

# Programmes Arduino Minitel

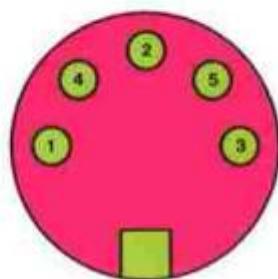
## Librairies

[Libraries Minitel1B\\_Soft](#)

### 1.1 Prise mécanique

La prise péri-informatique est du type DIN 5 broches femelle sur laquelle sont disponibles les signaux suivants :

- **broche 1:** réception des données par le terminal (signal Rx) ;
- **broche 2:** masse ;
- **broche 3:** émission de données par le terminal (signal Tx) ;
- **broche 4:** périphérique en transmission (signal PT) ;
- **broche 5:** sortie alimentation disponible pour les périphériques. Cette fonction n'est pas disponible sur les versions dont l'identification porte les références Cu2 à Cu4 incluses.



Prise femelle vue de face

- prise Arduino D2(RX) sur 3 minitel (TX)
- prise Arduino D3(TX) sur 1 minitel (RX)
- prise Arduino GND sur 2 minitel (Masse)

## ESP32-Minitel Demo

[ESP32\\_Minitel-Demo.ino](#)

```
// Code OK apres test
///////////////////////////////
/
/*
  Minitel1B_Hard - Démo - Version du 11 juin 2017 à 16h00
  Copyright 2016, 2017 - Eric Sérandour

  >> Légèrement adapté pour l'ESP32 par iodeo

  Documentation utilisée :
  Spécifications Techniques d'Utilisation du Minitel 1B
```

```
http://543210.free.fr/TV/stum1b.pdf
```

```
////////////////////////////////////////////////////////////////////////  
/
```

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```
*/  
////////////////////////////////////////////////////////////////////////  
/
```

```
////////////////////////////////////////////////////////////////////////  
/
```

```
// DEBUT DU PROGRAMME
```

```
////////////////////////////////////////////////////////////////////////  
/
```

```
#include <Minitel1B_Hard.h>
```

```
Minitel minitel(Serial2); // Le port utilisé sur ESP32
```

```
int wait = 10000;
```

```
////////////////////////////////////////////////////////////////////////  
/
```

```
void setup() {  
    Serial.begin(115200); // Le port de débug  
    minitel.changeSpeed(minitel.searchSpeed());  
}
```

```
////////////////////////////////////////////////////////////////////////  
/
```

```
void loop() {
```

```
demoCaracteres();
demoGraphic();
demoTailles();
demoCouleurs();
demoCurseur();
}

/////////////////////////////
/

void newPage(String titre) {
    minitel.newScreen();
    minitel.println(titre);
    for (int i=1; i<=40; i++) {
        minitel.writeByte(0x7E);
    }
    minitel.moveCursorReturn(1);
}

/////////////////////////////
/

void demoCaracteres() {
    newPage("LES CARACTERES");

    // Mode texte

    minitel.println("MODE TEXTE SANS LIGNAGE :");
    for (int i=0x20; i<=0x7F; i++) {
        minitel.writeByte(i);
    }
    minitel.moveCursorReturn(2);

    minitel.println("MODE TEXTE AVEC LIGNAGE :");
    minitel.attributs(DEBUT_LIGNAGE); // En mode texte, le lignage est
déclenché par le premier espace rencontré (0x20).
    for (int i=0x20; i<=0x7F; i++) {
        minitel.writeByte(i);
    }
    minitel.attributs(FIN_LIGNAGE);
    minitel.moveCursorReturn(2);

    // Mode semi-graphique

    minitel.textMode();
    minitel.println("MODE SEMI-GRAFIQUE SANS LIGNAGE :");
    minitel.graphicMode();
    for (int i=0x20; i<=0x7F; i++) {
        minitel.writeByte(i);
    }
    minitel.moveCursorReturn(2);
```

```
minitel.textMode();
minitel.println("MODE SEMI-GRAFIQUE AVEC LIGNAGE :");
minitel.graphicMode();
minitel.attributs(DEBUT_LIGNAGE);
for (int i=0x20; i<=0x7F; i++) {
    minitel.writeByte(i);
}
minitel.attributs(FIN_LIGNAGE);
minitel.moveCursorReturn(2);

delay(wait);
}

/////////////////////////////
/

void demoGraphic() {
    newPage("LA FONCTION GRAPHIC");
    minitel.textMode();
    minitel.println("Un caractère semi-graphique est composé de 6 pseudo-
pixels :");
    minitel.println();
    minitel.graphicMode();
    minitel.attributs(DEBUT_LIGNAGE);
    minitel.writeByte(0x7F);
    minitel.attributs(FIN_LIGNAGE);
    minitel.textMode();
    minitel.print(" avec lignage ou ");
    minitel.graphicMode();
    minitel.writeByte(0x7F);
    minitel.textMode();
    minitel.println(" sans lignage.");
    minitel.println();
    String chaine = "";
    chaine += "minitel.graphic(0b101011) donne ";
    minitel.textMode();
    minitel.print(chaine);
    minitel.graphicMode();
    minitel.graphic(0b101011);
    minitel.textMode();
    minitel.println();
    minitel.println();
    chaine = "";
    chaine += "minitel.graphic(0b110110,30,15) donne ";
    minitel.print(chaine);
    minitel.graphicMode();
    minitel.graphic(0b110110,30,15);
    minitel.noCursor();
```

```
    delay(2*wait);
}

///////////////////////////////
/

void demoTailles() {
    newPage("LES TAILLES");
    minitel.println("GRANDEUR_NORMALE");
    minitel.attributs(DOUBLE_HAUTEUR);
    minitel.print("DOUBLE_HAUTEUR");
    minitel.attributs(DOUBLE_LARGEUR);
    minitel.println();
    minitel.println("DOUBLE_LARGEUR");
    minitel.attributs(DOUBLE_GRANDEUR);
    minitel.println("DOUBLE_GRANDEUR");
    minitel.println();
    minitel.attributs(GRANDEUR_NORMALE);
    minitel.attributs(DEBUT_LIGNAGE); // En mode texte, le lignage est déclenché par le premier espace rencontré (0x20).
    minitel.println("SEULEMENT EN MODE TEXTE");
    minitel.attributs(FIN_LIGNAGE);
    minitel.println();
    delay(wait);
}

