

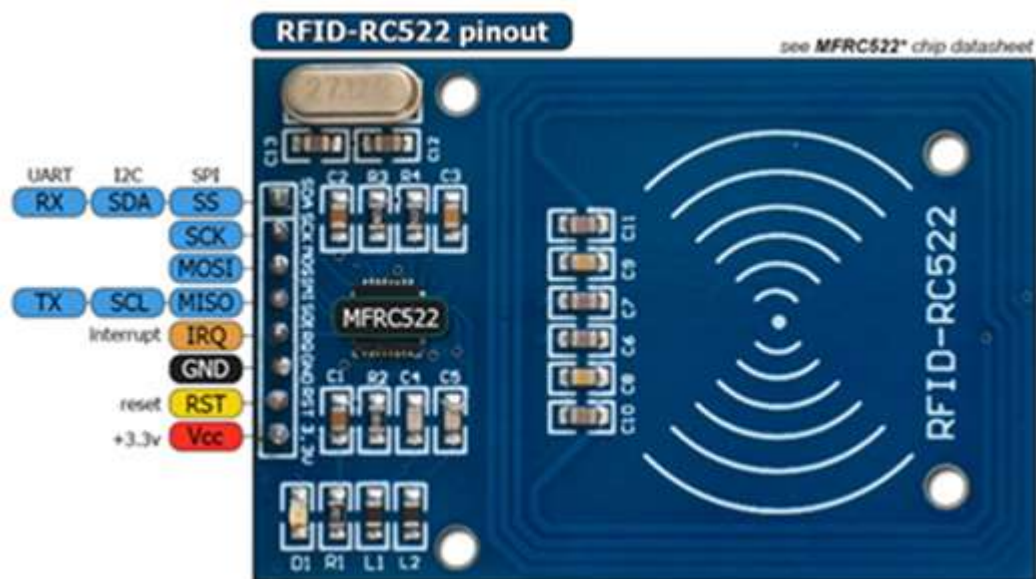


RFID

**ID u EEPROM-u
identifikatora**

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

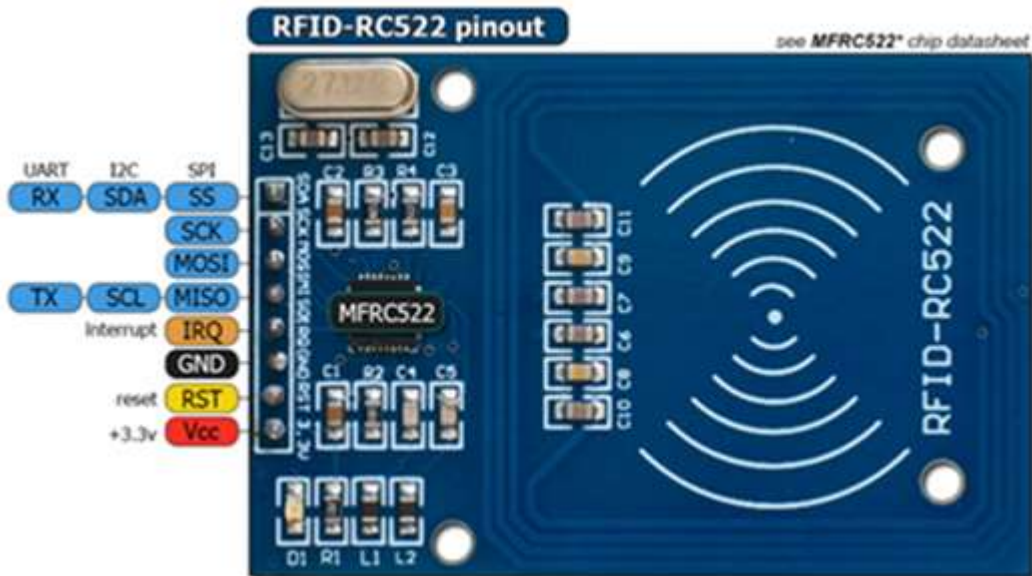
Podržava mifare1 S50 identifikatore

Dimenzije: 40mm x 60mm

RFID IDENTIFIKATORI

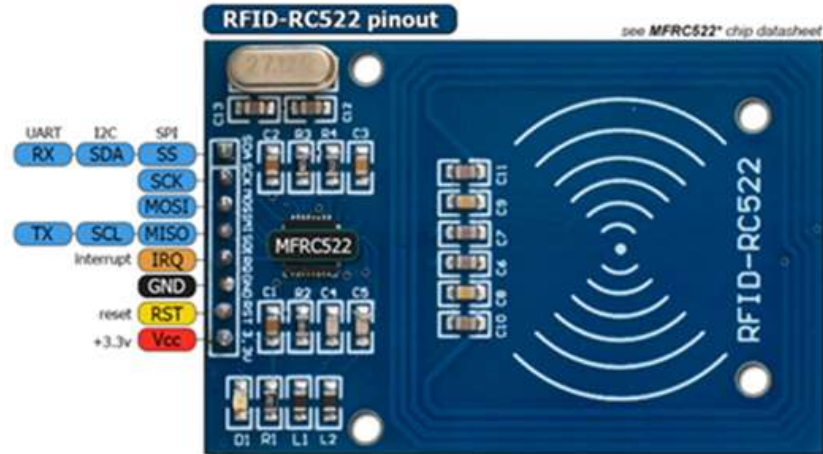
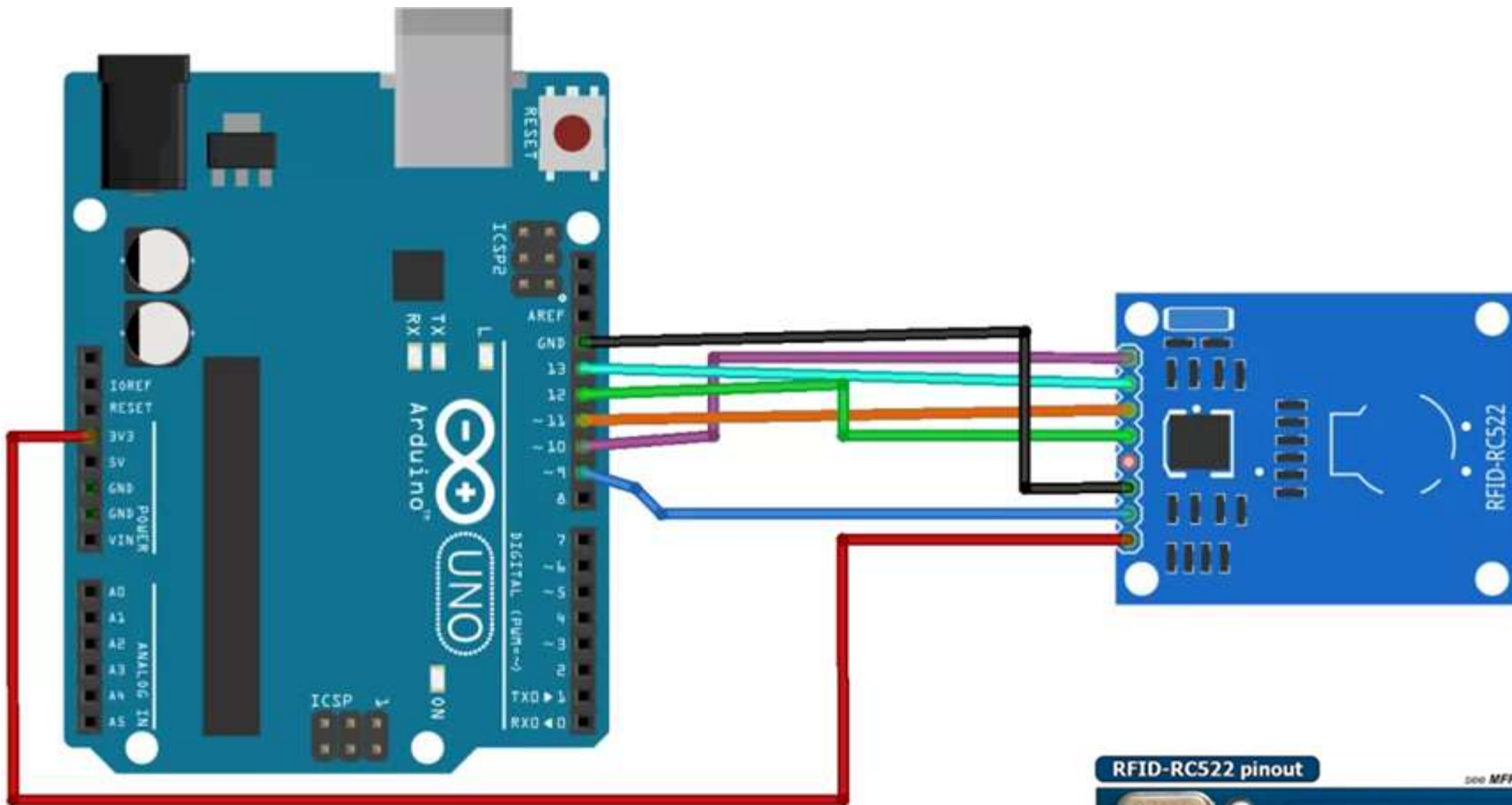


