Doppler Option for Fiber Optic Delay Lines.

EOX delay lines are well suited as target simulators for many radar applications. The following write-up describes a method for adding Doppler to the radar transmit pulses.

In addition to RF components described below, two RF signal generators will be required, (for dynamic Doppler addition, one of which needs to have internal arbitrary waveform generator (Aeroflex 3410) capable of FM-ing the output signal). These units are referenced locked using the same clock (10/100 MHZ). For this explanation assume a fixed 30KHz Doppler frequency.

Doppler Insertion Components Described:

- Mixer # 1 is used to down-convert the 9 GHz Radar pulse to about 6,000,030,000 Hz by using the doppler added 2,999,970,000 Hz signal generator.
- Band Pass Filter #1 is used to limit mixing products to the FODL.
- Output of FODL goes through Mixer 2 which mixes the delayed Doppler signal with a 3.0GHz CW Signal from Generator #2 produces the 9GHz output frequency.
- BP Filter #2, removes unwanted mixing products prior to optional gain compensation Amplifier 1.
- Output of the system is the customers radar pulse with 30KHz Doppler added.

Delay Line with added Doppler

Approach 1 for discussion purposes
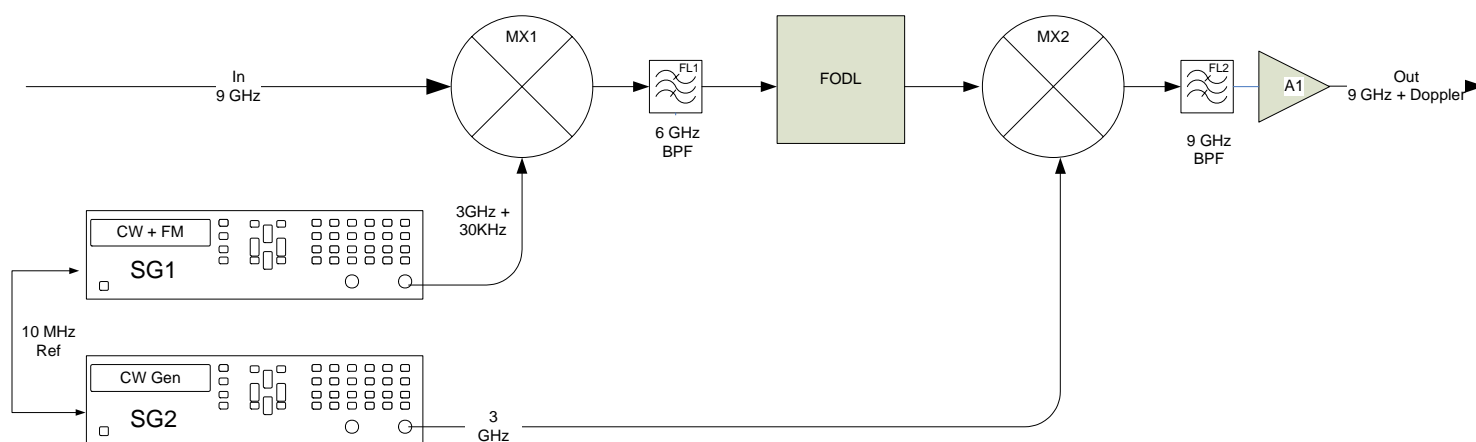
Notes:
1. Sig Gen #1 Adds FM to signal simulating Doppler.
2. Sig Gen #2 is just a CW source and is phase locked to #1