CLAIMS:

1. A carrier cancellation system for generating an analogue cancellation signal, the system comprising:

an analogue gain module configured to receive and amplify an analogue signal;

an automatic gain control (AGC) module configured to:

receive a digital signal, whereby the digital signal is converted from the amplified analogue signal generated by the analogue gain module;

adjust an analogue gain of the analogue gain module based on an estimated power level of the received digital signal to maintain the power level of the received digital signal at a predetermined optimal level;

an initialized logic control module communicatively coupled to a system clock, whereby initialization of the logic control module comprises the logic control module being configured to:

initialize the logic control module when an analogue gain lock notification is received from the AGC module;

select an initial starting phase entry from phase LUT and an initial gain entry from gain LUT, and provide the selected starting phase and gain entries to the multipler to generate an initial cancellation signal;

iteratively select a starting phase entry from the phase LUT until an optimal starting phase entry α_x is obtained, whereby the optimal starting phase entry α_x is defined as the starting phase entry that produces the lowest power of cancelled signal P_c, whereby P_c is defined as an estimated power of the received analogue signal after the received analogue signal has been cancelled by the cancellation signal;

iteratively select a gain entry from the gain LUT until the optimum gain entry is selected, whereby the optimum gain entry is defined as a gain entry that produces the lowest power of cancelled signal P_c among all the gain entries in the gain LUT; and

notify the AGC module to unlock and adjust an analogue gain of the analogue gain module based on a power level of the cancelled signal,

the initialized logic control module being configured to:

select an optimum gain entry from a gain look up table (LUT) and provide the selected gain entry to a multiplier;

select a phase entry, once every clock cycle of the system's clock, from a phase LUT, beginning with the optimal starting phase entry and provide the selected phase entry to the multiplier,

the multiplier being configured to multiply the selected optimum gain entry and the selected phase entry; and

a digital-to-analogue converter (DAC) being configured to convert the multiplied signals generated by the multiplier to the analogue cancellation signal.

~~2. The carrier cancellation system according to claim 1 whereby the initialization of the logic control module comprises the logic control module being configured to:~~

~~initialize the logic control module when an analogue gain lock notification is received from the AGC module;~~

~~select an initial starting phase entry from phase LUT and an initial gain entry from gain LUT, and provide the selected starting phase and gain entries to the multipler to generate an initial cancellation signal;~~

~~iteratively select a starting phase entry from the phase LUT until an optimal starting phase entry α_x is obtained, whereby the optimal starting phase entry α_x is defined as the starting phase entry that produces the lowest power of cancelled signal P_e, whereby P_e is defined as an estimated power of the received analogue signal after the received analogue signal has been cancelled by the cancellation signal;~~

~~iteratively select a gain entry from the gain LUT until the optimum gain entry is selected, whereby the optimum gain entry is defined as a gain entry that produces the lowest power of cancelled signal P_e among all the gain entries in the gain LUT; and~~

~~notify the AGC module to unlock and adjust an analogue gain of the analogue gain module based on a power level of the cancelled signal.~~

~~3.~~2. The carrier cancellation system according to claims 1 whereby the phase LUT comprises phase entries sampled from a sinusoidal wave cycle at a certain constant interval.

~~4.~~3. The carrier cancellation system according to ~~any one of~~ claim~~s~~ 1 ~~to~~ or ~~3~~2, the system further comprising:

a post-DAC analogue gain module configured to amplify the analogue cancellation signal generated by the DAC.

~~5.~~4. The carrier cancellation system according to any one of claims 1 to ~~4~~3, the system further comprising:

an analogue-to-digital converter (ADC) configured to:

convert the amplified analogue signal generated by the analogue gain module into a digital signal; and

provide the digital signal to the ADC module.

56. A method for generating an analogue cancellation signal using a carrier cancellation system comprising an analogue gain module, an automatic gain control (AGC) module, an initialized logic control module, a multiplier and a digital-to-analogue converter (DAC), whereby the step of initializating the logic control module comprises:

initializing the logic control module when an analogue gain lock notification is received from the AGC module;

selecting, using the logic control module, an initial starting phase entry from phase LUT and an initial gain entry from gain LUT, and providing the selected starting phase and gain entries to the multipler to generate an initial cancellation signal;

iteratively selecting, using the logic control module, a starting phase entry from the phase LUT until an optimal starting phase entry α_x is obtained, whereby the optimal starting phase entry α_x is defined as the starting phase entry that produces the lowest power of cancelled signal P_c, whereby P_c is defined as an estimated power of the received analogue signal after the received analogue signal has been cancelled by the cancellation signal;

iteratively selecting, using the logic control module, a gain entry from the gain LUT until the optimum gain entry is selected, whereby the optimum gain entry is defined as a gain entry that produces the lowest power of cancelled signal P_c among all the gain entries in the gain LUT; and

notifying, using the logic control module, the AGC module to unlock and adjust an analogue gain of the analogue gain module based on a power level of the cancelled signal,

the method comprising:

receiving and amplifying, using the analogue gain module, an analogue signal;

receiving, using the AGC module, a digital signal, whereby the digital signal is converted from the amplified analogue signal generated by the analogue gain module;

adjusting, using the AGC module, an analogue gain of the analogue gain module based on an estimated power level of the received digital signal to maintain the power level of the received digital signal at a predetermined optimal level;

selecting, using the initialized logic control module communicatively coupled to a system clock, an optimum gain entry from a gain look up table (LUT) and provide the selected gain entry to a multiplier;

selecting, using the initialized logic control module, a phase entry, once every clock cycle of the system's clock, from a phase LUT, beginning with the optimal starting phase entry and providing the selected phase entry to the multiplier;

multiplying, using the multiplier, the selected optimum gain entry and the selected phase entry; and

converting, using the DACm the multiplied signals generated by the multiplier to the analogue cancellation signal.

~~7. The method according to claim 6, whereby the step of initializating the logic control module comprises:~~

~~initializing the logic control module when an analogue gain lock notification is received from the AGC module;~~

~~selecting, using the logic control module, an initial starting phase entry from phase LUT and an initial gain entry from gain LUT, and providing the selected starting phase and gain entries to the multipler to generate an initial cancellation signal;~~

~~iteratively selecting, using the logic control module, a starting phase entry from the phase LUT until an optimal starting phase entry α_x is obtained, whereby the optimal starting phase entry α_x is defined as the starting phase entry that produces the lowest power of cancelled signal P_c, whereby P_c is defined as an estimated power of the received analogue signal after the received analogue signal has been cancelled by the cancellation signal;~~

~~iteratively selecting, using the logic control module, a gain entry from the gain LUT until the optimum gain entry is selected, whereby the optimum gain entry is defined as a gain entry that produces the lowest power of cancelled signal P_c among all the gain entries in the gain LUT; and~~

~~notifying, using the logic control module, the AGC module to unlock and adjust an analogue gain of the analogue gain module based on a power level of the cancelled signal.~~

~~8~~6. The method according to claim~~s 6 or 7~~5 whereby the phase LUT comprises phase entries sampled from a sinusoidal wave cycle at a certain constant interval.

~~9~~7. The method according to ~~any one of claims 6 to 8~~claim 5 or 6, the method further comprising the step of:

amplifying, using a post-DAC analogue gain module, the analogue cancellation signal generated by the DAC.

~~10~~8. The method according to any one of claims ~~6~~ 5 to ~~9~~7, the method further comprising the step of:

converting, using an analogue-to-digital converter (ADC), the amplified analogue signal generated by the analogue gain module into a digital signal, and providing the digital signal to the ADC module.