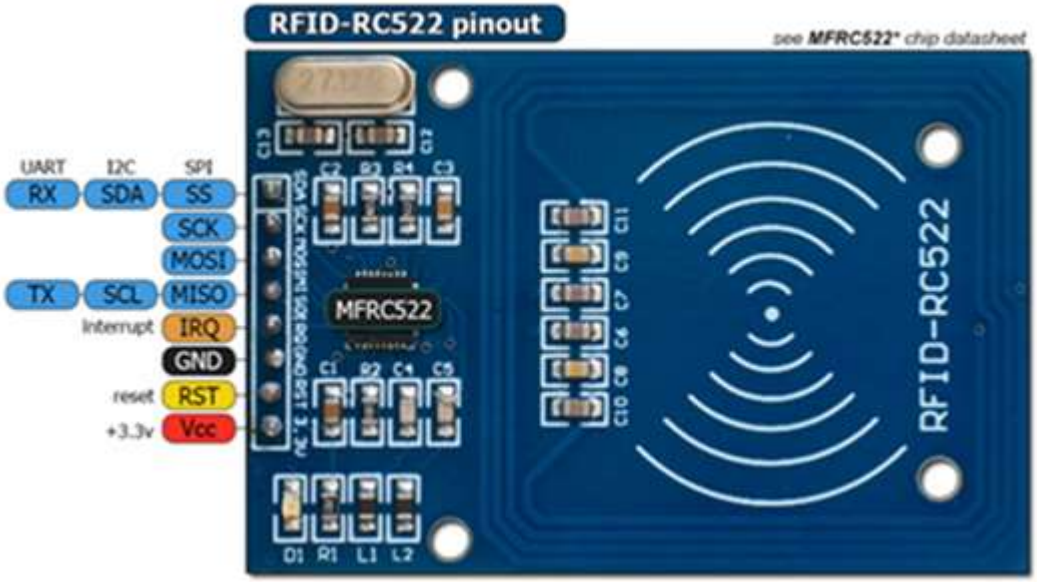
RFID
IDs in EEPROM

MFRC522 RFID

MFRC-522 RC522 13.56Mhz SPI RFID Writer Reader Wireless modul



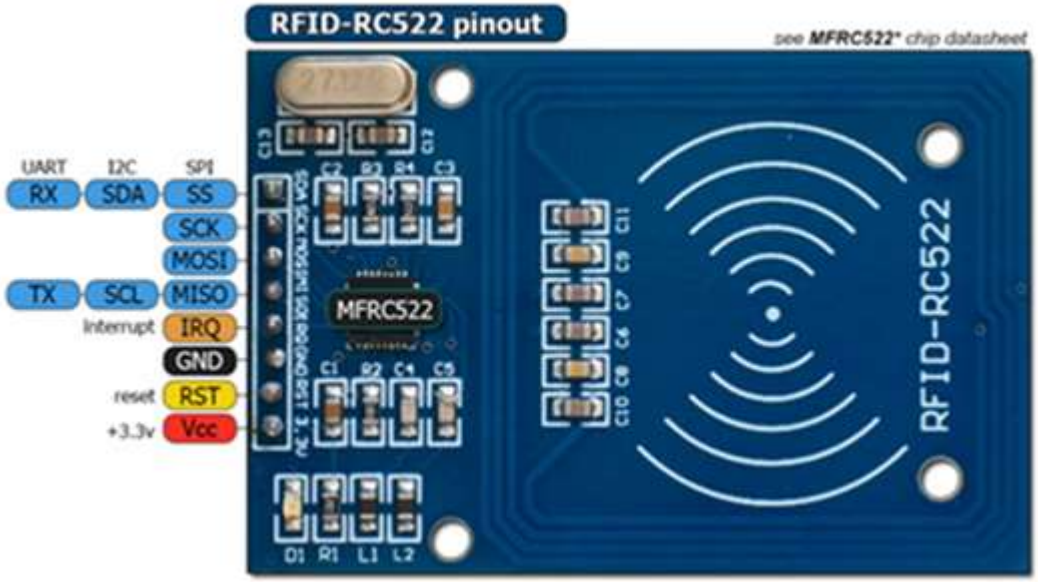
MFRC522 Chip IC radna frekvencija: 13.56MHz, Brzina razmjene podataka: Max. 10Mbit/s