///////////////////////////////
/


void demoCouleurs() {
    newPage("LES COULEURS");
    for (int i=0; i<=1; i++) {
        if (i==0) { minitel.textMode(); }
        if (i==1) { minitel.graphicMode(); }
        minitel.attributs(INVERSION_FOND);
        minitel.print("CARACTERE_NOIR, FOND_BLANC");
        minitel.attributs(FOND_NORMAL);
        minitel.println(" (INVERSION)");
        minitel.attributs(CARACTERE_ROUGE);
        minitel.println("CARACTERE_ROUGE");
        minitel.attributs(CARACTERE_VERT);
        minitel.println("CARACTERE_VERT");
        minitel.attributs(CARACTERE_JAUNE);
        minitel.println("CARACTERE_JAUNE");
        minitel.attributs(CARACTERE_BLEU);
        minitel.println("CARACTERE_BLEU");
        minitel.attributs(CARACTERE_MAGENTA);
        minitel.println("CARACTERE_MAGENTA");
        minitel.attributs(CARACTERE_CYAN);
        minitel.println("CARACTERE_CYAN");
        minitel.attributs(CARACTERE_BLANC);
    }
}
```

```
        minitel.println("CARACTERE_BLANC");
        minitel.println();
    }
    delay(wait);
}

/////////////////////////////
/

void demoCurseur() {
    minitel.cursor();
    newPage("DEPLACER LE CURSEUR");
    minitel.moveCursorXY(20,12);
    for (int i=1; i<=100; i++) {
        delay(100);
        switch (random(4)) {
            case 0: minitel.moveCursorRight(1+random(3)); break;
            case 1: minitel.moveCursorLeft(1+random(3)); break;
            case 2: minitel.moveCursorDown(1+random(3)); break;
            case 3: minitel.moveCursorUp(1+random(3)); break;
        }
    }
    newPage("POSITIONNER LE CURSEUR");
    minitel.textMode();
    for (int i=1; i<1000; i++) {
        minitel.moveCursorXY(1+random(40),3+random(22));
        minitel.writeByte(0x20 + random(0x60));
    }

    minitel.newScreen();
    minitel.textMode();
    minitel.noCursor();
    for (int i=1; i<1000; i++) {
        if (random(4)<3) { minitel.textMode(); }
        else {
            minitel.graphicMode();
            minitel.attributs(DEBUT_LIGNAGE);
        }
        minitel.attributs(0x4C+random(5));
        minitel.writeByte(0x20 + random(0x60));
        minitel.attributs(FIN_LIGNAGE);
    }
}

/////////////////////////////
/
```

## ESP32-Minitel Pong

Esp32-Minitel\_Pong.ino

```
#include <Minitel1B_Hard.h>

#define MINITEL_PORT Serial2 //for ESP32
//#define MINITEL_PORT Serial1 //for Leonardo

#define DEBUG true
#define DEBUG_PORT Serial

#if DEBUG // Debug enabled
#define debugBegin(x) DEBUG_PORT.begin(x)
#define debugPrint(x) DEBUG_PORT.println(x)
#define debugPrintHEX(x) DEBUG_PORT.println(x,HEX)
#define debugPrintBIN(x) DEBUG_PORT.println(x,BIN)
#else // Debug disabled : Empty macro functions
#define debugBegin(x)
#define debugPrint(x)
#define debugPrintHEX(x)
#define debugPrintBIN(x)
#endif

// SOUND FX
#define SOUND 1 // score using bip
//#define SOUND2 1 // hit using modem connection

// SCREEN SIZE
#define WIDTH 40
#define HEIGHT 24

// GAME FIELD
#define X1 2 //player1 column
#define X2 40 //player2 column
#define XNET 21 //net column
#define SPACE 2 //score digit space
#define YSCORE 2 //score top row
#define WSCORE 2 //score width
#define HSCORE 4 //score height
#define XSCORE1 14 //player 1 score column - align right
#define XSCORE1_U XSCORE1-WSCORE+1 //unit digit
#define XSCORE1_T XSCORE1_U-WSCORE-SPACE //tenth digit
#define XSCORE2 26 //player 2 score column - align left
#define XSCORE2_T XSCORE2 // unit digit
#define XSCORE2_U XSCORE2+WSCORE+SPACE // tenth digit

// GAME PARAMETER
#define NBALL 15 //NB OF BALLS IN THE MATCH
```

```
// BALL DIRECTION
#define HAUT_DROITE 1
#define BAS_DROITE 2
#define BAS_GAUCHE 3
#define HAUT_GAUCHE 4

Minitel minitel(MINITEL_PORT);

int yP1 = 13; //player1 position
int yP2 = 13; //player2 position
int xBall = 0;
int yBall = 0;
int xBallOld = 0;
int yBallOld = 0;
int d = HAUT_DROITE; //ball direction
int p1 = 0; //player1 score
int p2 = 0; //player2 score
int startingCounter = 0;
int level = 2; //the smaller the quicker
int bypassCounter = 0;
int hitCounter = 0; //nb hit
bool ping = true;

const byte digit[10][WSCORE*HSCORE] = { // digit de 0 à 9 sur 2
cellules par 4
    // les cellules sont décrites horizontalement de gauche a droite et
    // de haut en bas
{0b111110, 0b111101, 0b101010, 0b010101, 0b101010, 0b010101, 0b101111, 0b01111
1}, //0
{0b000000, 0b010101, 0b000000, 0b010101, 0b000000, 0b010101, 0b000000, 0b01010
1}, //1
{0b111100, 0b111101, 0b001111, 0b011111, 0b101010, 0b000000, 0b101111, 0b00111
1}, //2
{0b111100, 0b111101, 0b001111, 0b011111, 0b000000, 0b010101, 0b001111, 0b01111
1}, //3
{0b101010, 0b010101, 0b101111, 0b011111, 0b000000, 0b010101, 0b000000, 0b01010
1}, //4
{0b111110, 0b111100, 0b101111, 0b001111, 0b000000, 0b010101, 0b001111, 0b01111
1}, //5
{0b101010, 0b000000, 0b101111, 0b001111, 0b101010, 0b010101, 0b101111, 0b01111
1}, //6
{0b111100, 0b111101, 0b000000, 0b010101, 0b000000, 0b010101, 0b000000, 0b01010
1}, //7
{0b111110, 0b111101, 0b101111, 0b011111, 0b000000, 0b010101, 0b000000, 0b01010
1}, //8
{0b111110, 0b111101, 0b101111, 0b011111, 0b000000, 0b010101, 0b000000, 0b01010
1} //9
};
```





```
void setup() {  
  
    debugBegin(115200);  
    debugPrint("debug port ready");  
  
    delay(500); // wait minitel to init  
  
    //init minitel at 4800 bauds  
    if (minitel.searchSpeed() != 4800) { // search speed  
        if (minitel.changeSpeed(4800) < 0) { // set to 4800 if different  
            minitel.searchSpeed(); // search speed again if  
            change has failed  
        }  
    }  
  
    minitel.modeVideotex();  
  
    minitel.echo(false);  
  
}  
  
void loop() {  
    welcome();  
    startGame();
```

```
}

void welcome() {

    //draw welcome screen
    minitel.newScreen();
    minitel.attributs(CARACTERE_BLANC);
    minitel.attributs(FOND_NOIR);
    for (int i=0; i<LONGUEUR_TRAME_IMAGE; i++) {
        minitel.writeByte(pgm_read_byte_near(IMAGE + i));
    }

    minitel.textMode();
    minitel.noCursor();
    minitel.attributs(CARACTERE_BLANC);
    minitel.attributs(DOUBLE_HAUTEUR);
    minitel.moveCursorXY(12,19);
    minitel.attributs(CLIGNOTEMENT);
    minitel.print("APPUYER SUR ENTREE");

    minitel.attributs(CARACTERE_BLEU);
    minitel.attributs(GRANDEUR_NORMALE);
    minitel.attributs(FIXE);
    minitel.moveCursorXY(1,23);
    // 40 char -----*****----- *****
    minitel.print("PLAYER 1")           PLAYER 2");
    minitel.print("UP:Q DOWN:W          UP:J DOWN:N");

    //flush any input
    while(MINITEL_PORT.available()) {
        byte b = MINITEL_PORT.read();
        debugPrint(b);
    }
    //wait touch is pressed
    while(getKeyCodeOverride() != 141) {
        delay(10);
    }

    //clean up
    minitel.newScreen();
    minitel.attributs(FIXE);
    minitel.graphicMode();

}

void startGame() {

    //draw game field
    drawGameField();
```

```
debugPrint("game field done");
//init game parameters
initGame();
debugPrint("init game done");
//start
while (p1+p2 < NBALL) {
    playGame();
}
minitel.attributes(CLIGNOTEMENT);
if (p1>p2) drawScore1(p1);
else drawScore2(p2);
#ifndef SOUND
minitel.bip();
delay(1000);
minitel.bip();
delay(1000);
minitel.bip();
delay(1000);
#else delay(5000);
#endif
#ifndef SOUND2
    if (!ping) ping = pingpong(ping);
#endif

p1 = 0;
p2 = 0;
yP1 = 13;
yP2 = 13;
xBall = 0;
yBall = 0;
ping = true;

}

void handlePlayer() {

    int dy1 = 0;
    int dy2 = 0;

    byte key = getKeyCodeOverride();

    if (key == 215 && yP1<22) dy1++;
    if (key == 209 && yP1>3) dy1--;
    if (key == 78 && yP2<22) dy2++;
    if (key == 202 && yP2>3) dy2--;

    minitel.graphic(0b111111, X1, yP1+3*dy1);
    minitel.moveCursorXY(X1, yP1-2*dy1);
    if (dy1!=0) minitel.graphic(0b000000);
    else minitel.graphic(0b111111); //preserve frame rate
    yP1+=dy1;
```

```
minitel.graphic(0b111111, X2, yP2+3*dy2);
minitel.moveCursorXY(40, yP2-2*dy2);
if (dy2!=0) minitel.graphic(0b000000);
else minitel.graphic(0b111111); //preserve frame rate
yP2+=dy2;

}

void playGame() {

handlePlayer();

if (startingCounter > 0) {
    countdown();
}
else {
    //updateLevel
    if (hitCounter == 3) level=1;
    if (hitCounter == 6) level=0;
    if (bypassCounter < level) {
        //bypass frame to slow down
        bypassCounter++;
    }
    else {
        bypassCounter=0;

        xBallOld = xBall;
        yBallOld = yBall;

        // move ball
        if(d == HAUT_DROITE){
            xBall+=2;
            yBall--;
        }
        if(d == BAS_DROITE){
            xBall+=2;
            yBall++;
        }
        if(d == BAS_GAUCHE){
            xBall-=2;
            yBall++;
        }
        if(d == HAUT_GAUCHE){
            xBall-=2;
            yBall--;
        }

        //erase old ball
    }
}
```

```
eraseBall(xBallOld, yBallOld);
//draw new ball
minitel.graphic(0b111111, xBall, yBall);

// top limit
if(yBall == 1) {
    if(d == HAUT_DROITE) d = BAS_DROITE;
    if(d == HAUT_GAUCHE) d = BAS_GAUCHE;
}

// bottom limit
if(yBall == HEIGHT) {
    if (d == BAS_GAUCHE) d = HAUT_GAUCHE;
    if (d == BAS_DROITE) d = HAUT_DROITE;
}

// player1 side
if (xBall <= X1 + 2) {
    // player1 send back
    if(abs(yBall-yP1) < 3) {
        if(d == BAS_GAUCHE) d = BAS_DROITE;
        if(d == HAUT_GAUCHE) d = HAUT_DROITE;
        hitCounter++;
        #ifdef SOUND2
        ping = pingpong(ping);
        #endif
    }
    else{ // player2 win
#endif SOUND
        minitel.bip();
#endif
        p2++;
        drawScore2(p2);
        initGame();
    }
}

