

Programmes Arduino Minitel

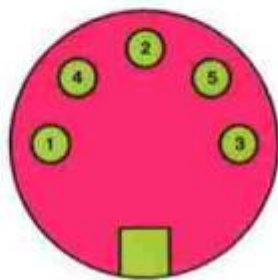
Librairies

[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)

Minitel Demo

Minitel-Esp32 Test Laison serie entre minitel et terminal arduino ou esp32

[ESP32_Minitel-Demo000.ino](#)

```
// OK apres test

void setup() {
  Serial.begin(115200); // port debug
  Serial2.begin(1200, SERIAL_7E1); // port minitel
}
```

```
void loop() {  
  // redirection debug -> minitel  
  while (Serial.available() > 0) {  
    Serial2.write(Serial.read());  
  }  
  // redirection minitel -> debug  
  while (Serial2.available() > 0) {  
    Serial.write(Serial2.read());  
  }  
}
```

Minitel-ESP32 Test different affichage

[ESP32_Minitel-Demo001.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  
  
  //////////////////////////////////////  
  /  
  
  This program is free software: you can redistribute it and/or modify  
  it under the terms of the GNU General Public License as published by  
  the Free Software Foundation, either version 3 of the License, or  
  (at your option) any later version.  
  
  This program is distributed in the hope that it will be useful,  
  but WITHOUT ANY WARRANTY; without even the implied warranty of  
  MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the  
  GNU General Public License for more details.  
  
  You should have received a copy of the GNU General Public License  
  along with this program. If not, see <http://www.gnu.org/licenses/>.  
*/  
////////////////////////////////////  
/
```

```
////////////////////////////////////  
/  
  
// 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 debug  
    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.attributes(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.attributes(FIN_LIGNAGE);
minitel.moveCursorReturn(2);

// Mode semi-graphique

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

minitel.textMode();
minitel.println("MODE SEMI-GRAPHIQUE AVEC LIGNAGE :");
minitel.graphicMode();
minitel.attributes(DEBUT_LIGNAGE);
for (int i=0x20; i<=0x7F; i++) {
    minitel.writeByte(i);
}
minitel.attributes(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.setCursorXY(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.attributes(DEBUT_LIGNAGE);
        }
        minitel.attributes(0x4C+random(5));
        minitel.writeByte(0x20 + random(0x60));
        minitel.attributes(FIN_LIGNAGE);
    }
}

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

```

ESP32-Minitel Pong

[Esp32-Minitel_Pong.ino](#)

```

//Programme OK

#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;
```


37, 0x1B, 0x57, 0x23, 0x23, 0x23, 0x2F, 0x1B, 0x50, 0x6F, 0x7F, 0x7F, 0x7F, 0x7F, 0x1B, 0x56, 0x3F, 0x1B, 0x57, 0x23, 0x1B, 0x41, 0x21, 0x1B, 0x45, 0x23, 0x1B, 0x40, 0x23, 0x1B, 0x52, 0x6F, 0x1B, 0x50, 0x7F, 0x7F, 0x7F, 0x7F, 0x1B, 0x57, 0x3F, 0x1B, 0x41, 0x21, 0x1B, 0x47, 0x7F, 0x1B, 0x45, 0x22, 0x1B, 0x40, 0x6B, 0x1B, 0x50, 0x7F, 0x7F, 0x7F, 0x7F, 0x1B, 0x54, 0x3F, 0x1B, 0x57, 0x2F, 0x23, 0x1B, 0x44, 0x23, 0x1B, 0x40, 0x1B, 0x53, 0x6B, 0x1B, 0x50, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x1B, 0x52, 0x35, 0x1B, 0x47, 0x1B, 0x57, 0x7F, 0x7F, 0x7F, 0x7F, 0x1B, 0x40, 0x2A, 0x1B, 0x54, 0x6F, 0x1B, 0x50, 0x7F, 0x7F, 0x1B, 0x57, 0x27, 0x1B, 0x47, 0x21, 0x7F, 0x1B, 0x42, 0x60, 0x1B, 0x46, 0x30, 0x1B, 0x47, 0x7F, 0x1B, 0x45, 0x22, 0x1B, 0x40, 0x1B, 0x52, 0x6B, 0x1B, 0x50, 0x7F, 0x7F, 0x1B, 0x57, 0x3F, 0x1B, 0x43, 0x21, 0x1B, 0x46, 0x60, 0x1B, 0x40, 0x70, 0x1B, 0x45, 0x30, 0x1B, 0x43, 0x22, 0x1B, 0x40, 0x6F, 0x1B, 0x50, 0x7F, 0x7F, 0x1B, 0x52, 0x3F, 0x1B, 0x41, 0x1B, 0x57, 0x21, 0x1B, 0x47, 0x7F, 0x1B, 0x46, 0x60, 0x1B, 0x42, 0x70, 0x1B, 0x44, 0x1B, 0x53, 0x6A, 0x1B, 0x40, 0x1B, 0x50, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x1B, 0x52, 0x35, 0x1B, 0x47, 0x1B, 0x57, 0x7F, 0x1B, 0x40, 0x6A, 0x1B, 0x51, 0x7C, 0x1B, 0x57, 0x34, 0x1B, 0x47, 0x22, 0x1B, 0x40, 0x1B, 0x56, 0x6A, 0x1B, 0x50, 0x7F, 0x1B, 0x53, 0x3F, 0x1B, 0x43, 0x1B, 0x57, 0x21, 0x1B, 0x44, 0x60, 0x1B, 0x40, 0x1B, 0x53, 0x7E, 0x1B, 0x50, 0x7E, 0x7D, 0x1B, 0x57, 0x74, 0x1B, 0x43, 0x30, 0x1B, 0x44, 0x2A, 0x1B, 0x40, 0x1B, 0x50, 0x7F, 0x7F, 0x1B, 0x57, 0x21, 0x1B, 0x47, 0x60, 0x1B, 0x40, 0x7E, 0x1B, 0x50, 0x7F, 0x1B, 0x53, 0x75, 0x1B, 0x47, 0x1B, 0x57, 0x7F, 0x1B, 0x40, 0x6A, 0x1B, 0x50, 0x7F, 0x1B, 0x54, 0x3F, 0x1B, 0x57, 0x21, 0x1B, 0x47, 0x60, 0x1B, 0x40, 0x78, 0x1B, 0x54, 0x7E, 0x1B, 0x50, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x1B, 0x52, 0x35, 0x1B, 0x47, 0x1B, 0x57, 0x7F, 0x1B, 0x40, 0x6A, 0x1B, 0x50, 0x7F, 0x1B, 0x55, 0x35, 0x1B, 0x47, 0x1B, 0x57, 0x35, 0x1B, 0x40, 0x1B, 0x56, 0x6A, 0x1B, 0x50, 0x7F, 0x1B, 0x44, 0x1B, 0x57, 0x25, 0x1B, 0x47, 0x7F, 0x1B, 0x40, 0x1B, 0x56, 0x7E, 0x1B, 0x50, 0x7F, 0x7F, 0x7F, 0x7F, 0x1B, 0x57, 0x75, 0x1B, 0x47, 0x7F, 0x1B, 0x40, 0x1B, 0x53, 0x6A, 0x1B, 0x50, 0x7F, 0x1B, 0x42, 0x1B, 0x57, 0x35, 0x1B, 0x47, 0x6A, 0x1B, 0x40, 0x1B, 0x50, 0x6A, 0x1B, 0x40, 0x1B, 0x50, 0x6A, 0x7F, 0x35, 0x1B, 0x47, 0x1B, 0x57, 0x7F, 0x1B, 0x40, 0x6A, 0x1B, 0x50, 0x7F, 0x1B, 0x56, 0x37, 0x1B, 0x47, 0x1B, 0x57, 0x21, 0x1B, 0x40, 0x6A, 0x1B, 0x50, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x1B, 0x52, 0x35, 0x1B, 0x47, 0x1B, 0x57, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x1B, 0x40, 0x60, 0x1B, 0x54, 0x7E, 0x1B, 0x50, 0x7F, 0x1B, 0x43, 0x1B, 0x57, 0x35, 0x1B, 0x44, 0x6A, 0x1B, 0x40, 0x1B, 0x50, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x35, 0x1B, 0x47, 0x1B, 0x57, 0x35, 0x1B, 0x45, 0x6A, 0x1B, 0x40, 0x1B, 0x50, 0x7F, 0x1B, 0x42, 0x1B, 0x57, 0x35, 0x1B, 0x47, 0x6A, 0x1B, 0x40, 0x1B, 0x50, 0x6A, 0x7F, 0x35, 0x1B, 0x47, 0x1B, 0x57, 0x7F, 0x1B, 0x40, 0x6A, 0x1B, 0x50, 0x7F, 0x1B, 0x57, 0x35, 0x1B, 0x47, 0x6A, 0x1B, 0x40, 0x1B, 0x51, 0x6A, 0x1B, 0x50, 0x37, 0x1B, 0x44, 0x1B, 0x57, 0x23, 0x23, 0x1B, 0x40, 0x1B, 0x53, 0x6B, 0x1B, 0x50, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x7F, 0x1B, 0x52, 0x35, 0x1B, 0x47, 0x1B, 0x57, 0x7F, 0x1B, 0x40, 0x60, 0x70, 0x7C, 0x1B, 0x54, 0x7E, 0x1B, 0x50, 0x7F, 0x7F, 0x1B, 0x46, 0x1B, 0x57, 0x35, 0x1B, 0x42, 0x22, 0x1B, 0x40, 0x1B, 0x54, 0x6F, 0x1B, 0x50, 0x7F, 0x7F, 0x7F, 0x7F, 0x1B, 0x55, 0x3F, 0x1B, 0x47, 0x1B, 0x57, 0x25, 0x1B, 0x40, 0x6A, 0x1B, 0x50, 0x7F, 0x1B, 0x42, 0x1B, 0x57, 0x35, 0x1B, 0x47, 0x6A, 0x1B, 0x40, 0x1B, 0x50, 0x6A, 0x7F, 0x35, 0x1B, 0x47, 0x1B, 0x57, 0x7F, 0x1B, 0x40, 0x6A, 0x1B, 0x50, 0x


```
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.attributes(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);
#ifdef SOUND
  minitel.bip();
  delay(1000);
  minitel.bip();
  delay(1000);
  minitel.bip();
  delay(1000);
#else delay(5000);
#endif
#ifdef 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 = getKeyValueOverride();

    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.setCursorXY(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.setCursorXY(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
```

```
#ifdef 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
#ifdef 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(0b000000);
}

/*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.attributs(CARACTERE_BLEU);
      minitel.graphic(0b111111, xBallOld, yBallOld);
      minitel.attributs(CARACTERE_BLANC);
    }
    if (startingCounter == 2) {
      minitel.attributs(CARACTERE_VERT);
      minitel.graphic(0b111111, xBallOld, yBallOld);
      minitel.attributs(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 souligné

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

void setup() {

Serial.begin(1200); // port serie 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 &= B01111111;
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'ecrire 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 partié
else bitWrite(b, 7, 0); //écriture de la partié
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 arduino: »);
    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 tester = OK

#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
    // de 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.attributes(FIXE);
debugPrint("> Minitel setup done");

// Intialize 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: verifiy 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.attributs(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.setCursorXY(SCORE_LEFT+1,sx);
minitel.print("BLACK ");
minitel.attributs(FOND_NORMAL);
sx+=2;
minitel.setCursorXY(SCORE_LEFT+1,sx);
minitel.print("time:");
minitel.attributs(INVERSION_FOND);
sx++;
minitel.setCursorXY(SCORE_LEFT+1,sx);
minitel.print(" --:--");
minitel.attributs(FOND_NORMAL);
sx+=2;
minitel.setCursorXY(SCORE_LEFT+1,sx);
minitel.print("str:");
minitel.attributs(INVERSION_FOND);
sx++;
minitel.setCursorXY(SCORE_LEFT+1,sx);
minitel.print("  --");

