
</tr>
<tr>
<td>-1</td>
<td>1</td>
<td>0</td>
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<tr>
<td>1</td>
<td>-1</td>
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</tr>
<tr>
<td>1</td>
<td>1</td>
<td>+2</td>
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</tbody>
</table>

- A and B are two level signal while A+B are three level signal.
- The first line is low level and is neither A NOR B, while the last one is high level and can be implemented as AND
- The output of the first line and last line will be input of RS trigger

3. SIMULATION

4. IMPLEMENTATION AND MEASUREMENT

D flip flop CD74HC74E, NOT gate CD74HC04E, XOR gate CD74HC86E, NOR gate CD74HC02E, AND gate CD74HC08E, PLL chip CD74HC4046AE

CONCLUSION

The digital mixer is realizable but has spurs, careful filtering is needed.

REFERENCES
