Transmit and Receive Paths for Radio Test Set

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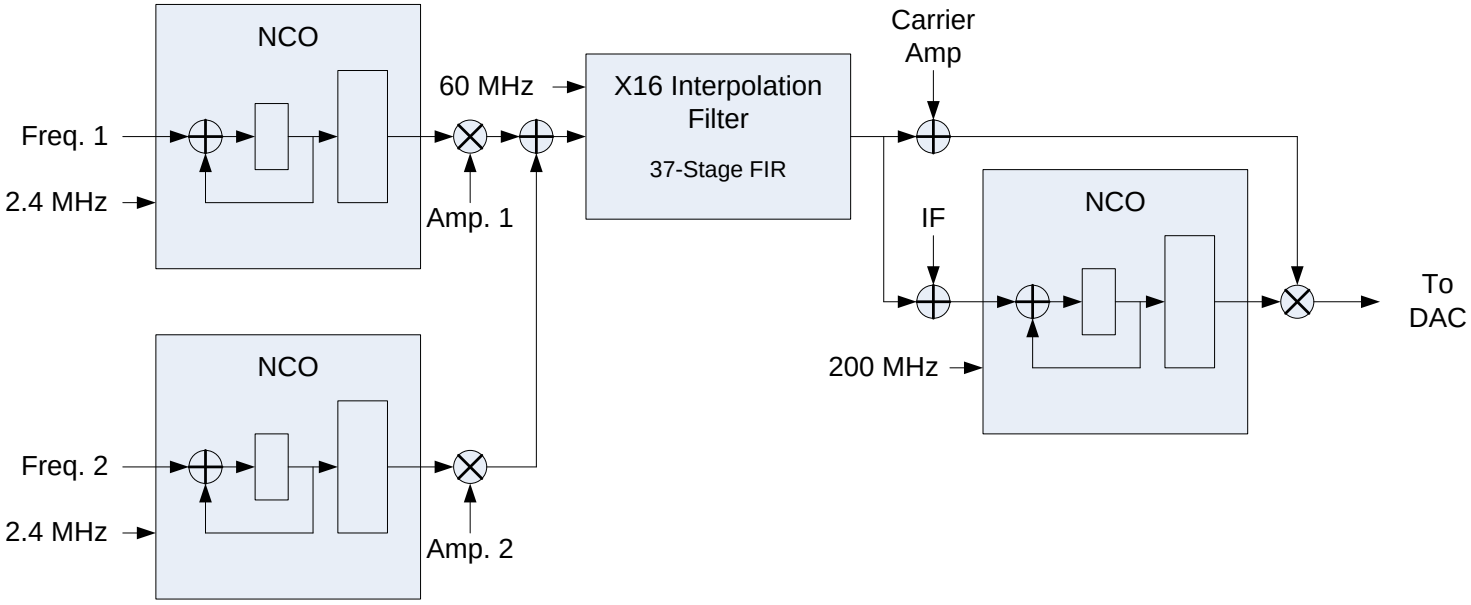
ECE-641

Fall 2010

Transmit Path

- Two separate Audio source channels
  - Generated by Numerically Controlled Oscillator (NCO) Functions
- Adjust Magnitude (multiply) and Sum the two channels
- X16 Interpolation to smooth out sampling
  - 37 stage FIR filter
- Third NCO for Carrier channel
- FM or AM modulate Audio on to Carrier

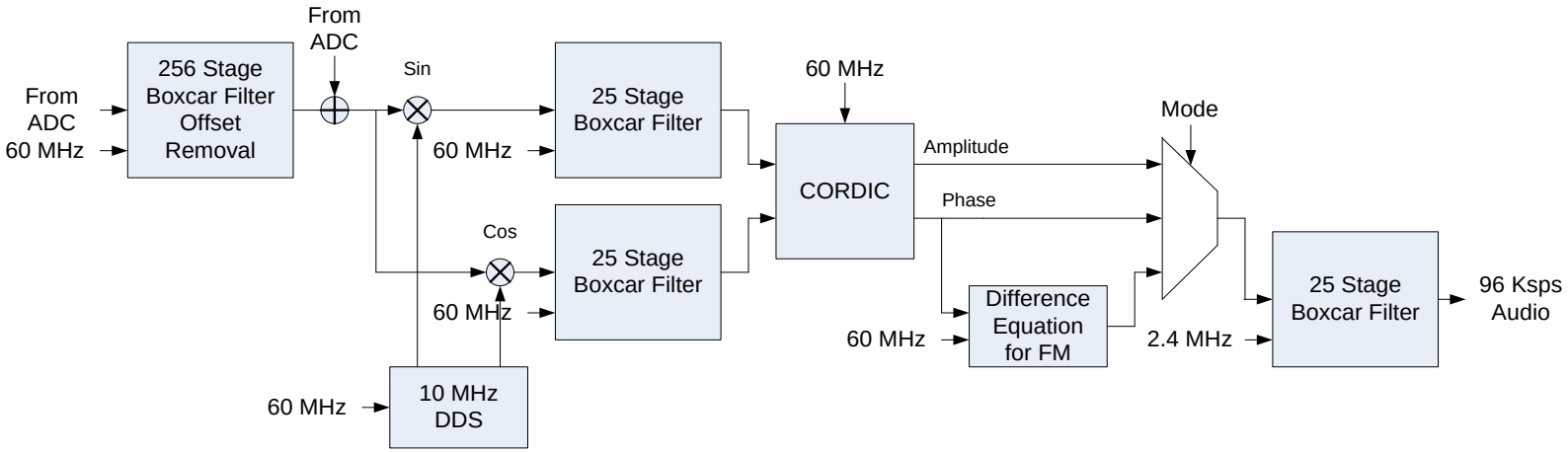
Transmit Path Block Diagram



Receive Path

- Sample 70 MHz input at 60 MHz
  - Results in 10 MHz IF
- 256 Stage Boxcar Filter for Offset Removal
- Multiply IF by sin and cos to recover Audio
- LPF (Two 25 Stage Boxcar Filters)
- CORDIC to recover Amplitude and Phase
- Decimate (AM) or Difference (FM)

Receive Path Block Diagram



User Interface

- SW(17 downto 16) used as address
- SW(15 downto 0) used as data
- KEY(0) used as reset
- KEY(1) used as data latch
- LEDR(15 downto 0) shows latched data at address
- HEX(7) shows address
- HEX(3 downto 0) shows current status of SW(15 downto 0)