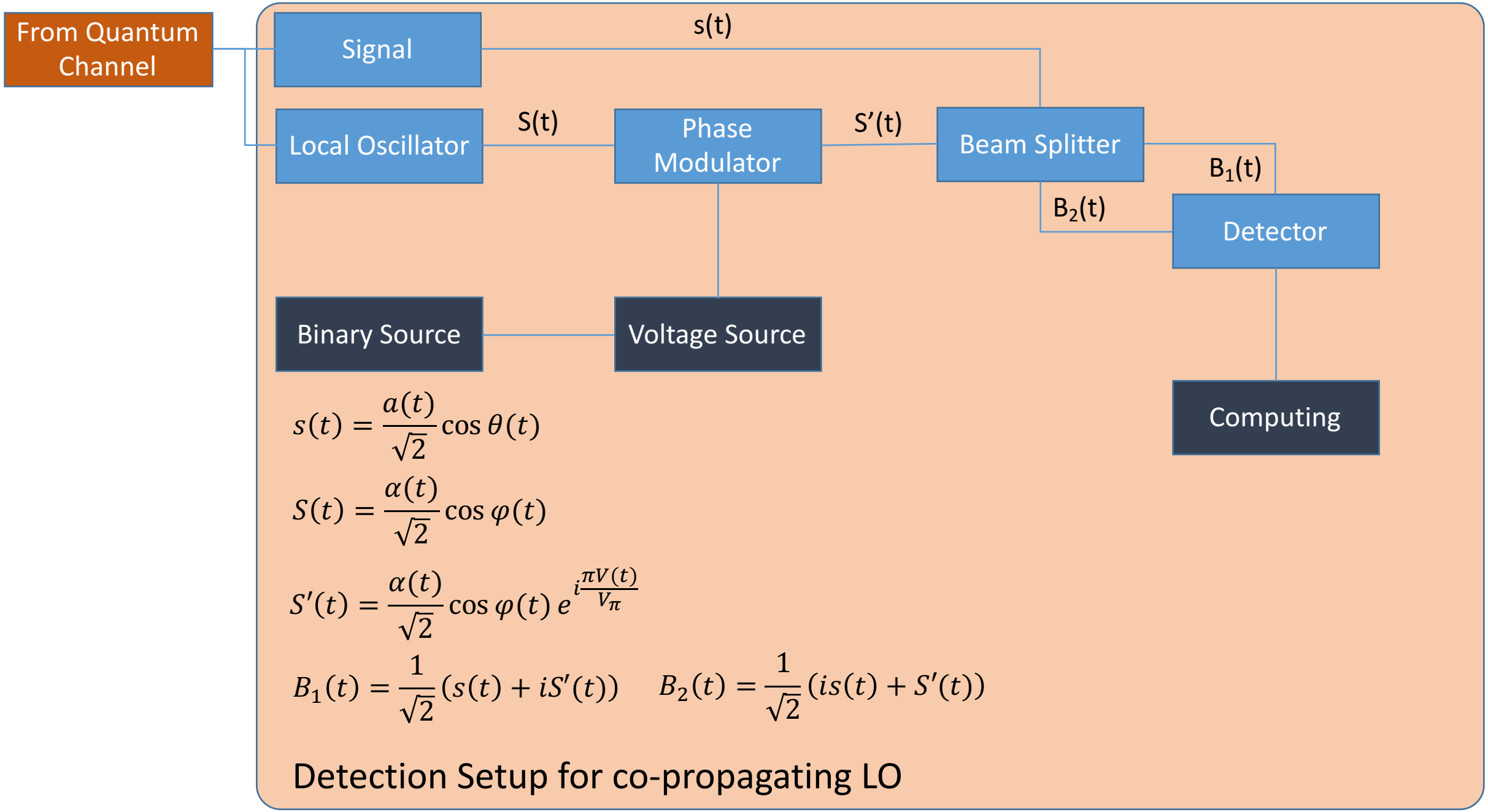


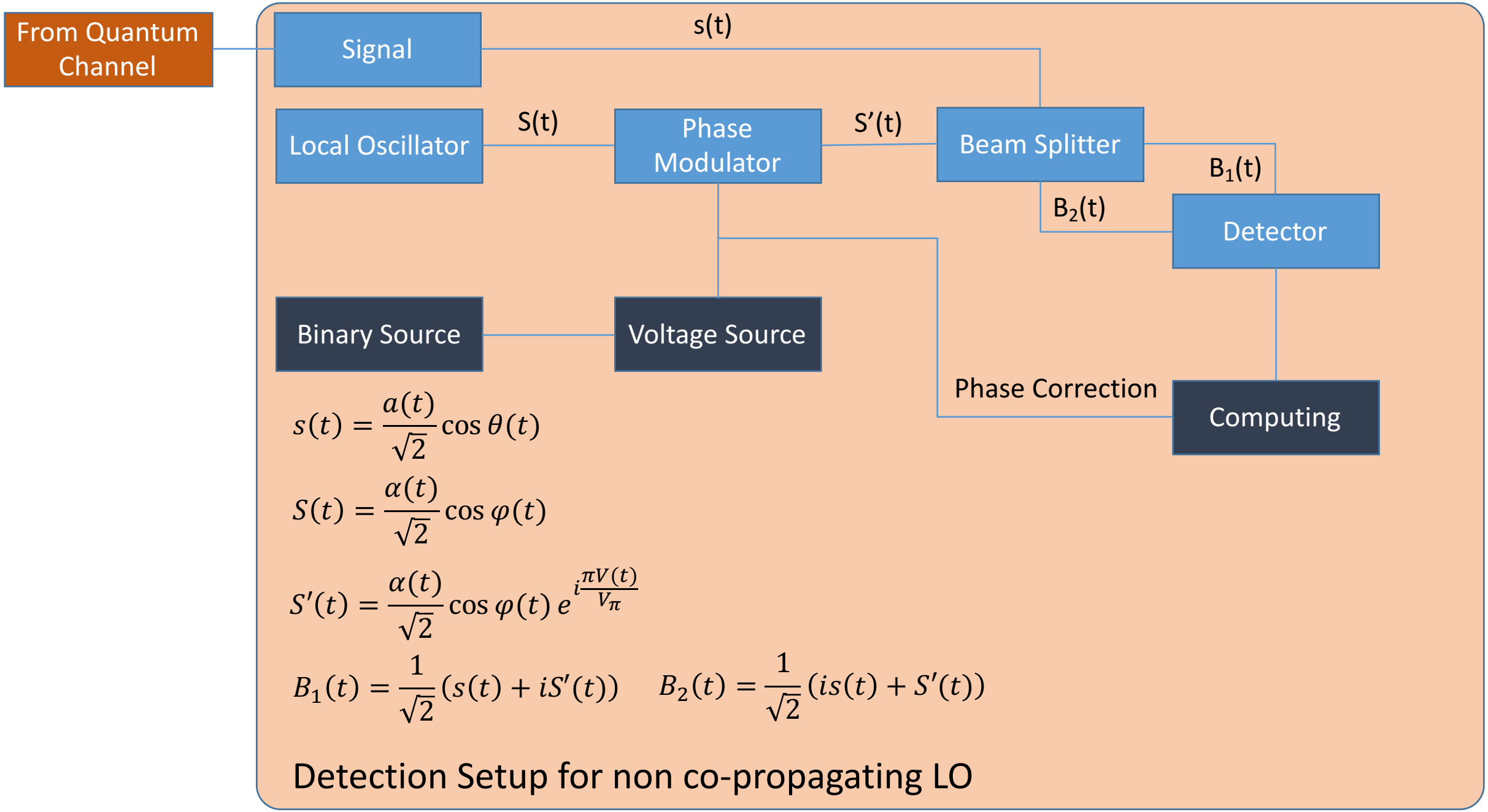
$$s(t) = \frac{a(t)}{\sqrt{2}} \cos\theta(t)$$

$$S(t) = \frac{\alpha(t)}{\sqrt{2}} \cos\varphi(t)$$

$$S'(t) = \frac{\alpha(t)}{\sqrt{2}} \cos\varphi(t)\, e^{i\frac{\pi V(t)}{V_\pi}}$$

$$B_1(t) = \frac{1}{\sqrt{2}}(s(t) + iS'(t)) \qquad B_2(t) = \frac{1}{\sqrt{2}}(is(t) + S'(t))$$

Detection Setup for co-propagating LO



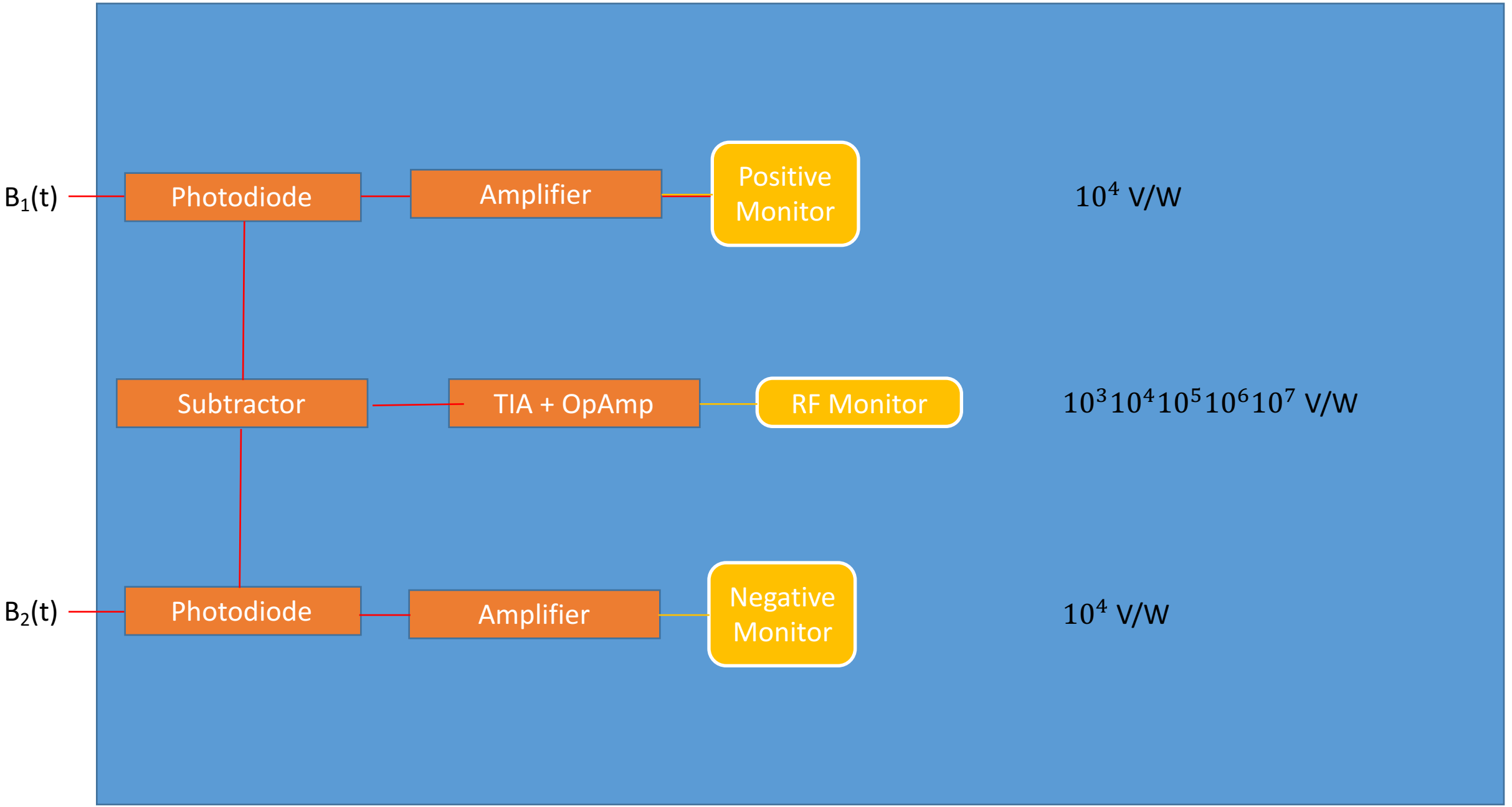
$$s(t) = \frac{a(t)}{\sqrt{2}} \cos\theta(t)$$