// player2 side
if (xBall >= X2 - 2) {
    // player2 send back
    if(abs(yBall-yP2) < 3) {
        if(d == BAS_DROITE) d = BAS_GAUCHE;
        if(d == HAUT_DROITE) d = HAUT_GAUCHE;
        hitCounter++;
        #ifdef SOUND2
        ping = pingpong(ping);
        #endif
    }
    else{ // player1 win
#endif SOUND
        minitel.bip();
    }
}
```

```
#endif
    p1++;
    drawScore1(p1);
    initGame();
}
}
}
}

bool pingpong(bool ping) {
    if (ping) {
        minitel.connexion(true);
        return false;
    }
    else {
        minitel.connexion(false);
        return true;
    }
}

void eraseBall(int x, int y) {
    // erase ball preserving game field and score

    minitel.moveCursorXY(x,y);

    bool erase = true;

    if (x == XNET) { // Ball in net
        if (y%2 == 1) erase = false;
    }

    if (y >= YSCORE && y < YSCORE + HSCORE) { // Ball in score
        if (x >= XSCORE1_T && x < XSCORE1_T + WSCORE) { //ball in score1 tenth
            if (p1 >= 10) {
                drawDigit(p1/10, XSCORE1_T, YSCORE);
                erase = false;
            }
        }
        if (x >= XSCORE1_U && x < XSCORE1_U + WSCORE) { //ball in score1 unit
            drawDigit(p1%10, XSCORE1_U, YSCORE);
            erase = false;
        }
        if (x >= XSCORE2_T && x < XSCORE2_T + WSCORE) { //ball in score2 tenth
    }
```

```
    if (p2 >= 10) {
        drawDigit(p2/10, XSCORE2_T, YSCORE);
        erase = false;
    }
}
if (x >= XSCORE2_U && x < XSCORE2_U + WSCORE) { //ball in score2
unit
    drawDigit(p2%10, XSCORE2_U, YSCORE);
    erase = false;
}
}
if (erase) minitel.graphic(0b0000000);
}

/*void drawDigit(int num, int x, int y) {
for (int i = 0; i < WSCORE; i++) {
    for (int j = 0; j < HSCORE; j++) {
        minitel.graphic(digit[num][i+WScore*j],x+i,y+j);
    }
}
}*/



void initGame() {
// init level
hitCounter = 0;
level = 2;
bypassCounter = 2;
// get random starting point
xBallOld = xBall;
yBallOld = yBall;
d = random(1,4);
xBall = random(1,5)*2+1;
if (d>2) xBall = 40-xBall;
yBall = random(3,22);
// draw new ball
minitel.graphic(0b111111, xBall, yBall);
// starting countdown
startingCounter = 10;
}

void countdown() {
if (xBallOld != 0) {
    if (startingCounter == 8) {
        minitel.attributs(CARACTERE_BLEU);
        minitel.graphic(0b111111, xBallOld, yBallOld);
        minitel.attributs(CARACTERE_BLANC);
    }
    if (startingCounter == 6) {
        minitel.attributs(CARACTERE_VERT);
        minitel.graphic(0b111111, xBallOld, yBallOld);
        minitel.attributs(CARACTERE_BLANC);
    }
}
}
```

```
        }
        if (startingCounter == 4) {
            minitel.attributes(CARACTERE_BLEU);
            minitel.graphic(0b111111, xBallOld, yBallOld);
            minitel.attributes(CARACTERE_BLANC);
        }
        if (startingCounter == 2) {
            minitel.attributes(CARACTERE_VERT);
            minitel.graphic(0b111111, xBallOld, yBallOld);
            minitel.attributes(CARACTERE_BLANC);
        }
        if (startingCounter == 1) {
            minitel.graphic(0b000000, xBallOld, yBallOld); //erase ball
            #ifdef SOUND2
                ping = pingpong(ping);
            #endif
        }
    }
    startingCounter--;
}

byte getKeyCodeOverride() {
    byte b = 255;
    if (MINITEL_PORT.available()) {
        b = MINITEL_PORT.read();
        MINITEL_PORT.flush();
        debugPrint(b);
    }
    return b;
}

void drawGameField() {
    //draw net
    for (int i = 1; i < HEIGHT; i+=2) {
        minitel.graphic(0b111111, 21, i);
    }
    //draw players
    for (int i = -2; i < 3; i++) {
        minitel.graphic(0b111111, X1, yP1+i);
        minitel.graphic(0b111111, X2, yP2+i);
    }
    // draw score
    drawScore1(p1);
    drawScore2(p2);

}

void drawScore1(int score) {
```

```

    drawDigit(score%10, XSCORE1_U, YSCORE);
    if (score>=10) drawDigit(score/10, XSCORE1_T, YSCORE);
}

void drawScore2(int score) {
    drawDigit(score%10, XSCORE2_U, YSCORE);
    if (score>=10) drawDigit(score/10, XSCORE2_T, YSCORE);
}

void drawDigit(int num, int x, int y) {
    for (int i = 0; i < WSCORE; i++) {
        for (int j = 0; j < HSCORE; j++) {
            minitel.graphic(digit[num][i+WScore*j],x+i,y+j);
        }
    }
}

```

## Arduino\_Minitel.ino

```

#include <SoftwareSerial.h>
SoftwareSerial mySerial(2, 3);

byte gauche = 8;
byte droite = 9;
byte bas = 10;
byte haut = 11;
byte debutDeLigne = 13;
byte hautGauche = 30;
byte hautGaucheEfface = 12;
byte separateurDeSousArticle = 31;
byte remplissageEspace = 24; //Remplit le reste de la rangée avec des espaces
byte CBleu = 68; // caractère niveau gris bleu
byte CBlanc = 71; // caractère couleur blanche
byte Clignote = 72 ; // caractère clignote
byte Fixe = 73 ; // caractère fixe
byte NormalH = 76 ; // taille caractère normal
byte DoubleH = 77 ; // double hauteur
byte Ligne = 90 ; // caractère souligné
byte SLigne = 89; // annule soulingé

short incomming;
char inascii = » »;
short outcomming;
int TS = 0; // touche spéciale
String TSS = « »; // touche spéciale texte

void setup() {

Serial.begin(1200); // port série vers le PC

```

```
mySerial.begin(1200); // port serie vers le minitel

mySerial.write(hautGaucheEfface); //efface l'écran
// serialprint7(0x0E); // passe en mode graphique
delay(500);
sendMessage(<< "BONJOUR >>);

CR();
sendMessage(<< "BONSOIR >>);

Gauche(3);
sendMessage(<< "REBONSOIR >>);

Droite(3);
delay(1000);
sendMessage(<< "JOUR >>);

CR();
ESC(Clignote);
sendMessage(<< "BONJOUR >>);

ESC(Fixe);
CR();
CR();
ESC(DoubleH);
sendMessage(<< "BONJOUR >>);

CR();
ESC(NormalH);
ESC(CBleu);
sendMessage(<< "BONJOUR >>);

CR();
ESC(CBlanc);
sendMessage(<< "BONJOUR >>);

CR();
ESC(Ligne);
sendMessage(" >> BONJOUR >>);

CR();
ESC(SLigne);
sendMessage(<< "BONJOUR >>);

CR();
Serial.println(" >> );

}

char modifyParity(char c) {
char i = 1 << 6;
boolean p = false;
c &= B0111111;
while (i) {
if (c & i) {
p = !p;
}
i >>= 1;
}
c |= p << 7;
```

```
return c;
}

void sendMessage(char *msg) {
int i = 0;
while (*msg[i]) {
serialprint7(msg[i]);
i++;
}
Serial.write(msg);
Serial.flush();
}

void serialprint7(byte b) // permet d'écrire en 7 bits + parité sur le
software serial
{
boolean i = false;
for (int j = 0; j < 8; j++)
{
if (bitRead(b, j) == 1) i = !i; //calcul de la parité
}
if (i) bitWrite(b, 7, 1); //écriture de la parité
else bitWrite(b, 7, 0); //écriture de la parité
mySerial.write(b); //écriture du byte sur le software serial
}

void Gauche(int g) {
for (int i = 0; i <= g; i++) {
serialprint7(9);
}
}

void Droite(int g) {
for (int i = 0; i <= g; i++) {
serialprint7(8);
}
}

void Haut(int g) {
for (int i = 0; i <= g; i++) {
serialprint7(11);
}
}

void ESC(int c){
serialprint7(27);
serialprint7(c);
}

void CR() {
serialprint7(13);
```

```
serialprint7(10);  
}  
  
void loop() //tout ce que je recois sur le port serie, je le renvoi sur  
le software serial  
{  
  
// Serial.println(<< "loop");  
if (Serial.available()) {  
outcomming = Serial.read();  
Serial.print(<< "saisie ardiuno: ");  
Serial.println (outcomming);  
// serialprint7(incomming);  
serialprint7(outcomming);  
}  
  
if (mySerial.available()) {  
incomming = mySerial.read() & B01111111; // ignore parity check //  
ignore parity check  
Serial.print(<< "saisie minitel : ");  
inascii = char(incomming);  
Serial.println (inascii);  
if (TS == 1) {  
touchespeciales();  
TS = 0;  
}  
if (incomming == 19) {  
TS = 1;  
}  
  
}  
  
}  
  
void touchespeciales() {  
switch (incomming) {  
case 70:  
Serial.println (<< "Sommaire");  
TSS = << "Sommaire";  
break;  
case 69:  
Serial.println (<< "Annulation");  
TSS = << "Annulation";  
break;  
case 66:  
Serial.println (<< "Retour");  
TSS = << "Retour";  
break;  
case 67:
```

```

Serial.println (« Repetition »);
TSS = « Repetition »;
break;
case 68:
Serial.println (« Guide »);
TSS = « Guide »;
break;
case 71:
Serial.println (« Correction »);
TSS = « Correction » ;
break;
case 72:
Serial.println (« Suite »);
TSS = « Suite »;
break;
case 65:
Serial.println (« Envoi »);
TSS = « Envoi »;
break;
case 89:
Serial.println (« Connexion »);
TSS = « Connexion »;
break;

}
}

```

## Programme 2 Minitel1B\_ChessUI.ino

[Minitel1B\\_ChessUI.ino](#)

```

// programme à Tester ???

#include <Minitel1B_Hard.h>

#define MINITEL_PORT Serial2 //for ESP32
//#define MINITEL_PORT Serial1 //for Leonardo

#define DEBUG true
#define DEBUG_PORT Serial

#if DEBUG // Debug enabled
#define debugBegin(x)    DEBUG_PORT.begin(x)
#define debugPrint(x)    DEBUG_PORT.println(x)
#define debugPrintHEX(x) DEBUG_PORT.println(x,HEX)
#define debugPrintBIN(x) DEBUG_PORT.println(x,BIN)
#else // Debug disabled : Empty macro functions

```

```
#define debugBegin(x)
#define debugPrint(x)
#define debugPrintHEX(x)
#define debugPrintBIN(x)
#endif

#define CASE_WIDTH 4
#define CASE_HEIGHT 3
#define BOARD_TOP 1
#define BOARD_LEFT 1
#define PIECE_WIDTH 3
#define PIECE_HEIGHT 3

#define SCORE_TOP 1
#define SCORE_LEFT 33
#define SCORE_WIDTH 8
#define SCORE_HEIGHT 24
#define SCORE_BLACK_TOP 1
#define SCORE_WHITE_TOP 16
#define SCORE_HEIGHT_2 9 // indiv. score frame
#define SCORE_MOVE_TOP 10
#define SCORE_HEIGHT_3 6 // move frame

