

## Technical Description

The system is shown below:

# SS225 Block Diagram

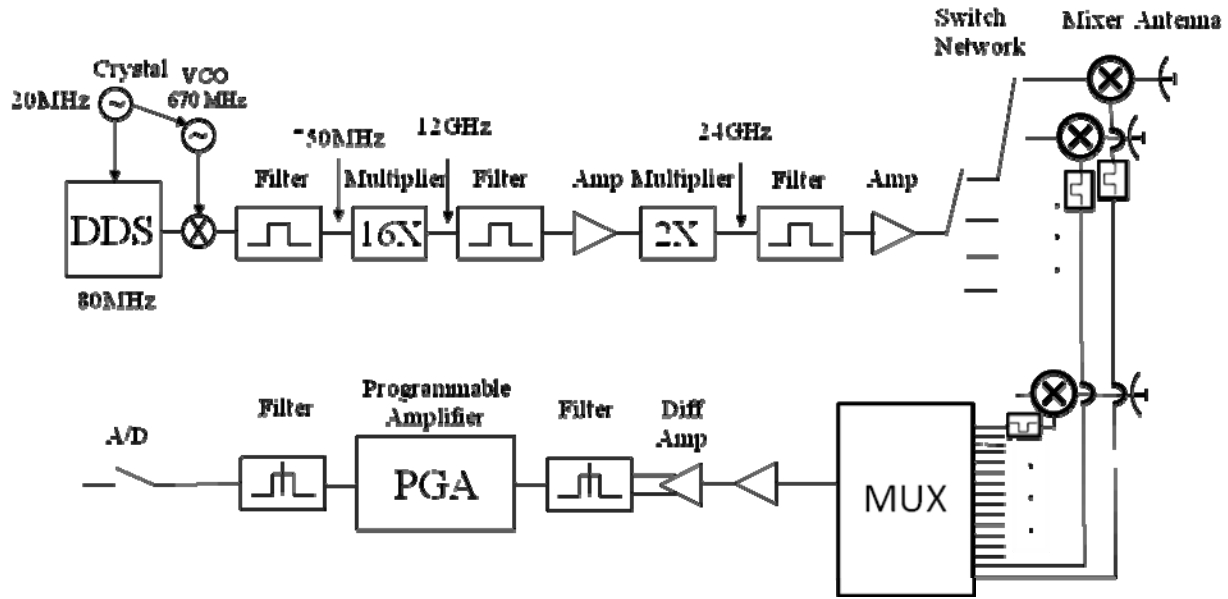


Figure 1

As shown in figure 1, the DDS generates a linear frequency modulated chirp from 0 to 7.8 MHz. This signal is mixed up and filtered to leave a chirp from 750 MHz to 757.8 MHz. The signal then goes through the 16 times multiplier, filter and amplifier to create a linear frequency modulated chirp that ramps the signal from 12 GHz to 12.125 GHz. The doubler and filter then move the signal to the 24 to 24.25 Linear Frequency Modulated (LFM) chirp, or Frequency Modulated Continuous Wave (FMCW) signal. The signal is then amplified and goes through the switch network to be transmitted out of only one antenna at a time. The up chirp takes 255 microseconds and the down chirp takes 5 microseconds. The Pulse Repetition Frequency (PRF) is then 3846 Hz, or roughly 4 KHz.

The transmitted frequency is controlled using a DDS, VCO, 16X multiplier and Doubler as shown in the block diagram and discussed above.

To suppress spurious signals, stripline RF filters are built into the printed circuit board. Additionally, 2 pieces of RF absorbing foam are used. The first is placed between the RF board and the DSP board and the second piece of absorbing material is attached to the back of the RF board (the side with the antennas).

The system does not send information, but transmits an LFM chirp and listens for the echoes from objects in its antenna pattern. The frequency modulation is used so that when the delayed return chirp is mixed with the transmit signal, the resulting frequency corresponds to a range.