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

}

void drawBackground() {
  int sy = SCORE_TOP;
  minitel.graphicMode();
  minitel.attributs(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.attributs(CARACTERE_BLANC);
    minitel.attributs(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.attributs(CARACTERE_BLANC);
    else minitel.attributs(CARACTERE_NOIR);
    minitel.attributs(FOND_NORMAL);
    sx++;
    minitel.moveCursorXY(SCORE_LEFT+1,sx);
    minitel.print("move:");
    if (player == _WHITE) minitel.attributs(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.attributs(DEBUT_LIGNAGE);
        minitel.attributs(CARACTERE_BLANC);
    }
    else { // _BLACK
        minitel.attributs(CARACTERE_NOIR);
    }
    if ((cx+cy)%2 == 1) minitel.attributs(FOND_BLEU);
    else minitel.attributs(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.attributs(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.setCursorXY(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.setCursorXY(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;
}
```

Minitel-ESP32 Demo Teaser

Minitel-ESP32-DEMO_TEASER.ino

```
//Faire Reset de l'ESP32 à chaque démarrage du minitel

/*
 * Sample code for connexion to minitel videotex server via websocket
 * Requirements: ESP32 connected to minitel DIN port and a WiFi
connexion
 *
 * created by iodeo - dec 2021
 */

#include <WiFi.h>
#include <WebSocketsClient.h> // src:
https://github.com/Links2004/arduinoWebSockets.git
#include <Minitel1B_Hard.h> // src:
https://github.com/eserandour/Minitel1B\_Hard.git

// -----
// ----- Minitel port configuration

#define MINITEL_PORT Serial2 // for Minitel-ESP32 devboard
#define MINITEL_BAUD 4800 // 1200 / 4800 / 9600 depending on
minitel type
#define MINITEL_DISABLE_ECHO true // true if characters are repeated
when typing

// -----
// ----- Debug port configuration
```

```
#define DEBUG true

#if DEBUG
    #define DEBUG_PORT Serial          // for Minitel-ESP32 devboard
    #define DEBUG_BAUD 115200          // set serial monitor accordingly
    #define debugBegin(x)              DEBUG_PORT.begin(x)
    #define debugPrintf(...)           DEBUG_PORT.printf(__VA_ARGS__)
#else // Empty macro functions
    #define debugBegin(x)
    #define debugPrintf(...)
#endif

// -----
// ----- WiFi credentials

const char* ssid      = "xxxxxxxxxxxxx"; // your wifi network
const char* password  = "xxxxxxxxxxxxxxxxx"; // your wifi password

// -----
// ----- Websocket server

/***** TELETEL.ORG ----- connecté le 2 mar 2022
    */
// ws://home.teletel.org:9001/
char* host = "home.teletel.org";
int port = 9001;
char* path = "/";
bool ssl = false;
int ping_ms = 0;
char* protocol = "";
/**/

/***** 3615 ----- connecté le 2 mar 2022
    */
// wss://3615co.de/ws
char* host = "3615co.de";
int port = 80;
char* path = "/ws";
bool ssl = false;
int ping_ms = 0;
char* protocol = "";
/**/

/***** AE ----- connecté le 2 mar 2022
    */
// ws://3611.re/ws
// websocket payload length of 0
char* host = "3611.re";
int port = 80;
char* path = "/ws";
bool ssl = false;
int ping_ms = 0;
```

```
char* protocol = "";
/**/

/***** HACKER ----- connecté le 2 mar 2022
// ws://mntl.joher.com:2018/?echo
// websocket payload length up to 873
char* host = "mntl.joher.com";
int port = 2018;
char* path = "/?echo";
bool ssl = false;
int ping_ms = 0;
char* protocol = "";
/**/

/***** TEASER ----- connecté le 2 mar 2022
// ws://minitel.3614teaser.fr:8080/ws
char* host = "minitel.3614teaser.fr";
int port = 8080;
char* path = "/ws";
bool ssl = false;
int ping_ms = 10000;
char* protocol = "tty";
/**/

/***** SM ----- connecté le 2 mar 2022*/
// wss://wss.3615.live:9991/?echo
// websocket payload length up to 128
char* host = "wss.3615.live";
int port = 9991;
char* path = "/?echo";
bool ssl = true;
int ping_ms = 0;
char* protocol = "";
/**/

WiFiClient client;
WebSocketsClient webSocket;
Minitel minitel(MINITEL_PORT);

void setup() {

    debugBegin(DEBUG_BAUD);
    debugPrintf("\n-----\n");
    debugPrintf("\n> Debug port ready\n");

    // We initiate minitel communication
    debugPrintf("\n> Minitel setup\n");
    int baud = minitel.searchSpeed();
    if (baud != MINITEL_BAUD) baud = minitel.changeSpeed(MINITEL_BAUD);
    debugPrintf(" - Baud detected: %u\n", baud);
    if (MINITEL_DISABLE_ECHO) {
```

```
minitel.echo(false);
debugPrintf(" - Echo disabled\n");
}

// We connect to WiFi network
debugPrintf("\n> Wifi setup\n");
debugPrintf(" Connecting to %s ", ssid);
WiFi.begin(ssid, password);
while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    debugPrintf(".");
}
debugPrintf("\n WiFi connected with IP %s\n",
WiFi.localIP().toString().c_str());

// We connect to Websocket server
debugPrintf("\n> Websocket connection\n");
if (protocol[0] == '\0') {
    if (ssl) websocket.beginSSL(host, port, path);
    else websocket.begin(host, port, path);
}
else {
    debugPrintf(" - subprotocol added\n");
    if (ssl) websocket.beginSSL(host, port, path, protocol);
    else websocket.begin(host, port, path, protocol);
}

websocket.onEvent(webSocketEvent);

if (ping_ms != 0) {
    debugPrintf(" - heartbeat ping added\n");
    // start heartbeat (optional)
    // ping server every ping_ms
    // expect pong from server within 3000 ms
    // consider connection disconnected if pong is not received 2 times
    websocket.enableHeartbeat(ping_ms, 3000, 2);
}

debugPrintf("\n> End of setup\n\n");
}

void loop() {

    // Websocket -> Minitel
    websocket.loop();

    // Minitel -> Websocket
    uint32_t key = minitel.getKeyCode(false);
    if (key != 0) {
```

```
    debugPrintf("[KB] got code: %X\n", key);  
    // prepare data to send over websocket  
    uint8_t payload[4];  
    size_t len = 0;  
    for (len = 0; key != 0 && len < 4; len++) {  
        payload[3-len] = uint8_t(key);  
        key = key >> 8;  
    }  
    websocket.sendTXT(payload+4-len, len);  
}  
  
}  
  
void websocketEvent(WStype_t type, uint8_t * payload, size_t len) {  
    switch(type) {  
        case WStype_DISCONNECTED:  
            debugPrintf("[WS] Disconnected!\n");  
            break;  
  
        case WStype_CONNECTED:  
            debugPrintf("[WS] Connected to url: %s\n", payload);  
            break;  
  
        case WStype_TEXT:  
            debugPrintf("[WS] got %u chars\n", len);  
            if (len > 0) {  
                debugPrintf("    > %s\n", payload);  
                for (size_t i = 0; i < len; i++) {  
                    minitel.writeByte(payload[i]);  
                }  
            }  
            break;  
  
        case WStype_BIN:  
            debugPrintf("[WS] got %u binaries - ignored\n", len);  
            break;  
  
        case WStype_ERROR:  
            debugPrintf("[WS] WStype_ERROR\n");  
            break;  
  
        case WStype_FRAGMENT_TEXT_START:  
            debugPrintf("[WS] WStype_FRAGMENT_TEXT_START\n");  
            break;  
  
        case WStype_FRAGMENT_BIN_START:  
            debugPrintf("[WS] WStype_FRAGMENT_BIN_START\n");  
            break;  
  
        case WStype_FRAGMENT:  
            debugPrintf("[WS] WStype_FRAGMENT\n");  
            break;  
    }  
}
```

```
break;  
  
case WStype_FRAGMENT_FIN:  
    debugPrintf("[WS] WStype_FRAGMENT_FIN\n");  
    break;  
}  
}
```

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