Podržava mifare1 S50 identifikatore

Dimenzije: 40mm × 60mm

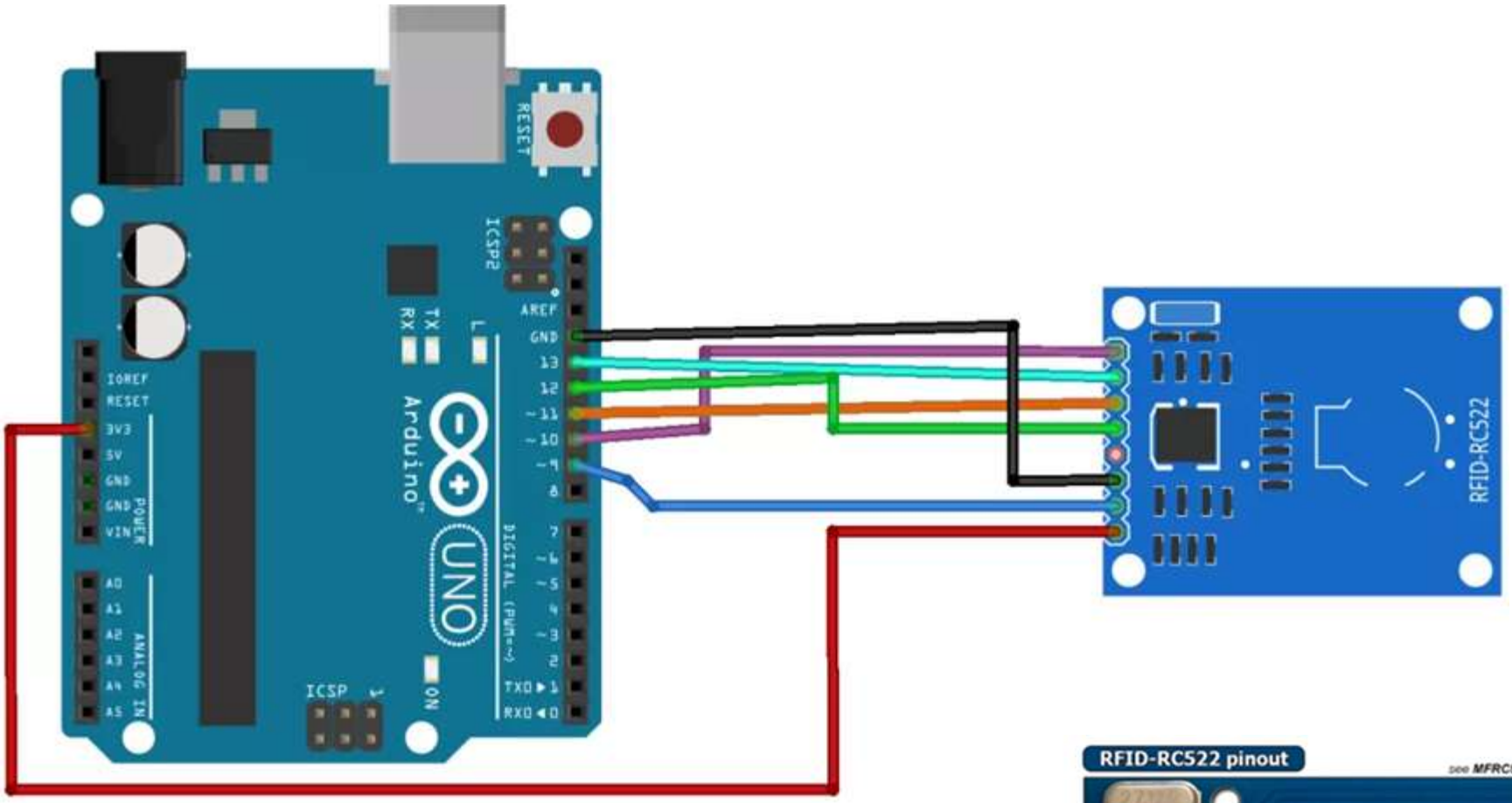
RFID IDENTIFIKATORI

POVEZIVANJE SA ARDUINO UNO



Pin čitača	Pin Arduino Uno
SDA	10
SCK	13
MOSI	11
MISO	12
IRQ	nepovezano
GND	GND
RST	9
3.3V	3.3V

POVEZIVANJE SA ARDUINO UNO



INSTALIRANJE BIBLIOTEKE

Za rad sa MFRC522 čitačem iz Arduino razvojnog okruženja potrebno je instalirati bibilioteku, koja se može preuzeti sa linka:

https://github.com/miguelbalboa/rfid

Za instaliranje biblioteke potrebno je odraditi sljedeća tri koraka:

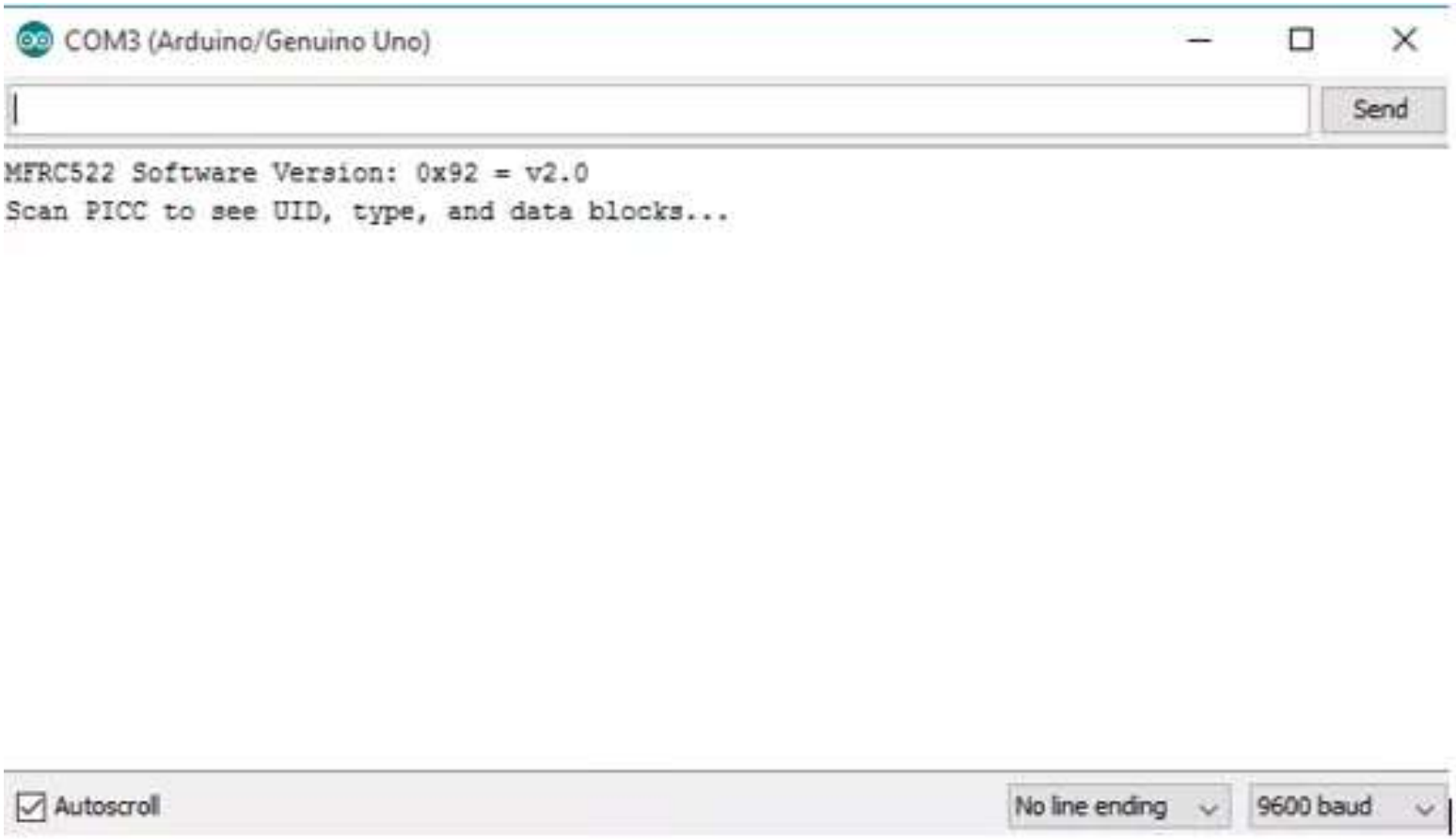
Dodajte biblioteku selektovanjem Add ZIP u SKETCH meniju, INCLUDE Library opcija.

Otvoriti arduino IDE.
Zatim, selektovati .zip fajl sa lokacije na kojoj je fajl sačuvan.