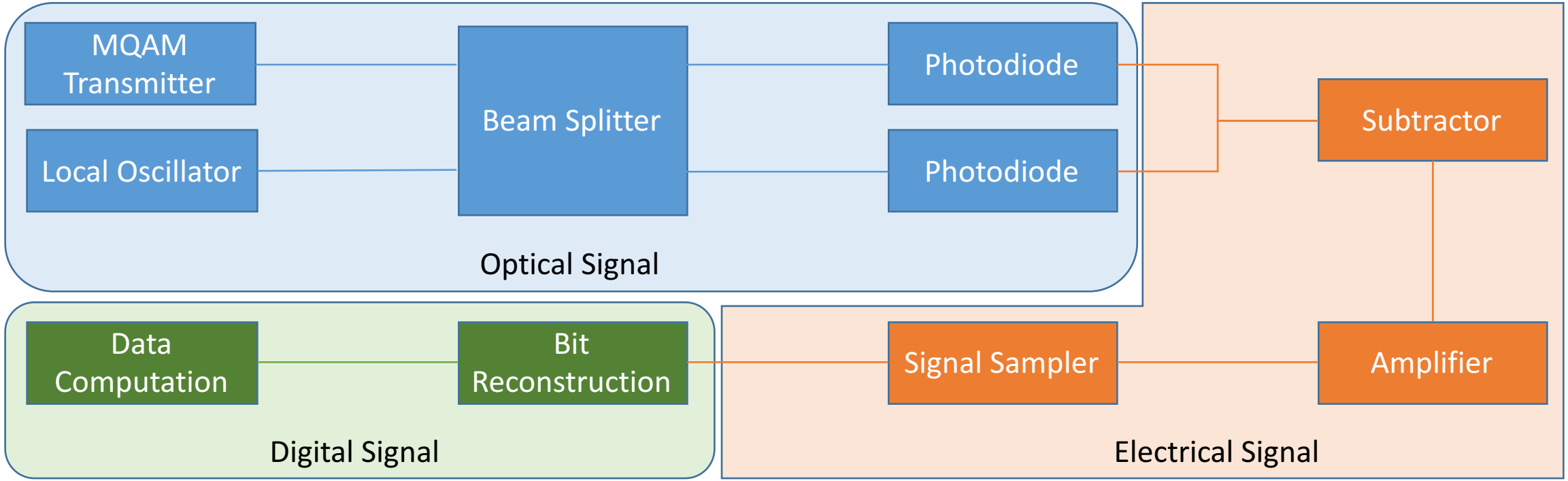
$$S(t) = \frac{\alpha(t)}{\sqrt{2}} \cos\varphi(t)$$

