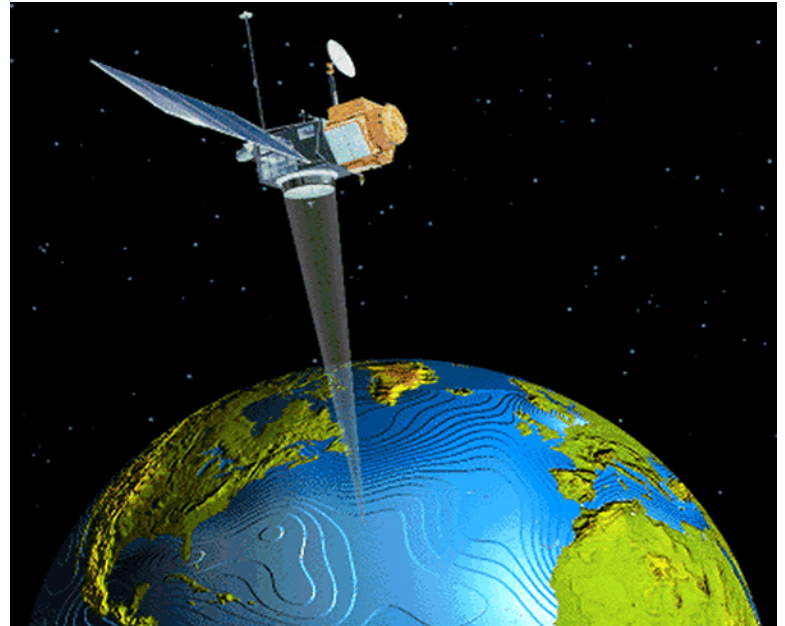


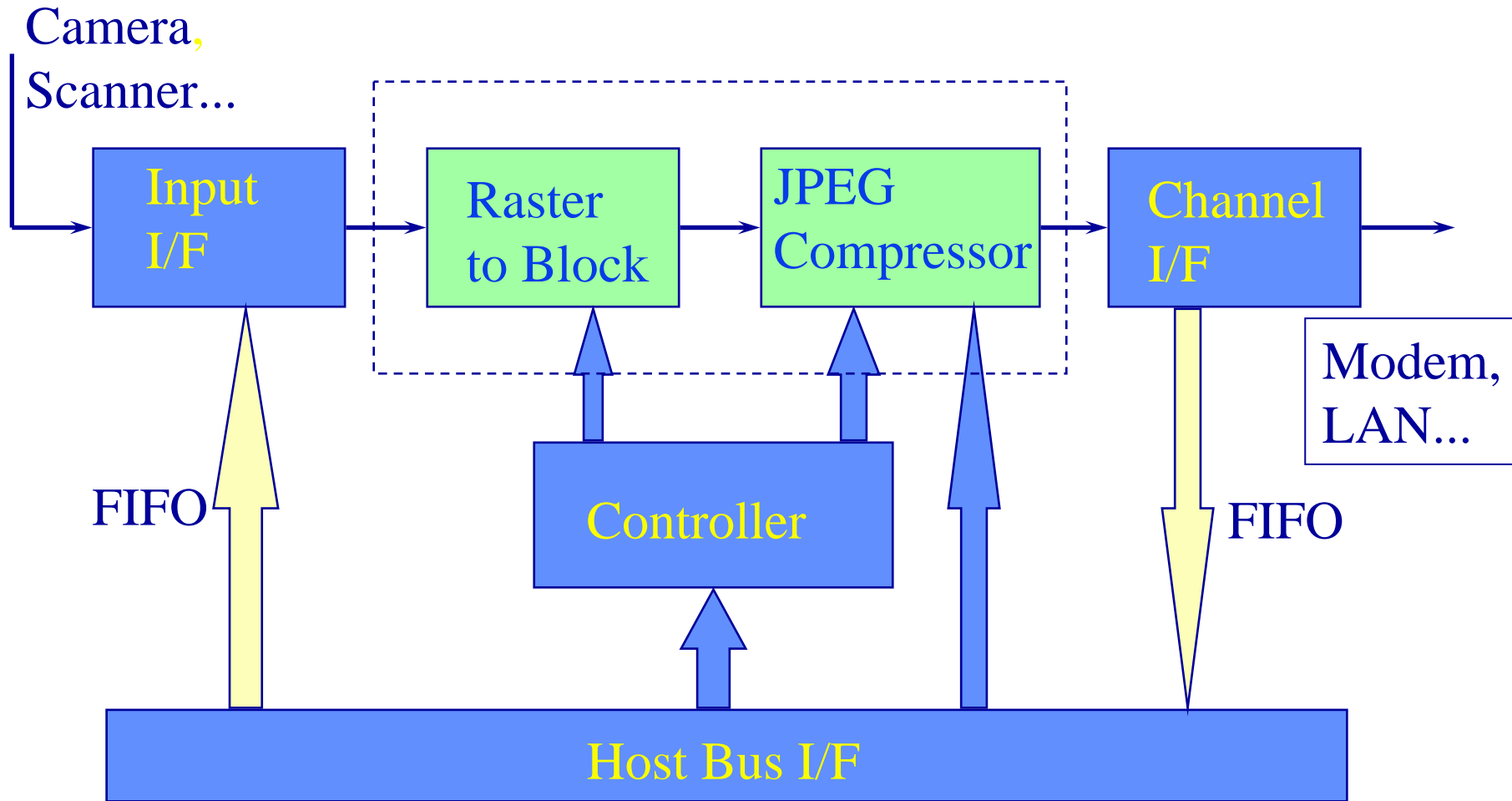
Motion-JPEG Board

Based on **ZORAN** Technology

Nimrod Peleg
Update: Dec. 2005



A Typical Block Diagram



Operation

- Input Signals:
 - Fixed rate pixels + Pixel clock + Line Sync
- Raster-to-Block:
 - Converts raster scan to 8x8 blocks
- JPEG Compressor:
 - Receives from host: control registers, Huffman tables and Markers
 - Supplies status after compression ends
- Output Signal:
 - Receives VLC (at variable rate) and should adopt to line

JPEG Compressor

- Example: Zoran ZR36050

Uses previous image statistics to estimate current image statistics in order to create a fixed bit rate



How to Fix JPEG Bitrate

Empiric Result:

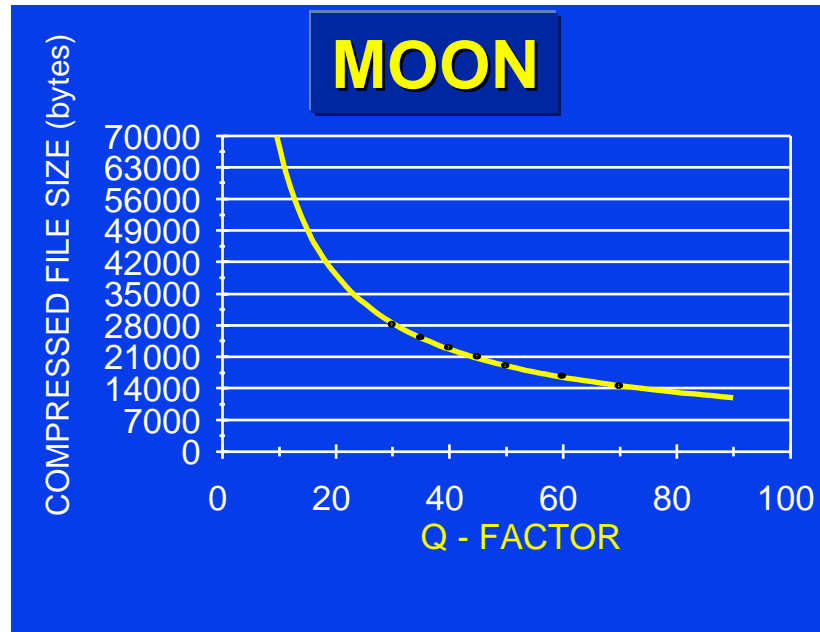
S: File Size

Q:Quality factor

$$S = a \times Q^b$$

Within compression ratio of 1:8 - 1:20 !

Now we should **only** find a and b ...



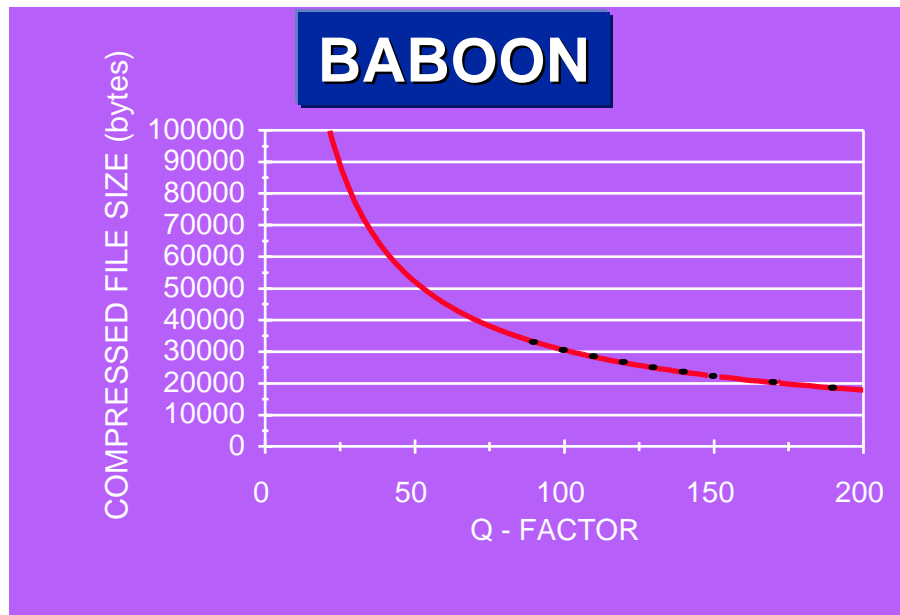
Estimated Function:

$$S = 414089.216 \times Q^{-0.787}$$

Correlation factor: -0.9988

Image Size: 512x512

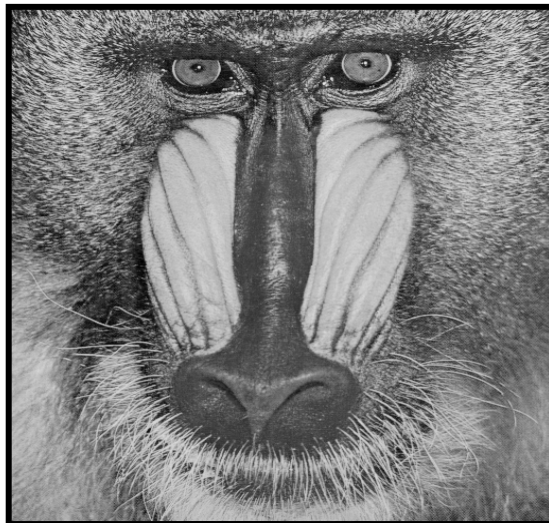




Estimated Function: $S = 1079148.544 \times Q^{-0.774}$

Correlation: -0.999

Image Size: 512x512



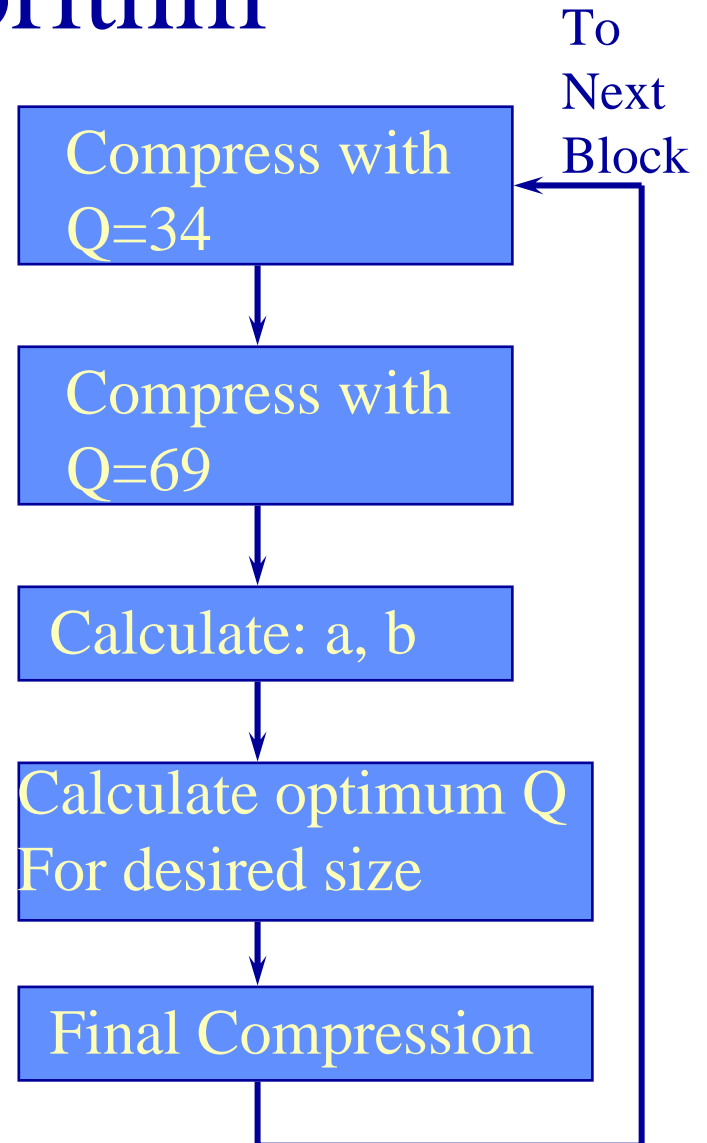
3 Passes Algorithm

- For the first block do:

$$b = \ln(S2/S1) / \ln(Q2/Q1)$$
$$a = S1 / (Q1^b)$$

$$Q = (\text{Desired_size} / a)^{1/b}$$

b varies in a small interval:
-0.65 to -0.79



The Problem

- The 3-pass algorithm is quite accurate ($\sim 2\%$) but 3 passes are not for real-time applications...

- The solution is **adaptive method**, based on an initialization procedure of 3 passes for first block only

Raster to Block Conversion

- Takes care of the SRAM control (saves counters and logic); For interleaved 3 colors:

