

4-wire Internal trunk (hundreds of miles)

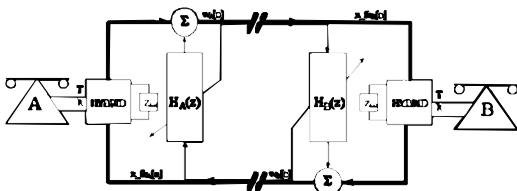


Figure 1: Illustration of Split echo cancellation topology. The heavy arrows indicate the direction of short term voice power. The communication illustrated is two-way simultaneous Full-Duplex.  $H_A(z)$  and  $H_B(z)$  are adaptive filters used to replicate the echo signal at each end.

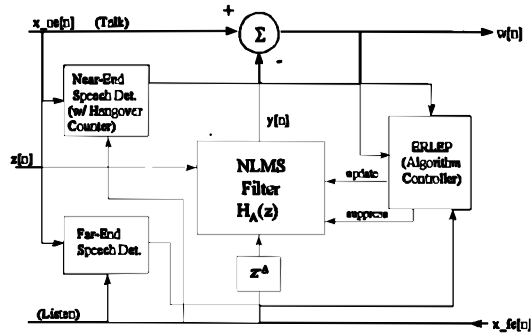
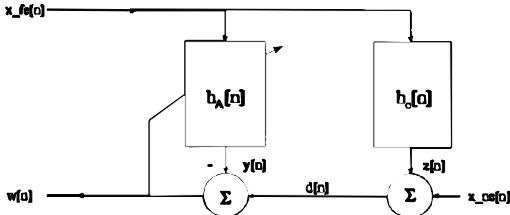


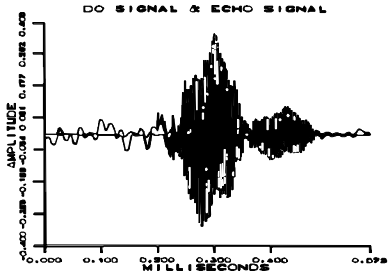
Figure 4: Complete Echo Canceler configuration.



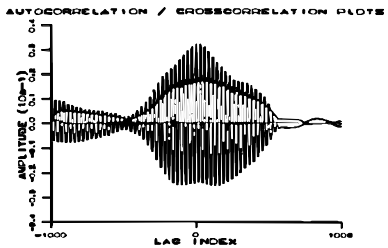
**Signal definition:**

- $x_{fe}[n]$  – Far end signal (Secret talker).
- $x_{ne}[n]$  – Near end signal (Open talker).
- $w[n]$  – Tell signal ( $x_{fe}[n] + x_{ne}[n]$ ).
- $r[n]$  – Residual echo signal.
- $y[n]$  – Echo replica signal.
- $d[n]$  – Desired signal.
- $z[n]$  – Echo signal.

Figure 2: Illustration of discrete time system identification model for adaptive echo cancellation.

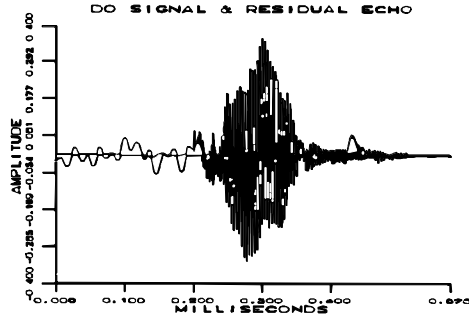


(a)

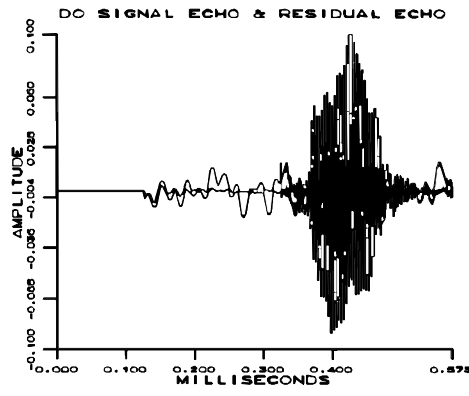


(b)

Figure 3: Signal and Correlation Plots



(a)



(b)

Figure 5: Signal and Echo Plots