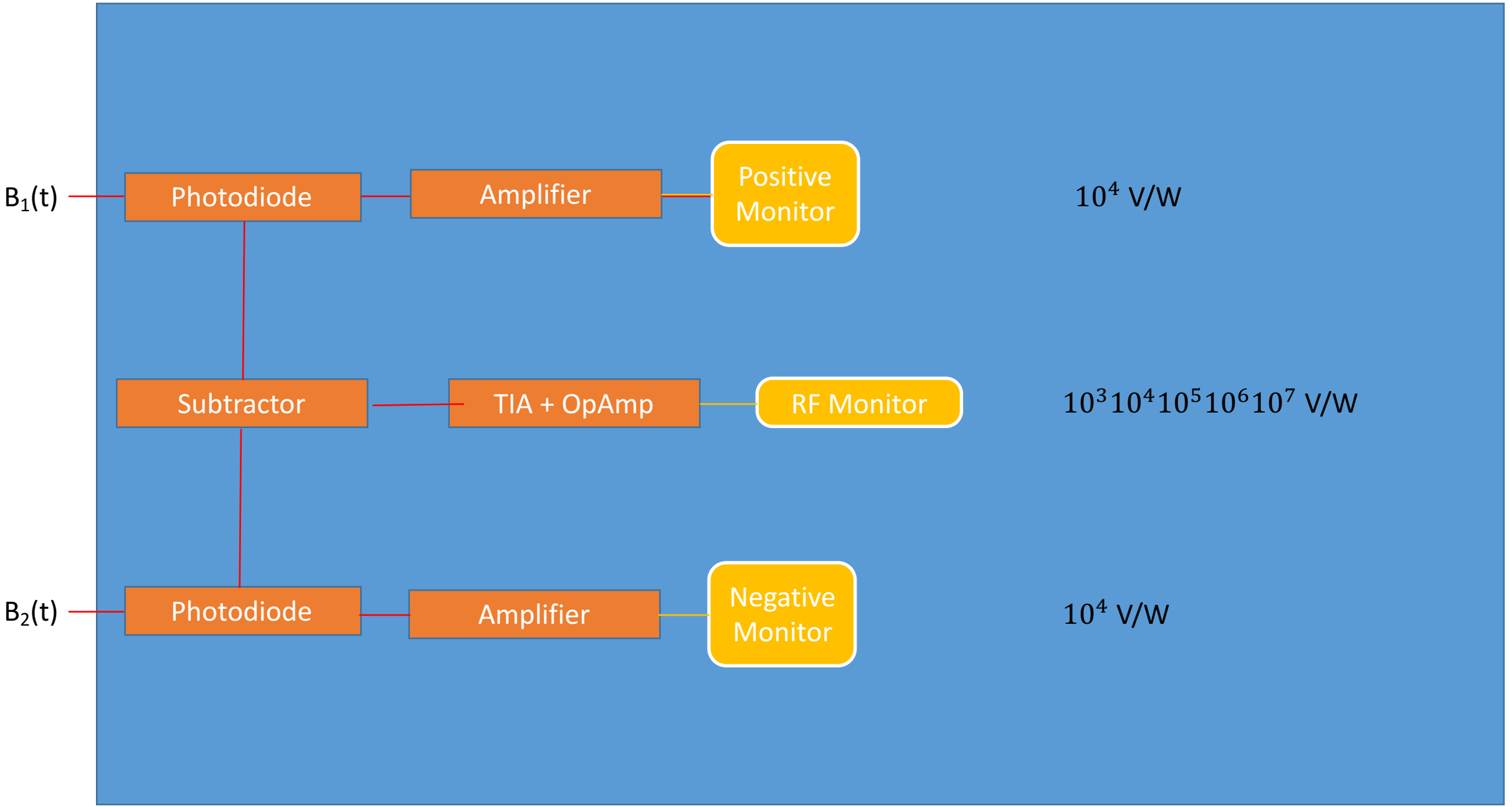
$$S'(t) = \frac{\alpha(t)}{\sqrt{2}} \cos\varphi(t)\, e^{i\frac{\pi V(t)}{V_\pi}}$$

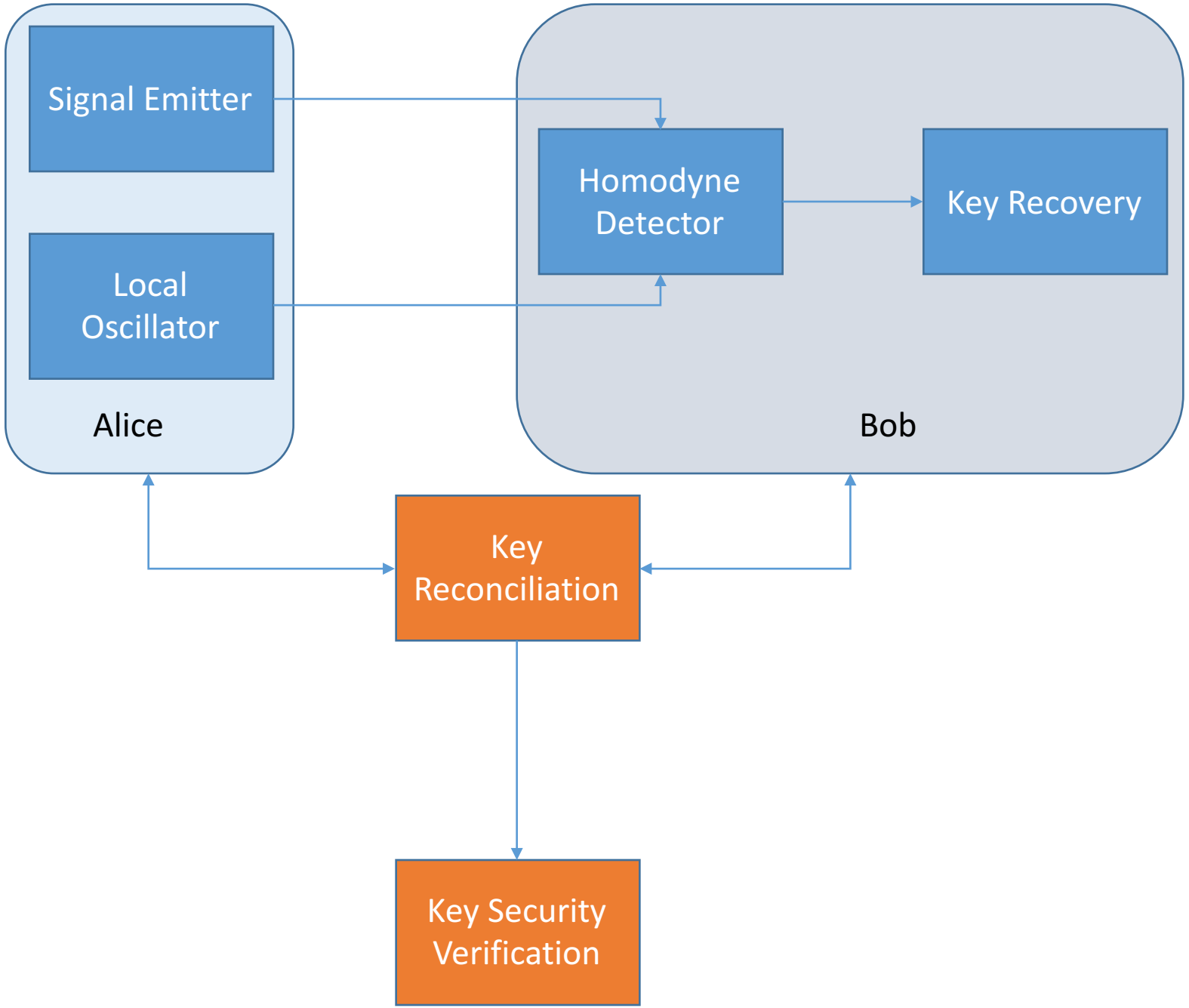
$$B_1(t) = \frac{1}{\sqrt{2}}(s(t) + iS'(t)) \qquad B_2(t) = \frac{1}{\sqrt{2}}(is(t) + S'(t))$$

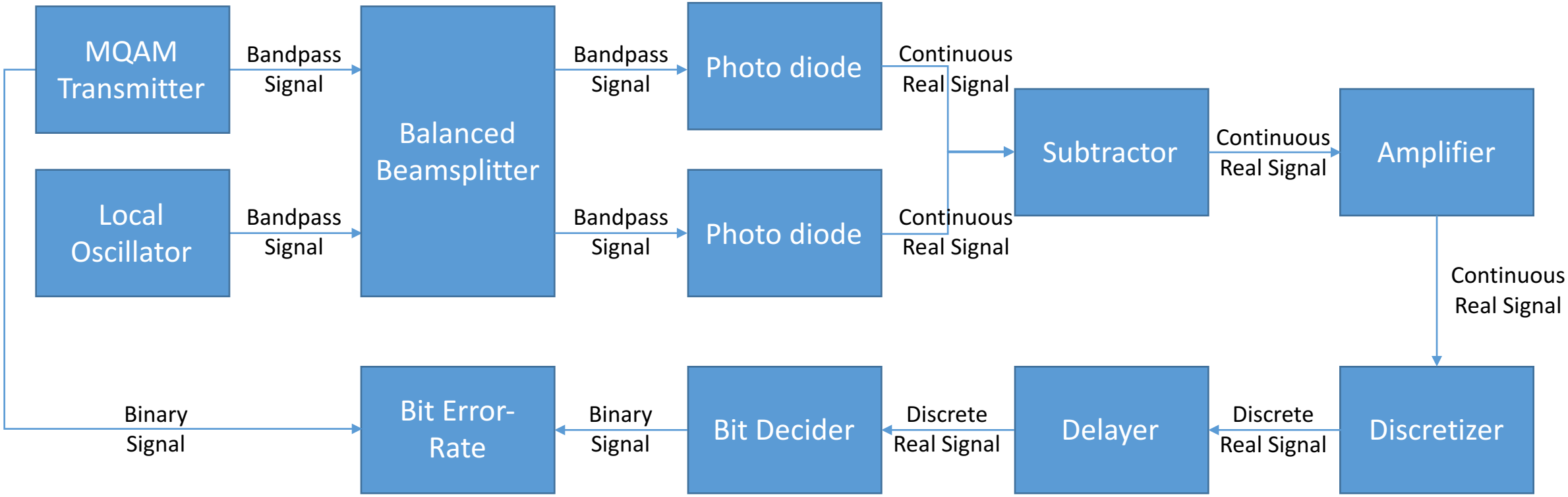
Detection Setup for non co-propagating LO