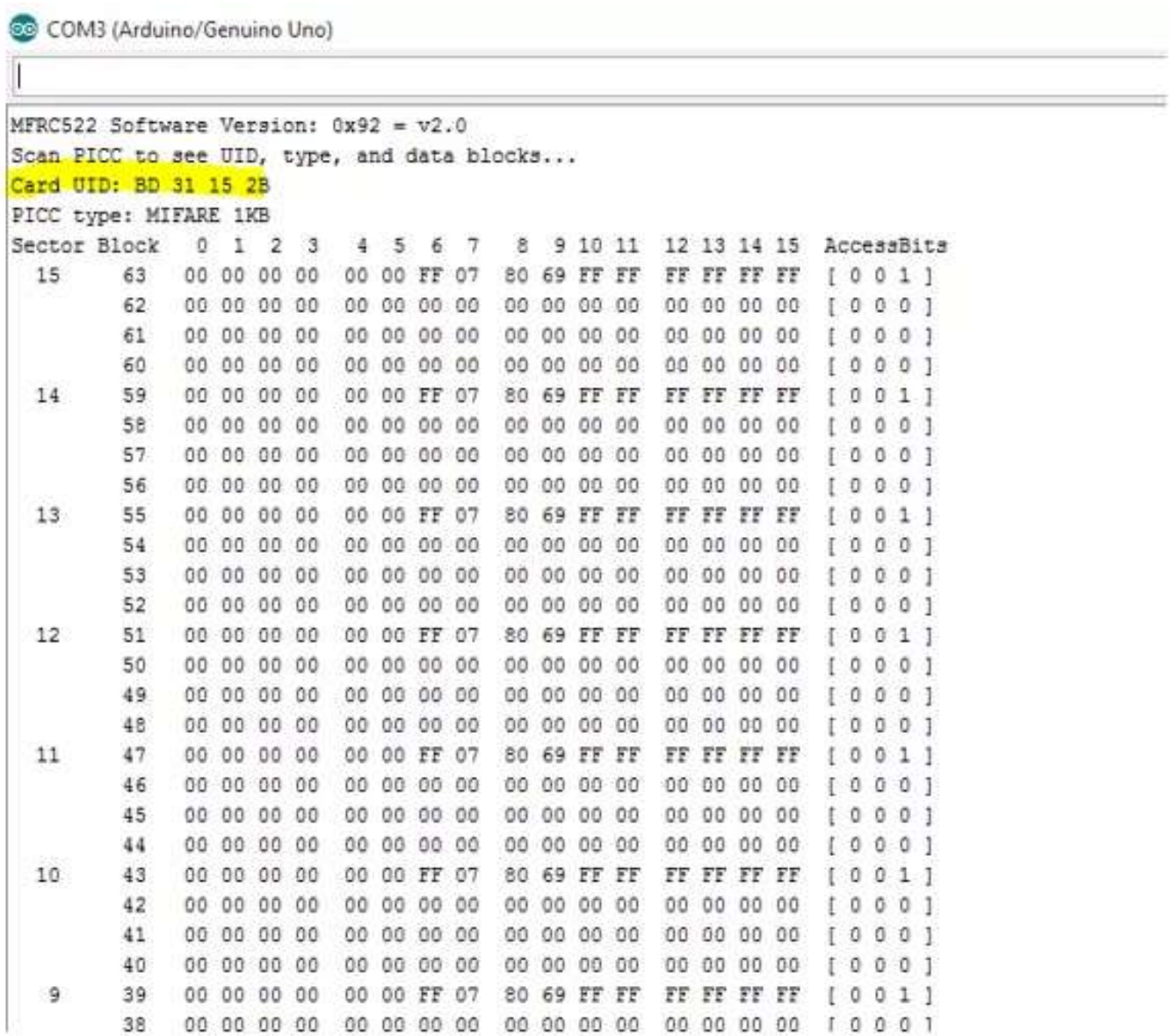
Detaljnije informacije o biblioteci mogu se vidijeti na adresi:

http://www.neilkolban.com/esp32/docs/cpp_utils/html/class_m_f_r_c522.html

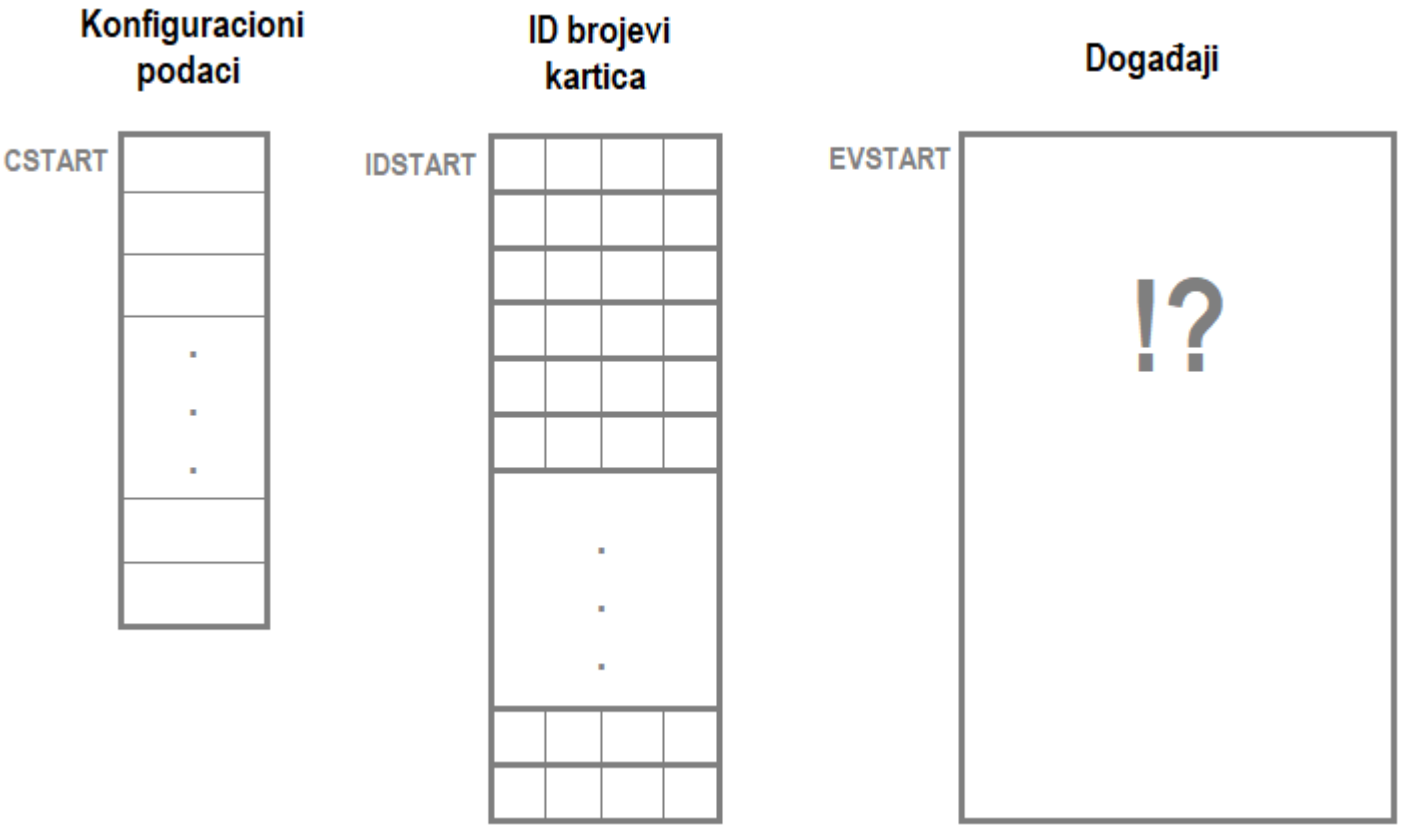
DUMPINFO


COM3 (Arduino/Genuino Uno)
Send
MFRC522 Software Version: 0x92 = v2.0
Scan PICC to see UID, type, and data blocks...
Autoscroll
No line ending
9600 baud

