

→ FCD - Fiche 2

2-

•  $f_a \gg 2B$

a)  $44,1 \text{ kHz} \Rightarrow B = 22,05 \text{ kHz}$

b)  $nc = K f_a \times (\text{temps})$

$K = 16$

$nc = 16 \times \frac{44,1 \times 10^3 \times 60 \times 10^3}{8} \quad \lg_{10} = 5,2920000 \rightarrow \times 2 \text{ canaux}$   
 $= 105840000$

3-

$B = 15 \text{ kHz}$

$B_T = 50 \text{ kHz}$

$q \gg 200$

$M = 2^n$

A1-  $f_a \gg 2B \Rightarrow f = 30 \text{ kHz}$

$2B_T \gg nc$

$nc = K f_a = 8 \times 30 \times 10^3 = 240000$

$2 \times B_T = 2 \times 50 \times 10^3 = 100000$

B2- P

$4 \times 30 \times 10^3 = 120000$

$2 \times B_T = 2 \times 50 \times 10^3 = 100000$

C3- F

D4- F



4-

$$B = 3 \text{ KHz}$$

$$S = 1/4 \text{ Watt}$$

$$(S/N_q)_{dB} \approx 40 \quad \Rightarrow B_T = 16 \text{ KHz}$$

$$f_a = 6$$

$$f_a \times K \leq 2B_T \Rightarrow 6K \leq 2 \times 16 \Rightarrow K \leq \frac{16}{3} \approx 5,3$$

$$10 \log_{10} \left( \frac{1/4}{1/3q^2} \right) \geq 40 \Rightarrow \dots \Rightarrow q \geq 115,4$$

$$q \geq 115,4 \Rightarrow M^B \gg q \Rightarrow M = 3$$

$$\Rightarrow q = 2 \vee 3 = 3^0$$

5-

$$N_q = \frac{1}{3q^2} < 12 \times 10^{-4}$$

$$\frac{1}{3q^2} < 12 \times 10^{-4} \Rightarrow 3q^2 > \frac{1}{12 \times 10^{-4}} \Rightarrow q^2 > \frac{1}{3 \times 12 \times 10^{-4}}$$

$$\Rightarrow q > \sqrt{\frac{1}{3 \times 12 \times 10^{-4}}} \Rightarrow q > \approx 15,43 \Rightarrow q \approx 16$$

• digits binarios

$$K = \log_2 q \Rightarrow K = 4$$

A1-V

B2-V

E3-F

D4-F

$$f_a \times K \geq 2B_T \Rightarrow 2 \times 4 \geq 2B_T \Rightarrow B_T \geq 4$$



$$B = 12 \text{ KHz} \Rightarrow f_a = 24 \text{ KHz}$$

$$B_T = 200 \text{ KHz} \quad \gamma = 2$$

$$N_q = \frac{1}{3q^2}$$

$$K f_a \leq 2 B_T \Rightarrow K \leq \frac{400}{24} \Rightarrow K \leq 16,7 \Rightarrow K = 16$$

$$q = 2^N \Rightarrow q = 2^{16} = 65536$$

$$N_q = \frac{1}{3 \times (65536)^2} = 7,7610 \times 10^{-11} \approx 77,61 \times 10^{-12} < 100 \times 10^{-12}$$

$$b) \quad Z_c = K \times f_a \times \text{tempo}$$

$$= \frac{16 \times 24 \times 10^3}{2} \times 32 \text{ bytes} = 1536000 \text{ bytes}$$