$B_1(t)$
Photodiode
Amplifier
Positive Monitor
10^4 V/W
Subtractor
TIA + OpAmp
RF Monitor
$10^3 10^4 10^5 10^6 10^7$ V/W
$B_2(t)$
Photodiode
Amplifier
Negative Monitor
10^4 V/W

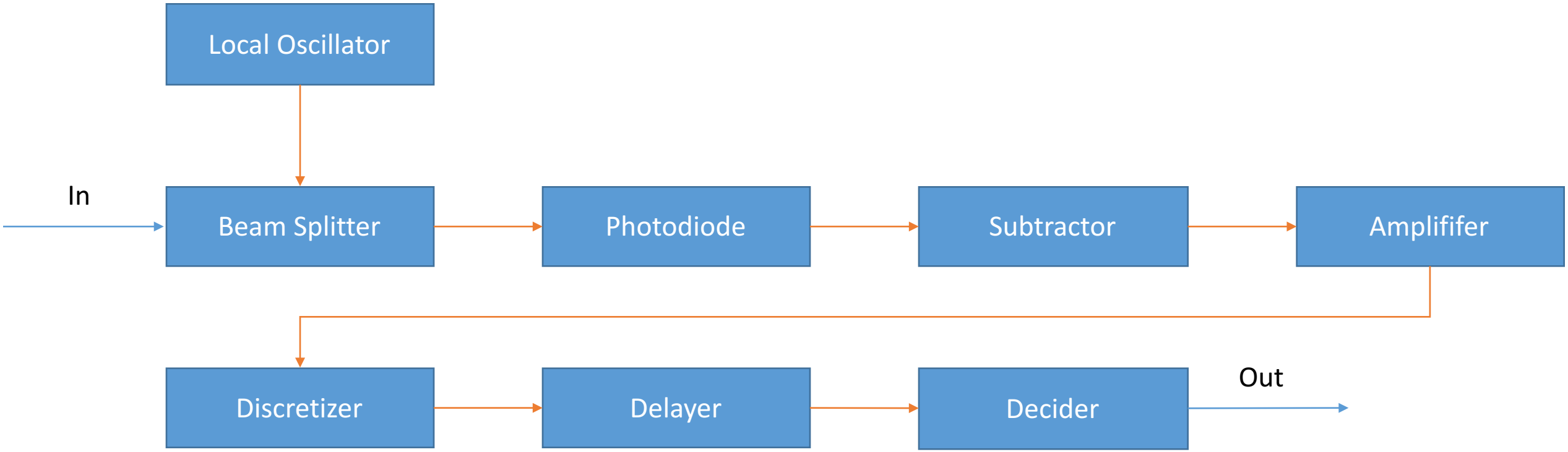

MQAM Transmitter
Local Oscillator
Beam Splitter
Photodiode
Photodiode
Subtractor
Optical Signal
Data Computation
Bit Reconstruction
Signal Sampler
Amplifier
Digital Signal
Electrical Signal


$B_1(t)$
Photodiode
Amplifier
Positive Monitor
10^4 V/W
Subtractor
TIA + OpAmp
RF Monitor
$10^3 10^4 10^5 10^6 10^7$ V/W
$B_2(t)$
Photodiode
Amplifier
Negative Monitor
10^4 V/W


Signal Emitter
Local Oscillator
Alice
Homodyne Detector
Key Recovery
Bob
Key Reconciliation
Key Security Verification


MQAM Transmitter
Bandpass Signal
Balanced Beamsplitter
Bandpass Signal
Photo diode
Continuous Real Signal
Local Oscillator
Bandpass Signal
Bandpass Signal
Photo diode
Continuous Real Signal
Subtractor
Continuous Real Signal
Amplifier
Continuous Real Signal
Binary Signal
Bit Error-Rate
Binary Signal
Bit Decider
Discrete Real Signal
Delayer
Discrete Real Signal
Discretizer

BPSK
Transmitter
BPSK
Receiver
BER
Estimation


Local Oscillator
In
Beam Splitter
Photodiode
Subtractor
Amplififer
Discretizer
Delayer
Decider
Out