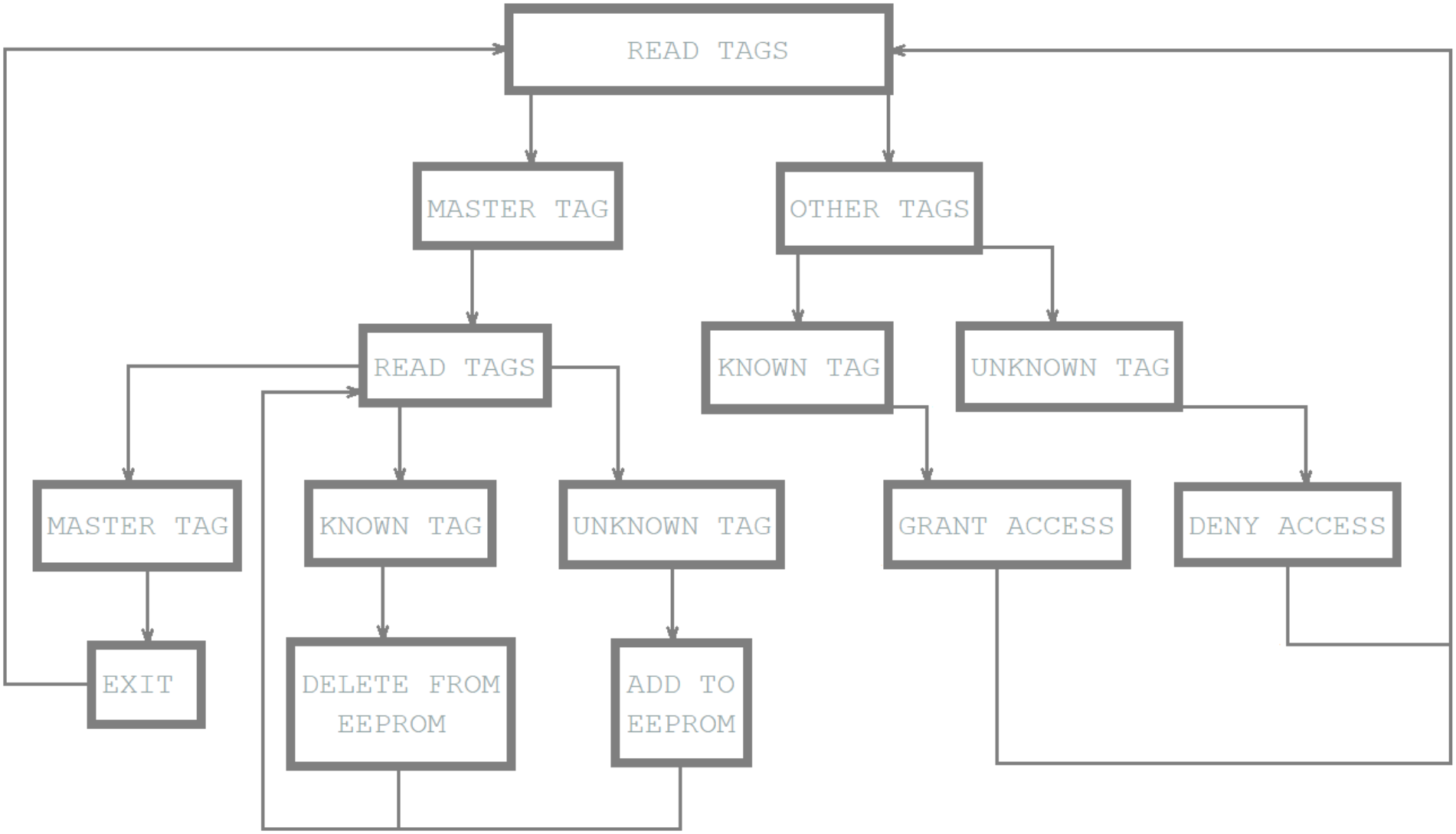
DUMPINFO


COM3 (Arduino/Genuino Uno)
MFRC522 Software Version: 0x92 = v2.0
Scan PICC to see UID, type, and data blocks...
Card UID: BD 31 15 2B
PICC type: MIFARE 1KB
Sector Block 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 AccessBits
15 63 00 00 00 00 00 00 FF 07 80 69 FF FF FF FF FF FF [0 0 1]
62 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 [0 0 0]
61 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 [0 0 0]
60 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 [0 0 0]
14 59 00 00 00 00 00 00 FF 07 80 69 FF FF FF FF FF FF [0 0 1]
58 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 [0 0 0]
57 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 [0 0 0]
56 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 [0 0 0]
13 55 00 00 00 00 00 00 FF 07 80 69 FF FF FF FF FF FF [0 0 1]
54 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 [0 0 0]
53 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 [0 0 0]
52 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 [0 0 0]
12 51 00 00 00 00 00 00 FF 07 80 69 FF FF FF FF FF FF [0 0 1]
50 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 [0 0 0]
49 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 [0 0 0]
48 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 [0 0 0]
11 47 00 00 00 00 00 00 FF 07 80 69 FF FF FF FF FF FF [0 0 1]
46 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 [0 0 0]
45 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 [0 0 0]
44 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 [0 0 0]
10 43 00 00 00 00 00 00 FF 07 80 69 FF FF FF FF FF FF [0 0 1]
42 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 [0 0 0]
41 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 [0 0 0]
40 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 [0 0 0]
9 39 00 00 00 00 00 00 FF 07 80 69 FF FF FF FF FF FF [0 0 1]
38 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 [0 0 0]

EEPROM

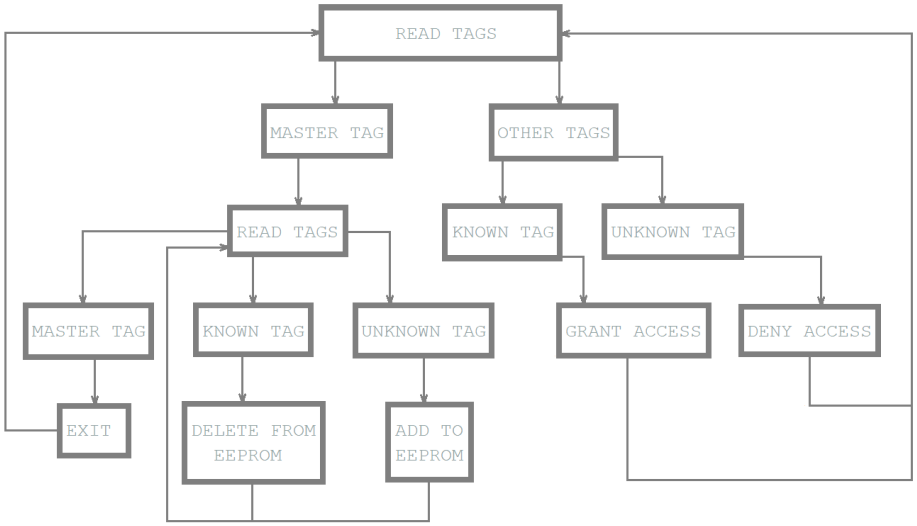

Konfiguracioni podaci
CSTART
ID brojevi kartica
IDSTART
Događaji
EVSTART
!?

DIJAGRAM TOKA



READ TAGS

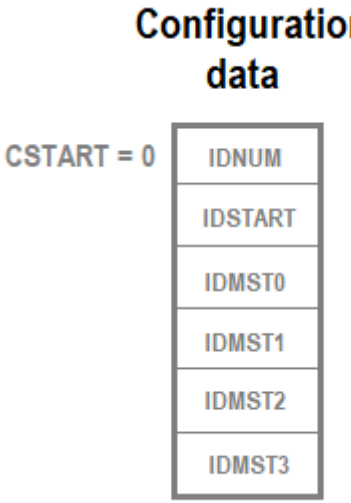
```
//Read card ID
uint8_t ReadCardID(byte* readTag) {
  if ( ! mfrc522.PICC_ReadCardSerial()) { //Since a PICC placed get Serial and continue
    return 0;
  }
  // We support 4 byte card ID
  Serial.println(F("Scanned card ID:"));
  for ( uint8_t i = 0; i < 4; i++) {  //
    readTag[i] = mfrc522.uid.uidByte[i];
    Serial.print(readTag[i], HEX);
  }
  readTag[4] = '\0';
  Serial.println("");
  mfrc522.PICC_HaltA(); // Stop reading
  return 1;
}
```




```
// Find card ID in EEPROM
bool findID(byte* rCard) {
  uint8_t k;
  byte strCard[8]; // Stores an ID read from EEPROM
  uint8_t count = EEPROM.read(0); // Read the first byte of EEPROM

  for ( uint8_t i = 0; i < count; i++ ) { // Loop once for each EEPROM entry
    readID(i, strCard); // Read an ID from EEPROM, it is stored in storedID
    for (k = 0; k < 4; k++ ) { // Loop 4 times
      if ( rCard[k] != strCard[k] ) { // IF a != b then false, because: one fails, all fail
        break;
      }
    }
    if (k == 4)return true;
  }
  // If not, return false
  return false;
}
```

