Claims

What is Claimed is:

1. Mixer circuitry comprising:

a transformer having a first winding and a second winding;

a first input transistor coupled to a first terminal of the first winding and configured to receive an input signal;

a second input transistor coupled to a second terminal of the first winding and configured to receive the input signal;

a first pair of mixer transistors coupled to a first terminal of the second winding and configured to receive an oscillating signal;

a second pair of mixer transistors coupled to a second terminal of the second winding and configured to receive the oscillating signal; and

a conductive path that couples a center tap contact of the first winding to a center tap contact of the second winding.

2. The mixer circuitry of claim 1, further comprising:

an output transformer having a third winding and a fourth winding, the first pair of mixer transistors being coupled between the output transformer and the first terminal of the second winding, and the second pair of mixer transistors being coupled between the output transformer and the second terminal of the second winding; and

a positive power supply line coupled to a center tap contact of the third winding.

3. The mixer circuitry of claim 2, wherein the first input transistor has a first source-drain terminal coupled to the first terminal of the first winding, a second source-drain terminal coupled to a ground line, and a first gate terminal configured to receive the input signal.

4. The mixer circuitry of claim 3, wherein the second input transistor has a third source-drain terminal coupled to the second terminal of the first winding, a fourth source-drain terminal coupled to the ground line, and a second gate terminal configured to receive the input signal.

5. The mixer circuitry of claim 3, wherein the positive power supply line and the ground line are configured to produce a DC bias current that flows across the conductive path between the center tap contact of the first winding and the center tap contact of the second winding.

6. The mixer circuitry of claim 1, further comprising:

a first impedance termination disposed on the conductive path.

7. The mixer circuitry of claim 6, further comprising:

a second impedance termination that couples the conductive path to a ground line.

8. The mixer circuitry of claim 1, wherein the first pair of mixer transistors have first source-drain terminals coupled to the first terminal of the second winding, the first pair of mixer transistors have first gate terminals configured to receive the oscillating signal, the second pair of mixer transistors have second source-drain terminals coupled to the second terminal of the second winding, and the second pair of mixer transistors have second gate terminals configured to receive the oscillating signal.

9. The mixer circuitry of claim 8, further comprising:

a first impedance termination coupled between the first source-drain terminals and the first terminal of the second winding; and

a second impedance termination coupled between the second source-drain terminals and the second terminal of the second winding.

10. The mixer circuitry of claim 9, further comprising:

a third impedance termination disposed on the conductive path.

11. The mixer circuitry of claim 10, wherein the first impedance termination comprises a first differential mode impedance termination, the second impedance termination

comprises a second differential mode impedance termination, and the third impedance termination comprises a common mode impedance termination.

12. The mixer circuitry of claim 1, further comprising:

an additional conductive path that couples a node on the conductive path to a ground line.

13. The mixer circuitry of claim 1, wherein the first pair of mixer transistors and the second pair of mixer transistors are configured to generate an output signal based on the oscillating signal and the input signal, the output signal having a different frequency than the input signal, and the conductive path being configured to share a DC bias current between the first pair of mixer transistors, the second pair of mixer transistors, the first input transistor, and the second input transistor.

14. Mixer circuitry comprising:

a transconductor;

mixer transistors; and

a transformer that couples an output of the transconductor to an input of the mixer transistors, wherein the transformer includes

a first coil having a first center tap contact, and

a second coil magnetically coupled to the first coil, the second coil having a second center tap contact that is coupled to the first center tap contact over a conductive path.

15. The mixer circuitry of claim 14, wherein the mixer transistors have first source-drain terminals respectively coupled to first and second terminals of the second coil and have gate terminals configured to receive an oscillating signal.

16. The mixer circuitry of claim 15, wherein the transconductor comprises transistors with second source-drain terminals respectively coupled to first and second terminals of the first coil.

17. The mixer circuitry of claim 16, wherein the transistors in the transconductor have third source-drain terminals coupled to a ground line.

18. The mixer circuitry of claim 17, wherein the mixer transistors have fourth source-drain terminals, the mixer circuitry further comprising:

a third coil, wherein the fourth source-drain terminals are respectively coupled to first and second terminals of the third coil, the third coil having a third center tap contact coupled to a power supply line.

19. An electronic device comprising:

an antenna; and

a transceiver configured to convey radio-frequency signals using the antenna, the transceiver including

a first pair of transistors having first gate terminals configured to receive an input signal and having first source-drain terminals,

a second pair of transistors having second gate terminals configured to receive a local oscillator (LO) signal and having second source-drain terminals,

a third pair of transistors having third gate terminals configured to receive the LO signal and having third source-drain terminals, and

a transformer having a first inductor and a second inductor, wherein the first inductor is coupled between the first source-drain terminals, the second inductor is coupled between the second source-drain terminals and the third source-drain terminals, and a center tap of the first inductor is coupled to a center tap of the second inductor over a conductive path.

20. The electronic device of claim 19, the first pair of transistors having fourth source-drain terminals, the second pair of transistors having fifth source-drain terminals, the third pair of transistors having sixth source-drain terminals, the second pair of transistors being configured to generate an output signal at the fifth source-drain terminals based on the input signal, the third pair of transistors being configured to generate the output signal at the sixth

source-drain terminals based on the input signal, the output signal being at a different frequency than the input signal, and the electronic device further comprising:

a ground power supply line coupled to the fourth source-drain terminals;

a third inductor coupled between the fifth source-drain terminals and the sixth source-drain terminals; and

a positive power supply line coupled to a center tap of the third inductor.