Minitel minitel(MINITEL_PORT);

enum { VOID, PAWN, ROOK, KNIGHT, BISHOP, QUEEN, KING};
enum {_BLACK = 0, _WHITE = 128};

byte piece[7][PIECE_WIDTH*PIECE_HEIGHT] = {
    // pieces en caractères semi-graphiques 3 par 3 décrites par lignes
    // haut-gauche à bas-droite
    {0b000000, 0b000000, 0b000000, 0b000000, 0b000000, 0b000000,
     0b000000, 0b000000, 0b000000}, // VOID
    {0b000000, 0b000000, 0b000000, 0b000101, 0b101111, 0b000000,
     0b000100, 0b101100, 0b000000}, // PAWN
    {0b000010, 0b000010, 0b000010, 0b110101, 0b111101, 0b100000,
     0b011100, 0b011100, 0b001000}, // ROOK
    {0b000000, 0b000111, 0b000010, 0b011110, 0b011101, 0b101010,
     0b001100, 0b111100, 0b001000}, // KNIGHT
    {0b000001, 0b001011, 0b000000, 0b111111, 0b101111, 0b101010,
     0b011100, 0b111100, 0b001000}, // BISHOP
    {0b001001, 0b000011, 0b001000, 0b000111, 0b101111, 0b000010,
     0b111100, 0b011100, 0b101000}, // QUEEN
    {0b000001, 0b001011, 0b000000, 0b000111, 0b101111, 0b000010,
     0b111100, 0b011100, 0b101000} // KING
};

byte board[8][8] { //top-left to bottom-right - _BLACK or _WHITE added
later
```

```

/*{ROOK,    KNIGHT, BISHOP, QUEEN,   KING,    BISHOP, KNIGHT, ROOK },
{PAWN,    PAWN,    PAWN,    PAWN,    PAWN,    PAWN,    PAWN,    PAWN },
{VOID,    VOID,    VOID,    VOID,    VOID,    VOID,    VOID,    VOID },
{VOID,    VOID,    VOID,    VOID,    VOID,    VOID,    VOID,    VOID },
{VOID,    VOID,    VOID,    VOID,    VOID,    VOID,    VOID,    VOID },
{VOID,    VOID,    VOID,    VOID,    VOID,    VOID,    VOID,    VOID },
{PAWN,    PAWN,    PAWN,    PAWN,    PAWN,    PAWN,    PAWN,    PAWN },
{ROOK,    KNIGHT, BISHOP, QUEEN,   KING,    BISHOP, KNIGHT, ROOK }*/  

};  
  

int cx = 0; // 0-7 > A-H  

int cy = 7; // 0-7 > 8-1  
  

int scx = -1; // first case selected  

int scy = -1; //  
  

String moveStr = "    -    ";  

String lastStr = "    -    ";  
  

byte player = _WHITE;  
  

void setup() {  
  

    debugBegin(115200);  

    debugPrint("> Debug start");  
  

    delay(500);  
  

    // Minitel setup  

    int baud = minitel.searchSpeed();  

    debugPrint("> Minitel is at " + String(baud) + "bds");  

    if (baud != 4800) {  

        debugPrint("> Set to 4800 bauds");  

        if (minitel.changeSpeed(4800) < 0) { // try set speed to 4800 if  

needed  

            debugPrint(" *** Failed to change speed ***");  

            minitel.searchSpeed(); // search back if failed  

        }
    }
}  
  

//minitel.modeVideotex();  

minitel.echo(false);  

minitel.extendedKeyboard(); //need arrows  

minitel.clearScreen();  

minitel.moveCursorXY(1,1);  

minitel.noCursor();  

minitel.attributs(FIXE);  

debugPrint("> Minitel setup done");  
  

// Initialize game board  

initBoard();

```

```
drawBoard();
drawAllPieces();
drawScoreBoard();

//hoverCase(cx, cy, true);

}

String keyboardInput = "";

void loop() {

    char c = 0;

    c = getKeyboardInput();

    switch (c) {
        // nothing
        case 0:      break;

        // move on board
        case UP:     moveUp();      break;
        case DOWN:   moveDown();   break;
        case LEFT:   moveLeft();   break;
        case RIGHT:  moveRight();  break;

        // cancel selection
        case DEL:
        case CAN:
            if (scx != -1) { // cancel selection
                selectCase(scx, scy, false);
                scx = -1; scy = -1;
                moveStr = " - ";
                writeMove();
            }
            break;

        // move selection
        case CR:
            if (scx == -1 || scy == -1) {
                // first case selection
                scx = cx;
                scy = cy;
                selectCase(cx, cy, true);
                moveStr.setCharAt(1,cx+65); // A(65)-H
                moveStr.setCharAt(2,56-cy); // 8(56)-1
                writeMove();
            }
    }
}
```

```

    else {
        if (cx == scx && cy == scy) {
            // cancel first case selection
            selectCase(cx, cy, false);
            moveStr = " - ";
            writeMove();
            scx = -1; scy = -1;
        }
        else {
            // second case selection
            // TODO: verify legal move
            moveStr.setCharAt(4,cx+65); // A(65)-H
            moveStr.setCharAt(5,56-cy); // 8(56)-1
            writeMove();
            board[cx][cy] = board[scx][scy];
            board[scx][scy] = VOID;
            erasePiece(scx, scy);
            selectCase(scx, scy, false);
            drawPiece(cx, cy, board[cx][cy]);
            scx = -1; scy = -1;
            if (player == _WHITE) player = _BLACK;
            else player = _WHITE;
            lastStr = moveStr;
            moveStr = " - ";
            redrawMove();
        }
    }
    break;
}
}

void initBoard() {
    for (int i = 0; i < 5; i++) board[i][0] = (i+2) + _BLACK;
    for (int i = 5; i < 8; i++) board[i][0] = (5-i+4) + _BLACK;
    for (int i = 0; i < 8; i++) board[i][1] = PAWN + _BLACK;
    for (int j = 2; j < 6; j++) {
        for (int i = 0; i < 8; i++) board[i][j] = VOID;
    }
    for (int i = 0; i < 5; i++) board[i][7] = (i+2) + _WHITE;
    for (int i = 5; i < 8; i++) board[i][7] = (5-i+4) + _WHITE;
    for (int i = 0; i < 8; i++) board[i][6] = PAWN + _WHITE;
}
}

void drawBoard() {

    minitel.textMode();
    minitel.attributes(GRANDEUR_NORMALE);

    minitel.graphicMode();
    minitel.moveCursorXY(BOARD_LEFT, BOARD_TOP);
    bool dark = false;
}

```