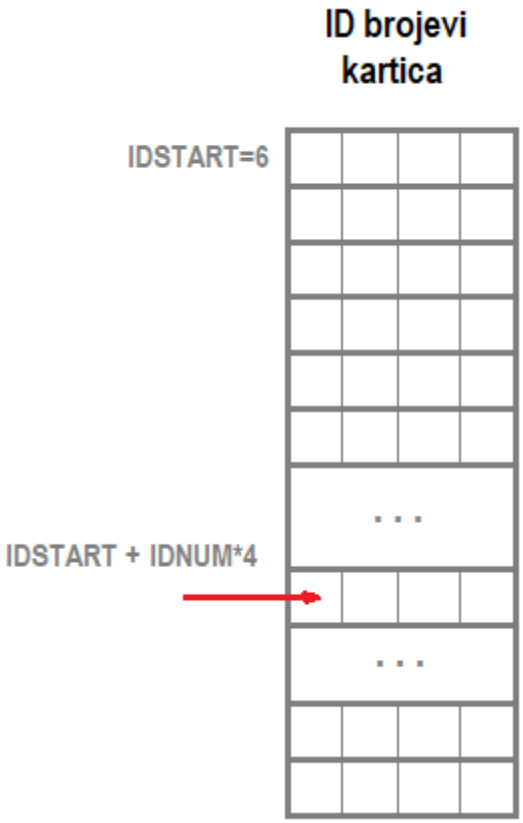
KONFIGURACIONI PODACI




```
// Writing New Master ID to EEPROM
byte writeNewMasterID(char* newMasterCard) {
  uint8_t start = 2;  // Figure out where the next slot starts
  for ( uint8_t j = 0; j < 4; j++ ) { // Loop 4 times
    EEPROM.write( start + j, newMasterCard[j] ); // Write the array values to EEPROM in the right position
  }
  Serial.println(F("Succesfully writed New Master ID record to EEPROM"));
  return (1);
}


// Reading Master ID from EEPROM
void readMasterID(byte* masterTag) {
  uint8_t start = 2; // Figure out starting position
  for ( uint8_t i = 0; i < 4; i++ ) { // Loop 4 times to get the 4 Bytes
    masterTag[i] = EEPROM.read(start + i); // Assign values read from EEPROM to array
    Serial.print(masterTag[i], HEX);
    delay(1);
  }
  Serial.println();
  Serial.println(F("Succesfully read Master ID record from EEPROM"));
}
```

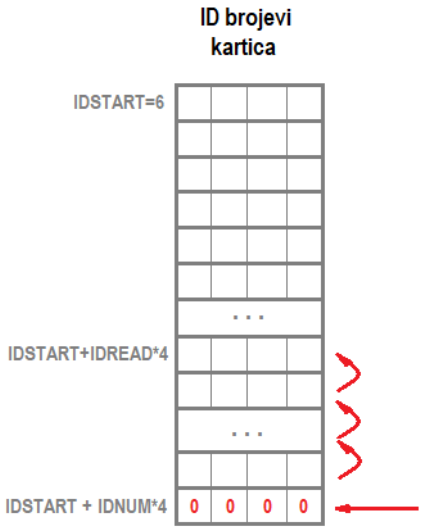
READ-WRITE ID




```
// Read an ID from EEPROM
void readID( uint8_t number, byte sCard[]) {
  uint8_t start = (number * 4 ) + 6; // Figure out starting position
  for ( uint8_t i = 0; i < 4; i++ ) { // Loop 4 times to get the 4 Bytes
    sCard[i] = EEPROM.read(start + i); // Assign values read from EEPROM to array
    delay(1);
  }
}
```

```
// Add tag(card) ID to EEPROM
byte writeID(byte* rCard) {
  uint8_t num = EEPROM.read(0); // Get the numer of used spaces, position
                                // 0 stores the number of ID cards
  uint8_t start = ( num * 4 ) + 6;  // Figure out where the next slot starts
  num++; // Increment the counter by one
  EEPROM.write( 0, num ); // Write the new count to the counter
  for ( uint8_t j = 0; j < 4; j++ ) { // Loop 4 times
    EEPROM.write( start + j, rCard[j] ); // Write the array values
                                         // to EEPROM in the right position
  }
  Serial.println(F("Succesfully added ID record to EEPROM"));
  return (1);
}
```

