Programmes Arduino Minitel

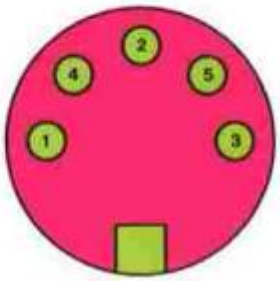
Librairies

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 differant 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

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

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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-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.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

```
//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;
```

```
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
{0b111110,0b111101,0b101111,0b011111,0b101010,0b010101,0b101111,0b01111
1}, //8
{0b111110,0b111101,0b101111,0b011111,0b000000,0b010101,0b000000,0b01010
1} //9
};


// image of welcome page
// made from jpg using processing IDE
// +jpgtovdt2.pde (PAMAL) to get vdt from jpg
// +conversion_videotex_hex (Eserandour) to get hex from vdt//const int
LONGUEUR_TRAME_IMAGE = 1666;
//const prog_uchar IMAGE[] PROGMEM =
{0x0C,0x0E,0x1B,0x40,0x1B,0x50,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,
0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0
x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x
7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7
F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F
,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,
0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0
x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x
7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7
F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F
,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,
0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0
x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x
7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7
F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F
,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,
0x7F,0x7F,0x7F,0x3F,0x1B,0x51,0x2F,0x1B,0x50,0x7F,0x7F,0x7F,0x7F,0x7F,0
```

```
x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x1B,0x52,0x
37,0x1B,0x57,0x23,0x23,0x23,0x2F,0x1B,0x50,0x6F,0x7F,0x7F,0x7F,0x7F,0x1
B,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,0
x7F,0x7F,0x1B,0x54,0x3F,0x1B,0x57,0x2F,0x23,0x1B,0x44,0x23,0x1B,0x40,0x
1B,0x53,0x6B,0x1B,0x50,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x1B,0x52,0x35,0x1
B,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,0
x50,0x7F,0x7F,0x1B,0x57,0x3F,0x1B,0x43,0x21,0x1B,0x46,0x60,0x1B,0x40,0x
70,0x1B,0x45,0x30,0x1B,0x43,0x22,0x1B,0x40,0x6F,0x1B,0x50,0x7F,0x7F,0x1
B,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,0
x1B,0x51,0x7C,0x1B,0x57,0x34,0x1B,0x47,0x22,0x1B,0x40,0x1B,0x56,0x6A,0x
1B,0x50,0x7F,0x1B,0x53,0x3F,0x1B,0x43,0x1B,0x57,0x21,0x1B,0x44,0x60,0x1
B,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,0x57,0
x7F,0x1B,0x40,0x6A,0x1B,0x50,0x7F,0x1B,0x54,0x3F,0x1B,0x57,0x21,0x1B,0x
47,0x60,0x1B,0x40,0x78,0x1B,0x54,0x7E,0x1B,0x50,0x7F,0x7F,0x7F,0x7F,0x7
F,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,0
x40,0x1B,0x56,0x7E,0x1B,0x50,0x7F,0x7F,0x7F,0x7F,0x1B,0x57,0x75,0x1B,0x
47,0x7F,0x1B,0x40,0x1B,0x53,0x6A,0x1B,0x50,0x7F,0x1B,0x42,0x1B,0x57,0x3
5,0x1B,0x47,0x6A,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,0
x7F,0x7F,0x1B,0x52,0x35,0x1B,0x47,0x1B,0x57,0x7F,0x1B,0x40,0x2A,0x1B,0x
56,0x2F,0x1B,0x57,0x25,0x1B,0x47,0x60,0x1B,0x40,0x1B,0x56,0x6A,0x1B,0x5
0,0x7F,0x1B,0x43,0x1B,0x57,0x35,0x1B,0x44,0x6A,0x1B,0x40,0x1B,0x50,0x7F
,0x7F,0x7F,0x7F,0x7F,0x35,0x1B,0x47,0x1B,0x57,0x34,0x1B,0x44,0x6A,0x1B,
0x40,0x1B,0x50,0x7F,0x1B,0x42,0x1B,0x57,0x35,0x1B,0x47,0x6A,0x1B,0x40,0
x1B,0x50,0x6A,0x7F,0x35,0x1B,0x47,0x1B,0x57,0x7F,0x1B,0x40,0x6A,0x1B,0x
50,0x7F,0x1B,0x57,0x35,0x1B,0x47,0x68,0x1B,0x40,0x1B,0x55,0x6A,0x1B,0x5
0,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x1B,0x52,0x35,0x1B
,0x47,0x1B,0x57,0x7F,0x7F,0x7F,0x7F,0x1B,0x40,0x60,0x1B,0x54,0x7E,0x1B,
0x50,0x7F,0x1B,0x43,0x1B,0x57,0x35,0x1B,0x44,0x6A,0x1B,0x40,0x1B,0x50,0
x7F,0x7F,0x7F,0x7F,0x7F,0x35,0x1B,0x47,0x1B,0x57,0x35,0x1B,0x45,0x6A,0x
1B,0x40,0x1B,0x50,0x7F,0x1B,0x42,0x1B,0x57,0x35,0x1B,0x47,0x6A,0x1B,0x4
0,0x1B,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,0
x50,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x1B,0x52,0x35,0x1B,0x47,0x1B,0x57,0x
7F,0x1B,0x40,0x60,0x70,0x7C,0x1B,0x54,0x7E,0x1B,0x50,0x7F,0x7F,0x1B,0x4
6,0x1B,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,0
```

```
x50,0x6A,0x7F,0x35,0x1B,0x47,0x1B,0x57,0x7F,0x1B,0x40,0x6A,0x1B,0x50,0x
7F,0x1B,0x56,0x35,0x1B,0x47,0x1B,0x57,0x22,0x1B,0x40,0x1B,0x53,0x6B,0x1
B,0x50,0x75,0x1B,0x44,0x1B,0x57,0x70,0x1B,0x47,0x7F,0x1B,0x44,0x1B,0x53
,0x6A,0x1B,0x40,0x1B,0x50,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x1B,0x52,0x35,
0x1B,0x47,0x1B,0x57,0x7F,0x1B,0x40,0x1B,0x56,0x6A,0x1B,0x50,0x7F,0x7F,0
x7F,0x7F,0x7F,0x1B,0x57,0x35,0x1B,0x47,0x7F,0x1B,0x40,0x2A,0x1B,0x50,0x
6F,0x7F,0x7F,0x1B,0x54,0x3F,0x1B,0x57,0x25,0x1B,0x47,0x7F,0x1B,0x40,0x1
B,0x53,0x7A,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,0x55,0x7D,0x1B,0x43,0x1B,0x57,0x34,0x1B,0x41,0x22,0
x1B,0x40,0x1B,0x56,0x6F,0x1B,0x51,0x35,0x1B,0x47,0x1B,0x57,0x7F,0x1B,0x
44,0x1B,0x53,0x6A,0x1B,0x40,0x1B,0x50,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x1
B,0x52,0x35,0x1B,0x47,0x1B,0x57,0x7F,0x1B,0x40,0x1B,0x56,0x6A,0x1B,0x50
,0x7F,0x7F,0x7F,0x7F,0x7F,0x1B,0x51,0x7D,0x1B,0x41,0x1B,0x57,0x30,0x1B,
0x47,0x7F,0x1B,0x40,0x22,0x2B,0x27,0x1B,0x41,0x21,0x1B,0x47,0x7F,0x1B,0
x40,0x68,0x1B,0x50,0x7F,0x7F,0x1B,0x42,0x1B,0x57,0x35,0x1B,0x47,0x6A,0x
1B,0x40,0x1B,0x50,0x6A,0x7F,0x35,0x1B,0x47,0x1B,0x57,0x7F,0x1B,0x40,0x6
A,0x1B,0x50,0x7F,0x7F,0x1B,0x57,0x75,0x1B,0x47,0x30,0x1B,0x46,0x22,0x1B
,0x40,0x23,0x1B,0x47,0x7F,0x1B,0x44,0x1B,0x53,0x6A,0x1B,0x40,0x1B,0x50,
0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x1B,0x52,0x35,0x1B,0x47,0x1B,0x57,0x7F,0
x1B,0x40,0x1B,0x56,0x6A,0x1B,0x50,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x1B,0x
56,0x7D,0x1B,0x57,0x30,0x1B,0x47,0x30,0x7F,0x7F,0x60,0x1B,0x40,0x78,0x1
B,0x50,0x7E,0x7F,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,0x7F,0x7D,0x1B,0x57,0x74,0x1B,0x42,0x30,0x1B,0x47,0x7F,0x7F,0
x1B,0x44,0x1B,0x53,0x6A,0x1B,0x40,0x1B,0x50,0x7F,0x7F,0x7F,0x7F,0x7F,0x
7F,0x1B,0x52,0x7D,0x1B,0x57,0x7C,0x1B,0x56,0x7E,0x1B,0x50,0x7F,0x7F,0x7
F,0x7F,0x7F,0x7F,0x7F,0x7F,0x1B,0x57,0x7D,0x7C,0x7C,0x7E,0x1B,0x50,0x7F
,0x7F,0x7F,0x7F,0x1B,0x57,0x7C,0x7C,0x1B,0x50,0x7E,0x7F,0x7D,0x1B,0x57,
0x7C,0x7E,0x1B,0x50,0x7F,0x7F,0x7F,0x7F,0x1B,0x51,0x7D,0x1B,0x57,0x7C,0
x7C,0x1B,0x53,0x7E,0x1B,0x50,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x
7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7
F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F
,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,
0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0
x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x
7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7
F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F
,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,
0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0
x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x
7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7
F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F
,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,
0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0
x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x
7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7
F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F
,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,
0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0x7F,0
x7F,0x7F,0x7F,0x7F,0x7F};
```

```
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.attributs(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 = 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
#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 da 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 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); //ecriture de la partié
else bitWrite(b, 7, 0); //ecriture de la partié
mySerial.write(b);//ecriture 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  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.attributs(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.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.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.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;
}
```

Minitel-ESP32 Demo Teaser

Minitel-ESP32-DEMO_TEASER.ino

```
//Faire Reset de l'ESP32 à chaque démmarrage 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     = "xxxxxxxxxxxx";         // your wifi network
const char* password = "xxxxxxxxxxxxxxxxxx";    // 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;

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