```
int cy = 8;
while (cy > 0) {
    int row = 1;
    while (row <= CASE_HEIGHT) {
        int cx = 1;
        while (cx < 9) {
            if (dark) minitel.attributs(FOND_BLEU);
            else minitel.attributs(FOND_VERT);
            minitel.graphic(0b000000);
            minitel.repeat(CASE_WIDTH - 1);
            if (row < 3) {
                minitel.moveCursorLeft(CASE_WIDTH);
                minitel.textMode();
                if (dark) minitel.attributs(CARACTERE_BLEU);
                else minitel.attributs(CARACTERE_VERT);
                minitel.attributs(INVERSION_FOND);
                if (row == 1) minitel.printChar(cx+64); // A-H
                else minitel.printChar(cy+48); // 1-8
                minitel.moveCursorRight(CASE_WIDTH - 1);
                minitel.graphicMode();
            }
            dark = !dark;
            cx++;
        }
        minitel.moveCursorLeft(CASE_WIDTH*8);
        minitel.moveCursorDown(1);
        row++;
    }
    dark = !dark;
    cy--;
}
}

void drawScoreBoard() {

    drawBackground();

    drawFrame(SCORE_LEFT, SCORE_BLACK_TOP, SCORE_WIDTH, SCORE_HEIGHT_2,
    _BLACK);
    //drawFrame(SCORE_LEFT, SCORE_MOVE_TOP, SCORE_WIDTH, SCORE_HEIGHT_3,
    _WHITE);
    drawFrame(SCORE_LEFT, SCORE_WHITE_TOP, SCORE_WIDTH, SCORE_HEIGHT_2,
    _WHITE);

    minitel.textMode();
    minitel.attributs(GRANDEUR_NORMALE);
    int sx = SCORE_BLACK_TOP;
    minitel.attributs(CARACTERE_NOIR);
    minitel.attributs(INVERSION_FOND);
```

```
sx++;
minitel.moveCursorXY(SCORE_LEFT+1,sx);
minitel.print("BLACK ");
minitel.attributs(FOND_NORMAL);
sx+=2;
minitel.moveCursorXY(SCORE_LEFT+1,sx);
minitel.print("time:");
minitel.attributs(INVERSION_FOND);
sx++;
minitel.moveCursorXY(SCORE_LEFT+1,sx);
minitel.print(" ---");
minitel.attributs(FOND_NORMAL);
sx+=2;
minitel.moveCursorXY(SCORE_LEFT+1,sx);
minitel.print("str:");
minitel.attributs(INVERSION_FOND);
sx++;
minitel.moveCursorXY(SCORE_LEFT+1,sx);
minitel.print("      - -");

sx = SCORE_MOVE_TOP;
minitel.attributs(CARACTERE_BLANC);
minitel.attributs(FOND_NORMAL);
sx++;
minitel.moveCursorXY(SCORE_LEFT+1,sx);
minitel.print("move:");
minitel.attributs(CARACTERE_BLANC);
minitel.attributs(INVERSION_FOND);
sx++;
minitel.moveCursorXY(SCORE_LEFT+1,sx);
minitel.print(moveStr);
minitel.attributs(CARACTERE_NOIR);
minitel.attributs(FOND_NORMAL);
sx++;
minitel.moveCursorXY(SCORE_LEFT+1,sx);
minitel.print("last:");
minitel.attributs(CARACTERE_NOIR);
minitel.attributs(INVERSION_FOND);
sx++;
minitel.moveCursorXY(SCORE_LEFT+1,sx);
minitel.print(lastStr);

sx = SCORE_WHITE_TOP;
minitel.attributs(CARACTERE_BLANC);
minitel.attributs(INVERSION_FOND);
sx++;
minitel.moveCursorXY(SCORE_LEFT+1,sx);
minitel.print("WHITE ");
minitel.attributs(FOND_NORMAL);
sx+=2;
minitel.moveCursorXY(SCORE_LEFT+1,sx);
```

```
        minitel.print("time:");
        minitel.attributes(INVERSION_FOND);
        sx++;
        minitel.moveCursorXY(SCORE_LEFT+1,sx);
        minitel.print(" --:--");
        minitel.attributes(FOND_NORMAL);
        sx+=2;
        minitel.moveCursorXY(SCORE_LEFT+1,sx);
        minitel.print("str:");
        minitel.attributes(INVERSION_FOND);
        sx++;
        minitel.moveCursorXY(SCORE_LEFT+1,sx);
        minitel.print("      --");

    }

void drawBackground() {
    int sy = SCORE_TOP;
    minitel.graphicMode();
    minitel.attributes(FOND_MAGENTA);
    while (sy < SCORE_TOP + SCORE_HEIGHT) {
        minitel.moveCursorXY(SCORE_LEFT,sy);
        minitel.graphic(0b000000);
        minitel.repeat(SCORE_WIDTH-1);
        sy++;
    }
}

void writeMove() {
    minitel.textMode();
    if (player == _WHITE) {
        minitel.attributes(CARACTERE_BLANC);
        minitel.attributes(INVERSION_FOND);
    }
    minitel.moveCursorXY(SCORE_LEFT+1,SCORE_MOVE_TOP+2);
    minitel.print(moveStr);
}

void redrawMove() {
    int sx = SCORE_MOVE_TOP;
    minitel.textMode();
    if (player == _WHITE) minitel.attributes(CARACTERE_BLANC);
    else minitel.attributes(CARACTERE_NOIR);
    minitel.attributes(FOND_NORMAL);
    sx++;
    minitel.moveCursorXY(SCORE_LEFT+1,sx);
    minitel.print("move:");
    if (player == _WHITE) minitel.attributes(CARACTERE_BLANC);
```