DELETE ID




```
// Find Slot
uint8_t findIDSLOT(byte* rCard) {
  uint8_t k;
  byte strCard[8]; // Stores an ID read from EEPROM
  uint8_t count = EEPROM.read(0); // Read the first Byte of EEPROM that

  for ( uint8_t i = 0; i < count; i++ ) { // Loop once for each EEPROM entry
    readID(i,strCard); // Read an ID from EEPROM, it is stored in storedCard[]
    for (k = 0; k < 4; k++ ) { // Loop 4 times
      if ( rCard[k] != strCard[k] ) { // IF a != b then false, because: one fails, all fail
        break;
      }
    }
    if (k == 4)return (i);
  }
  return (0);
}
```

```
// Remove ID from EEPROM
byte deleteID() {
  uint8_t num = EEPROM.read(0);   // Get the number of used spaces, position 0 stores the number of ID cards
  uint8_t slot;       // Figure out the slot number of the card
  uint8_t start;      // = ( num * 4 ) + 6; // Figure out where the next slot starts
  uint8_t looping;    // The number of times the loop repeats
  uint8_t j;
  uint8_t count = EEPROM.read(0); // Read the first Byte of EEPROM that stores number of cards

  slot = findIDSLOT();   // Figure out the slot number of the card to delete
  start = (slot * 4) + 6;
  looping = ((num - slot) * 4);
  num--;      // Decrement the counter by one
  EEPROM.write( 0, num );   // Write the new count to the counter
  for ( j = 0; j < looping; j++ ) {         // Loop the card shift times
    EEPROM.write( start + j, EEPROM.read(start + 4 + j));   // Shift the array values to 4 places earlier in the EEPROM
  }
  for ( uint8_t k = 0; k < 4; k++ ) {   // Shifting loop. Write zero to the last four character in EEPROM
    EEPROM.write( start + j + k, 0);
  }
  Serial.println(F("Succesfully removed ID record from EEPROM"));
  return (1);
}
```

DELETE ALL TAGS ID FROM EEPROM

```
//Delete all tags ID from EEPROM
void deleteEEPROM() {
  digitalWrite(RedLED, HIGH); // Red Led stays on to inform user we are going to wipe
  Serial.println(F("Wipe Button Pressed"));
  Serial.println(F("You have 10 seconds to Cancel"));
  Serial.println(F("This will be remove all records and cannot be undone"));
  bool buttonState = monitorWipeButton(10000); // Give user enough time to cancel operation
  if (buttonState == true && digitalRead(wipeB) == LOW) { // If button still be pressed, wipe EEPROM
    Serial.println(F("Starting Wiping EEPROM"));
    for (uint16_t x = 0; x < EEPROM.length(); x = x + 1) { //Loop end of EEPROM address
      if (EEPROM.read(x) == 0) { //If EEPROM address 0
        // do nothing, already clear, go to the next address in order to save time and reduce writes to EEPROM
      }
      else {
        EEPROM.write(x, 0); // if not write 0 to clear, it takes 3.3mS
      }
    }
    Serial.println(F("EEPROM Successfully Wiped"));
    digitalWrite(RedLED, LOW); // visualize a successful wipe
    delay(200);
    digitalWrite(RedLED, HIGH);
    delay(200);
    digitalWrite(RedLED, LOW);
    delay(200);
    digitalWrite(RedLED, HIGH);
    delay(200);
    digitalWrite(RedLED, LOW);
  }
  else {
    // Show some feedback that the wipe button did not pressed for 10 seconds
    Serial.println(F("Wiping Cancelled"));
    digitalWrite(RedLED, LOW);
  }
}
```

DELETE ALL TAGS ID FROM EEPROM

```
//Monitoring of the Wipe button
bool monitorWipeButton(uint32_t interval) {
  uint32_t now = (uint32_t)millis();
  while ((uint32_t)millis() - now < interval)  {
    // check on every half a second
    if (((uint32_t)millis() % 500) == 0) {
      if (digitalRead(wipeB) != LOW)
        return false;
    }
  }
  return true;
}
```

ZA VJEŽBU

1. Modifikovati kod tako da se u MASTER mod ulazi ukoliko ID kod MASTER identifikatora nije upisan u EEPROM mikrokontrolera (očitane sve 0 ili sve FF) (2-1)

2. Modifikovati kod tako da se izmjena ID koda MASTER identifikatora inicira zadržavanjem na čitaču važećeg MASTER identifikatora, duže od 4 sekunde (3-2-1).

3. Modifikovati deleteEEPROM funkciju tako da se EEPROM briše ukoliko se MASTER identifikator zadrži na čitaču duže od 10 sekundi (2-1).

Poeni riješenih zadataka se sabiraju!