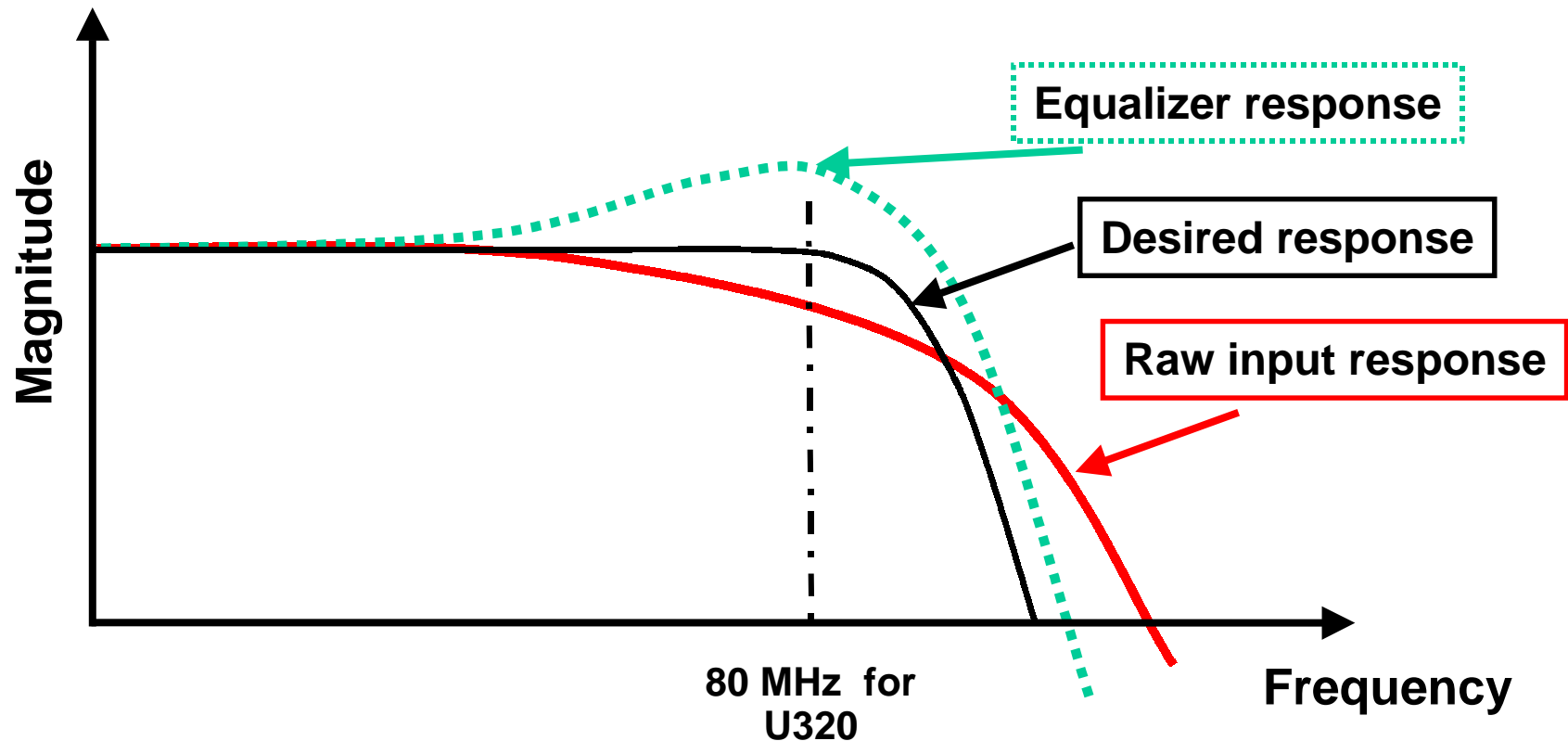


**Receive Equalizer used for
Quantum Ultra320 Eye Diagram Data**

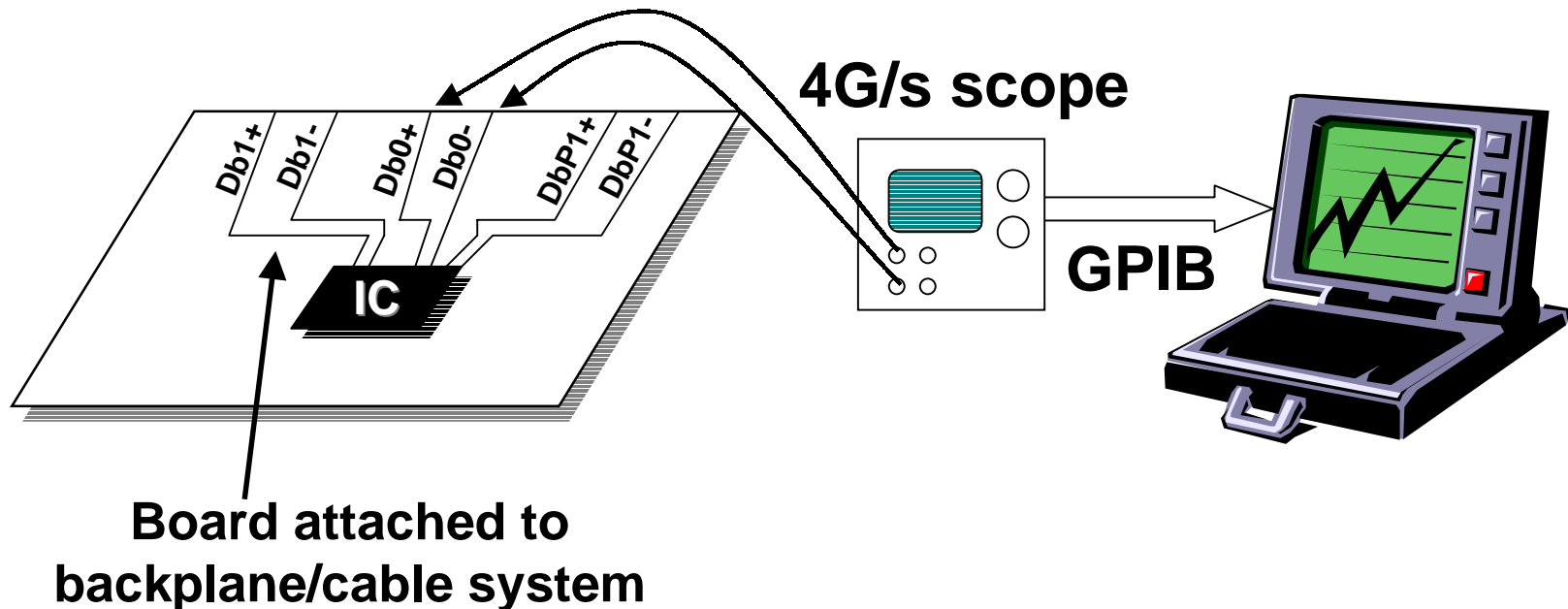
**Russ Brown
Quantum Corporation**

**SCSI Physical Working Group Meeting
07 March 2000
Dallas, TX**



The Receive Equalizer is used to boost the AC magnitude at the receiver to compensate for the frequency response losses of the loaded cable plant.

- Capture differential data from a cable and backplane setup.
- Send raw data to a PC to run mathematical simulation script:
 - Same data sets as used for no-comp and precomp measurements
 - Numerical adaptive equalization
 - Generate and evaluate eye diagrams

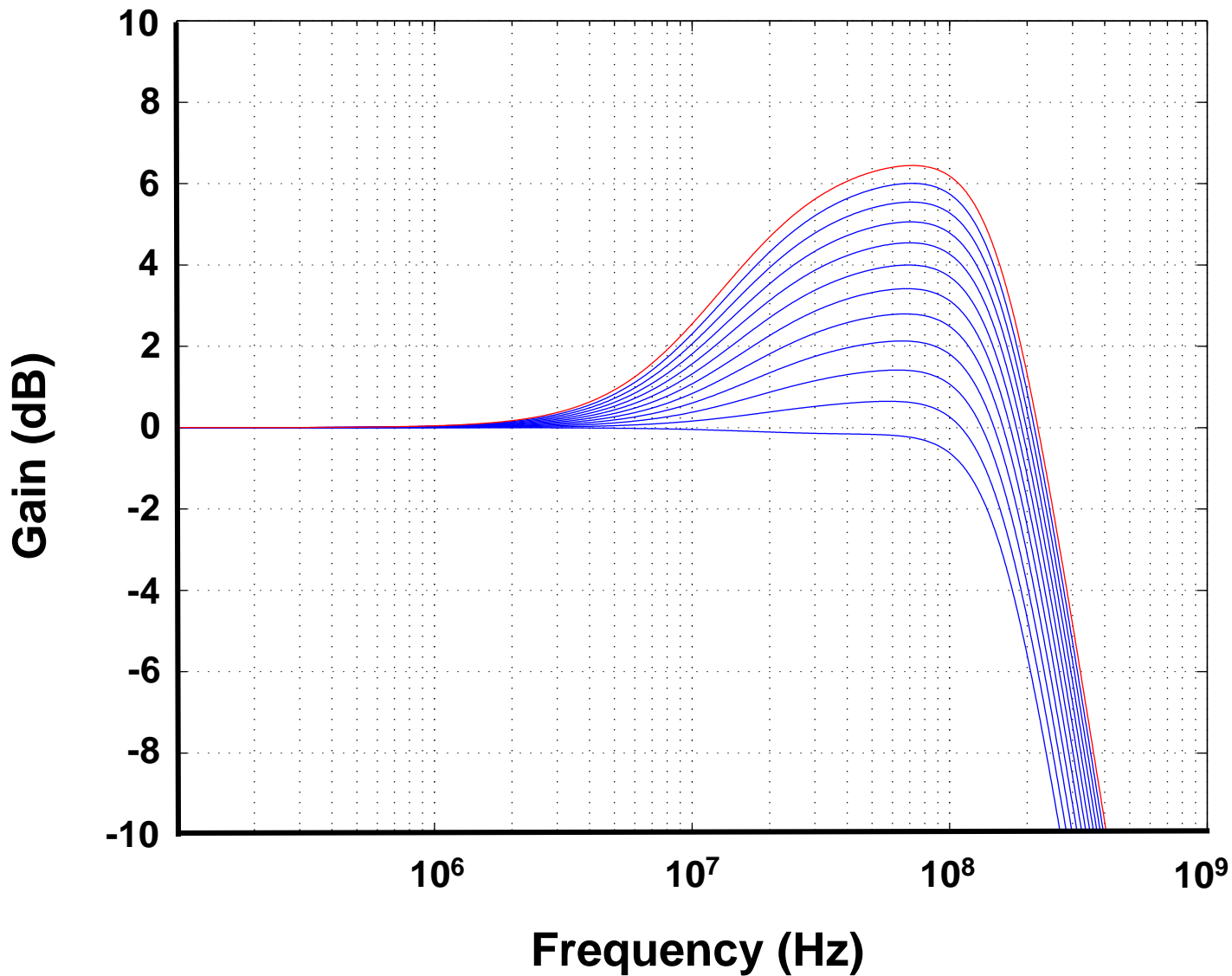


**Equalizer Function used for
calculated eye diagrams:**

$$H(s) = \frac{A \times (K \times s + B)}{(s + C) \times (s^2 + D \times s + E)}$$

K = boost gain

Equalizer AC response



- **Receiver Equalization requires a training pattern containing both low and high frequency signals.**
- **Proposed adaption procedure:**
 - **Apply a low frequency pattern.**
 - **Sample and store the low frequency signal amplitude at the equalizer output.**
 - **Apply a maximum frequency "101010..." pattern.**
 - **Adjust equalizer boost to match the "1010" pattern equalized amplitude to the stored low-frequency amplitude value.**

- **Simple adaption gives excellent results for U320 speeds for a wide variety of cable and load configurations.**
- **Filter design requirements are not stringent:**
 - **Low order filter**
 - **Fixed frequency filter design**
 - **No tuning range requirements**
 - **Low sensitivity to component tolerances**
 - **Filter calibration not required**
 - **Adaption provides adequate compensation for tolerances**
 - **Adapted by varying a single parameter (K)**