CLAIMS

What is claimed is:

1. A method for separating a first signal from a second signal of a plurality of constituent signals within a composite signal, the method comprising:

receiving, at a first clock rate, a first portion of the composite signal spanning a first period of time;

exponentiating the first portion to detect the first signal and the second signal within the composite signal and determine,

a first modulation estimate of the first signal,

a second modulation estimate of the second signal, and

at least one symbol rate;

resampling the first portion based on the first modulation estimate and the second modulation estimate at x-times the at least one symbol rate to determine at least one symbol trajectory, at least one modulation type, and offset information related to an offset_between the first signal and the second signal, x being an integer greater than zero;

determining a synthesized first signal and a synthesized second signal representing the first signal and the second signal within the first period of time at a second clock rate, the second clock rate being a multiple of the first clock rate , wherein the determining is performed at least partially off-chip.

2. The method of claim 1 wherein the determining comprises:

generating a first demodulation estimate based on the resampling;

remodulating the first demodulation estimate based on the at least one modulation type to form the synthesized first signal; and

canceling the synthesized first signal from the first portion to form a first residual signal including an estimate of the second signal.

3. The method of claim 2 further comprising:

demodulating the first residual signal to form a second demodulation estimate;

remodulating the second demodulation estimate to form the synthesized second signal; and

canceling the synthesized second signal from the first portion to form a first refined synthesized first signal.

4. The method of claim 3 further comprising repeating the demodulating and the remodulating to form a refined synthesized second signal and a second refined synthesized first signal, at the second clock rate.

5. The method of claim 3 further comprising performing echo adjustment on the first residual signal to form the synthesized second signal.

6. The method of claim 1 further comprising:

receiving, at the first clock rate, a second portion of the composite signal spanning a second period of time following the first period of time; and

repeating the exponentiating, the resampling, and the determining on the second portion.

7. The method of claim 1 wherein the determining is performed in part by a regenerator modem located off-chip.

8. A device for separating a first signal from a second signal of a plurality of constituent signals within a composite signal, the device comprising:

a receiver operable to receive, at a first clock rate, a first portion of the composite signal spanning a first period of time;

one or more processors coupled to the receiver operable to, exponentiate the first portion to detect the first signal and the second signal within the composite signal and determine,

a first modulation estimate of the first signal,

a second modulation estimate of the second signal, and

at least one symbol rate; and

a regenerator modem disposed off-chip and configured to, in conjunction with the one or more processors,

resample the first portion based on the first modulation estimate and the second modulation estimate at x-times the at least one symbol rate to determine at least one symbol trajectory, at least one modulation type, and offset information between the first signal and the second signal, x being an integer greater than zero; and

determine a synthesized first signal and a synthesized second signal representing the first signal and the second signal within the first period of time at a second clock rate, the second clock rate being a multiple of the first clock rate.

9. The device of claim 8, wherein the regenerator modem being further operable to:

generate a first demodulation estimate based at least in part on the symbol trajectory;

remodulate the first demodulation estimate based on the at least one modulation type to form the synthesized first signal,

cancel the synthesized first signal from the first portion to form a first residual signal including an estimate of the second signal, at the second clock rate.

10. The device of claim 9, wherein the regenerator model is further configured to

demodulate the first residual signal to form a second demodulation estimate, and

remodulate the second demodulation estimate to form the synthesized second signal, and

wherein the one or more processors is further configured to cancel the refined estimated second signal from the first portion to form the synthesized first signal.

11. The device of claim 10 wherein the one or more processors is further configured to repeat the demodulating and the remodulating to form a refined synthesized second signal and a second refined synthesized first signal, at the second clock rate.

12. The device of claim 10 further comprising performing echo adjustment on the first residual signal to form the synthesized second signal.

13. The device of claim 8 further comprising:

receiving, at the first clock rate, a second portion of the composite signal spanning a second period of time following the first period of time; and

repeating the exponentiating, the resampling, and the determining on the second portion.

14. An apparatus for separating a first signal from a second signal of a plurality of constituent signals within a composite signal, the apparatus comprising:

means for receiving, at a first clock rate, a first portion of the composite signal spanning a first period of time;

means for exponentiating the first portion to detect the first signal and the second signal within the composite signal and determine,

a first modulation estimate of the first signal,

a second modulation estimate of the second signal, and

at least one symbol rate;

means for resampling the first portion based on the first modulation estimate and the second modulation estimate at x-times the at least one symbol rate to determine at least one symbol trajectory, at least one modulation type, and offset information between the first signal and the second signal, x being an integer greater than zero;

means for determining a synthesized first signal and a synthesized second signal representing the first signal and the second signal within the first period of time at a second clock rate, the second clock rate being a multiple of the first clock rate , wherein the means for determining is performed at least partially off-chip.

15. The apparatus of claim 14 wherein the means for determining comprises:

means for generating a first demodulation estimate based on the resampling;

means for remodulating the first demodulation estimate based on the at least one modulation type to form the synthesized first signal; and

means for canceling the synthesized first signal from the first portion to form a first residual signal including an estimate of the second signal.

16. The apparatus of claim 15 further comprising:

means for demodulating the first residual signal to form a second demodulation estimate;

means for remodulating the second demodulation estimate to form the synthesized second signal; and

means for canceling the synthesized second signal from the first portion to form a first refined synthesized first signal.

17. The apparatus of claim 16 further comprising means for repeating the demodulating and the remodulating to form a refined synthesized second signal and a second refined synthesized first signal, at the second clock rate.

18. The apparatus of claim 16 further comprising means for performing echo adjustment on the first residual signal to form the synthesized second signal.

19. The apparatus of claim 14 further comprising:

means for receiving, at the first clock rate, a second portion of the composite signal spanning a second period of time following the first period of time; and

means for repeating the exponentiating, the resampling, and the determining on the second portion.

20. The apparatus of claim 16 wherein the means for determining comprises a regenerator modem located off-chip.