```
else minitel.attributs(CARACTERE_NOIR);
minitel.attributs(INVERSION_FOND);
sx++;
minitel.moveCursorXY(SCORE_LEFT+1,sx);
minitel.print(moveStr);
if (player == _WHITE) minitel.attributs(CARACTERE_NOIR);
else minitel.attributs(CARACTERE_BLANC);
minitel.attributs(FOND_NORMAL);
sx++;
minitel.moveCursorXY(SCORE_LEFT+1,sx);
minitel.print("last:");
if (player == _WHITE) minitel.attributs(CARACTERE_NOIR);
else minitel.attributs(CARACTERE_BLANC);
minitel.attributs(INVERSION_FOND);
sx++;
minitel.moveCursorXY(SCORE_LEFT+1,sx);
minitel.print(lastStr);

}

void drawFrame(int x, int y, int w, int h, int c) {
    int sy = y;
    minitel.graphicMode();
    minitel.attributs(FOND_MAGENTA);
    if (c == _BLACK) minitel.attributs(CARACTERE_NOIR);
    else minitel.attributs(CARACTERE_BLANC);
    minitel.moveCursorXY(x,sy);
    minitel.graphic(0b000001);
    minitel.graphic(0b000011);
    minitel.repeat(w-3);
    minitel.graphic(0b000010);
    sy++;
    while (sy < y + h - 1) {
        minitel.moveCursorXY(x,sy);
        minitel.graphic(0b010101);
        minitel.graphic(0b000000);
        minitel.repeat(w-3);
        minitel.graphic(0b101010);
        sy++;
    }
    minitel.moveCursorXY(x,sy);
    minitel.graphic(0b010000);
    minitel.graphic(0b110000);
    minitel.repeat(w-3);
    minitel.graphic(0b100000);
}

void drawPiece(int cx, int cy, byte pc) {
// x : from 0 to 7 - left to right
// y : from 0 to 7 - top to bottom
```

```
int x = cx * CASE_WIDTH + 1;
int y = cy * CASE_HEIGHT + 1;

byte color = _BLACK;
if (pc > _WHITE) color = _WHITE;
byte p = pc - color;

minitel.graphicMode();

if (color == _WHITE) {
    minitel.attributes(DEBUT_LIGNAGE);
    minitel.attributes(CARACTERE_BLANC);
}
else { // _BLACK
    minitel.attributes(CARACTERE_NOIR);
}
if ((cx+cy)%2 == 1) minitel.attributes(FOND_BLEU);
else minitel.attributes(FOND_VERT);

for (int j = 0; j < PIECE_HEIGHT; j++) {
    minitel.moveCursorXY(x+1,y+j);
    for (int i = 0; i < PIECE_WIDTH; i++) {
        minitel.graphic(piece[p][i+j*PIECE_WIDTH]);
    }
}
if (color == _WHITE) {
    minitel.attributes(FIN_LIGNAGE);
}
}

void erasePiece(int cx, int cy) {
// x : from 0 to 7 - left to right
// y : from 0 to 7 - top to bottom
drawPiece(cx, cy, VOID);
}

void drawAllPieces() {
    for (int i = 0; i < 8; i++) {
        for (int j = 0; j < 8; j++) {
            if (j<2 || j>5) drawPiece(i, j, board[i][j]);
        }
    }
}

void hoverCase(int cx, int cy, bool hover) {
    if (cx == scx && cy == scy) selectCase(cx, cy, true);
    else {
        int x = cx*CASE_WIDTH + 1;
        int y = cy*CASE_HEIGHT + 3;
```

```
    bool dark = false;
    if ((cx+cy)%2 == 1) dark = true;
    minitel.moveCursorXY(x,y);
    minitel.graphicMode();
    if (dark) minitel.attributs(FOND_BLEU);
    else minitel.attributs(FOND_VERT);
    if (hover) {
        minitel.attributs(CARACTERE_BLANC);
        minitel.graphic(0b111111);
    }
    else minitel.graphic(0b000000);
}

void selectCase(int cx, int cy, bool sel) {
    int x = cx*CASE_WIDTH + 1;
    int y = cy*CASE_HEIGHT + 3;
    bool dark = false;
    if ((cx+cy)%2 == 1) dark = true;
    minitel.moveCursorXY(x,y);
    minitel.graphicMode();
    if (dark) minitel.attributs(FOND_BLEU);
    else minitel.attributs(FOND_VERT);
    if (sel) {
        minitel.attributs(CARACTERE_NOIR);
        minitel.graphic(0b111111);
    }
    else {
        minitel.graphic(0b000000);
    }
}

void moveUp() {
    if (cy > 0) {
        hoverCase(cx,cy, false);
        cy--;
        hoverCase(cx,cy, true);
    }
}

void moveDown() {
    if (cy < 7) {
        hoverCase(cx,cy, false);
        cy++;
        hoverCase(cx,cy, true);
    }
}

void moveLeft() {
    if (cx > 0) {
        hoverCase(cx,cy, false);
    }
}
```

```
    CX--;
    hoverCase(cx, cy, true);
}

void moveRight() {
    if (cx < 7) {
        hoverCase(cx, cy, false);
        cx++;
        hoverCase(cx, cy, true);
    }
}

char getKeyboardInput() {

    unsigned long key = minitel.getKeyCode();
    if (key != 0) {
        debugPrintHEX(key);
        // key redirection/inhibition
        switch (key) {

            // cancel selection
            case CORRECTION:
            case ANNULATION:
            case RETOUR:
            case ESC:
                return CAN; break;

            // validate selection
            case ENVOI:
            case SP:
                return CR; break;

            // navigate
            case TOUCHE_FLECHE_HAUT: return UP; break;
            case TOUCHE_FLECHE_BAS: return DOWN; break;
            case TOUCHE_FLECHE_DROITE: return RIGHT; break;
            case TOUCHE_FLECHE_GAUCHE: return LEFT; break;

            // inhibited
            case CONNEXION_FIN:
            case SOMMAIRE:
            case REPETITION:
            case GUIDE:
            case SUITE:
                return 0; break;

            default: return key;
        }
    }
}
```

```
    }  
    else return 0;  
}
```

From:

<http://chanterie37.fr/fablab37110/> - Castel'Lab le Fablab MJC de Château-Renault

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Last update: **2023/01/27 16:08**

