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Amplitude Modulator Chassis

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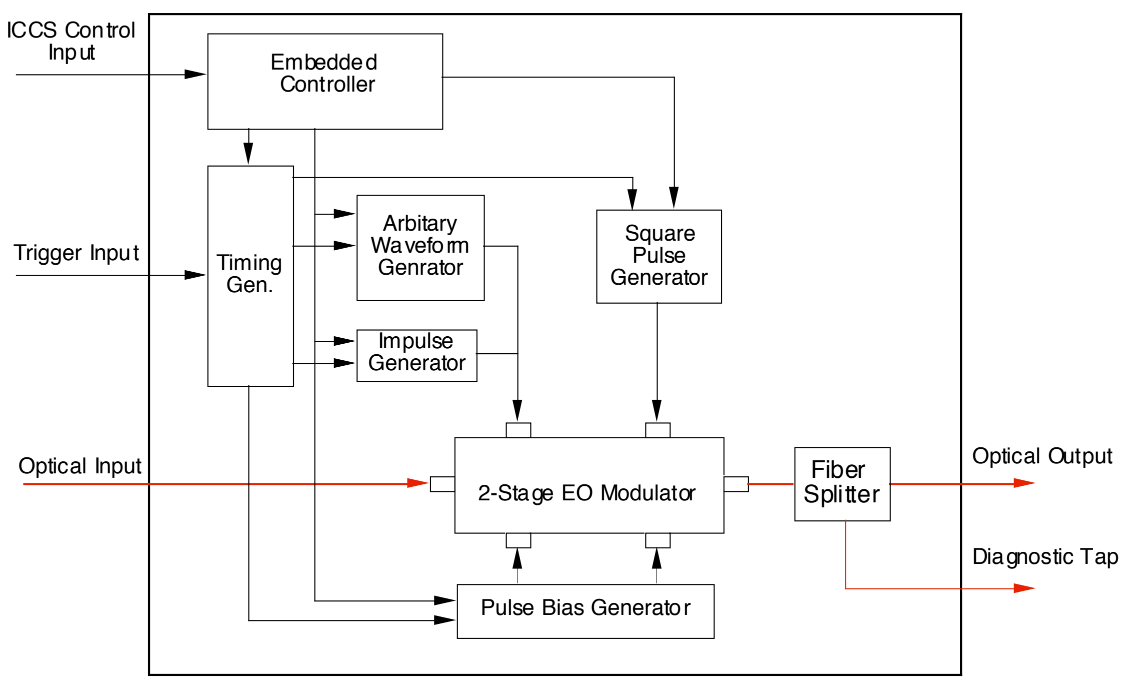
Amplitude Modulator Chassis

The Amplitude Modulator Chassis (AMC) is the final component in the MOR system and connects directly to the PAM input through a100-meter fiber. The 48 AMCs temporally shape the 48 outputs of the MOR using an arbitrary waveform generator coupled to an amplitude modulator.

The amplitude modulation element is a two stage, Lithium Niobate waveguide device, where the intensity of the light passing through the device is a function of the electrical drive applied. The first stage of the modulator is connected to a programmable high performance Arbitrary Waveform Generator (AWG) consisting of 140 impulse generators space 250 ps apart. An arbitrary waveform is generated by independently varying the amplitude of each impulse generator and then summing the impulses together. In addition to the AWG a short pulse generator is also connected to the first stage of the modulator to provide a sub 100-ps pulse used for timing experiments.

The second stage of the modulator is connect to a square pulse generator used to further attenuate any pre or post pulse light passing through the first stage of the modulator. The fast rise and fall time of the square pulse generator is also used to produce fast rise and fall times of the AWG by clipping the AWG pulse.

For maximum extinction, a pulse bias voltage is applied to each stage of the modulator. A pulse voltage is applied as opposed to a DC voltage to prevent charge buildup on the modulator. Each bias voltage is adjustable to provide a minimum of 50-dB extinction.



Block diagram of the AMC showing the main components of the chassis

The AMC is controlled through ICCS to generate the desired temporal pulse shape. This process involves a closed-loop control algorithm, which compares the desired temporal waveform to the produced optical pulse, and iterates the programming of the AWG until the two waveforms agree within an allowable tolerance.