POVEZIVANJE SA ARDUINO UNO



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 biblioteku, 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

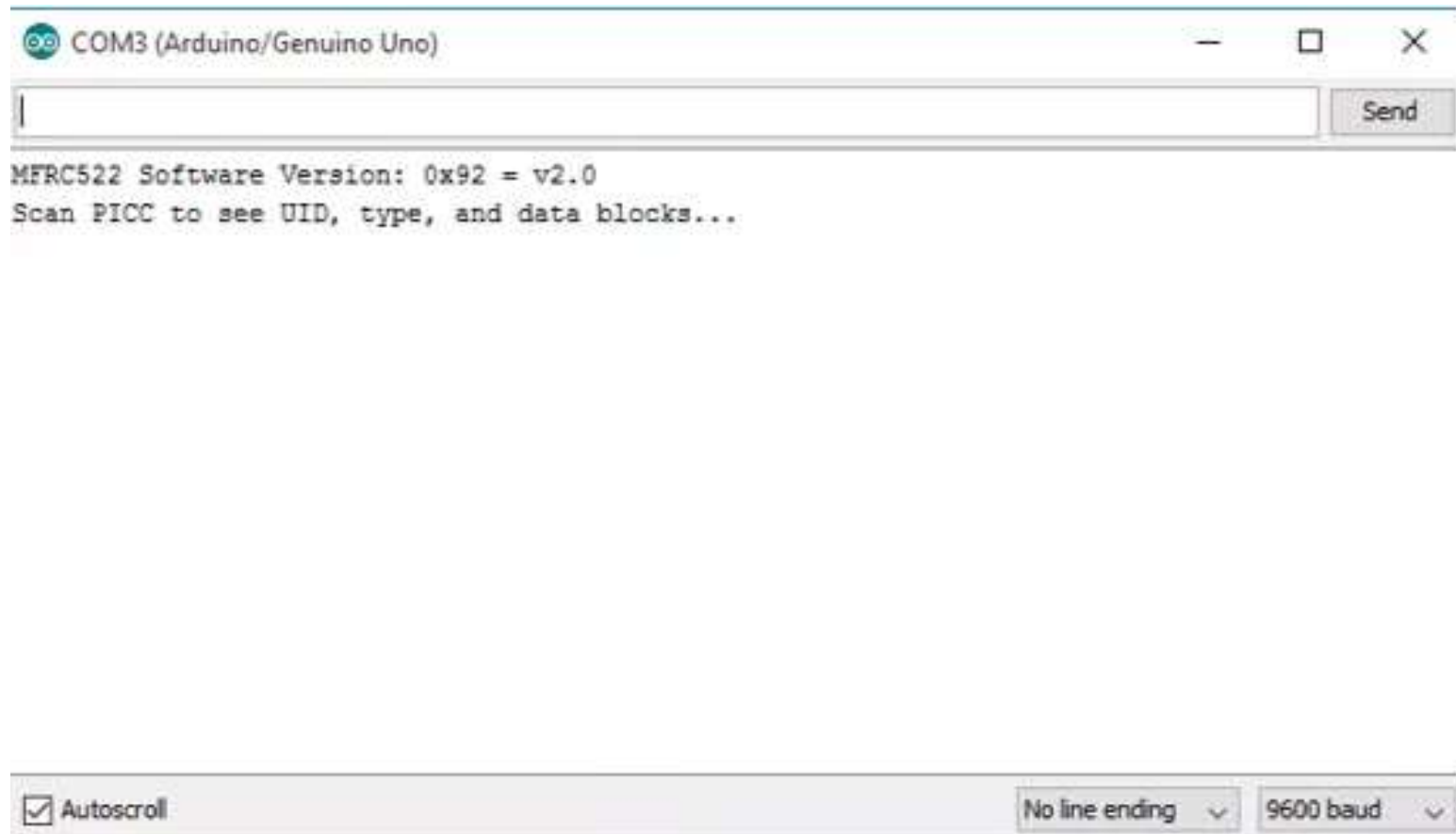
Zatim, selektovati .zip fajl sa lokacije na kojoj je fajl sačuvan.

Detaljnije informacije o biblioteci mogu se vidijeti na adresi:

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

<https://github.com/miguelbalboa/rfid/blob/master/doc/rfidmifare.doc>

DUMPINFO



DUMPINFO

COM3 (Arduino/Genuino Uno)

MFR522 Software Version: 0x92 = v2.0

Scan PICC to see UID, type, and data blocks...

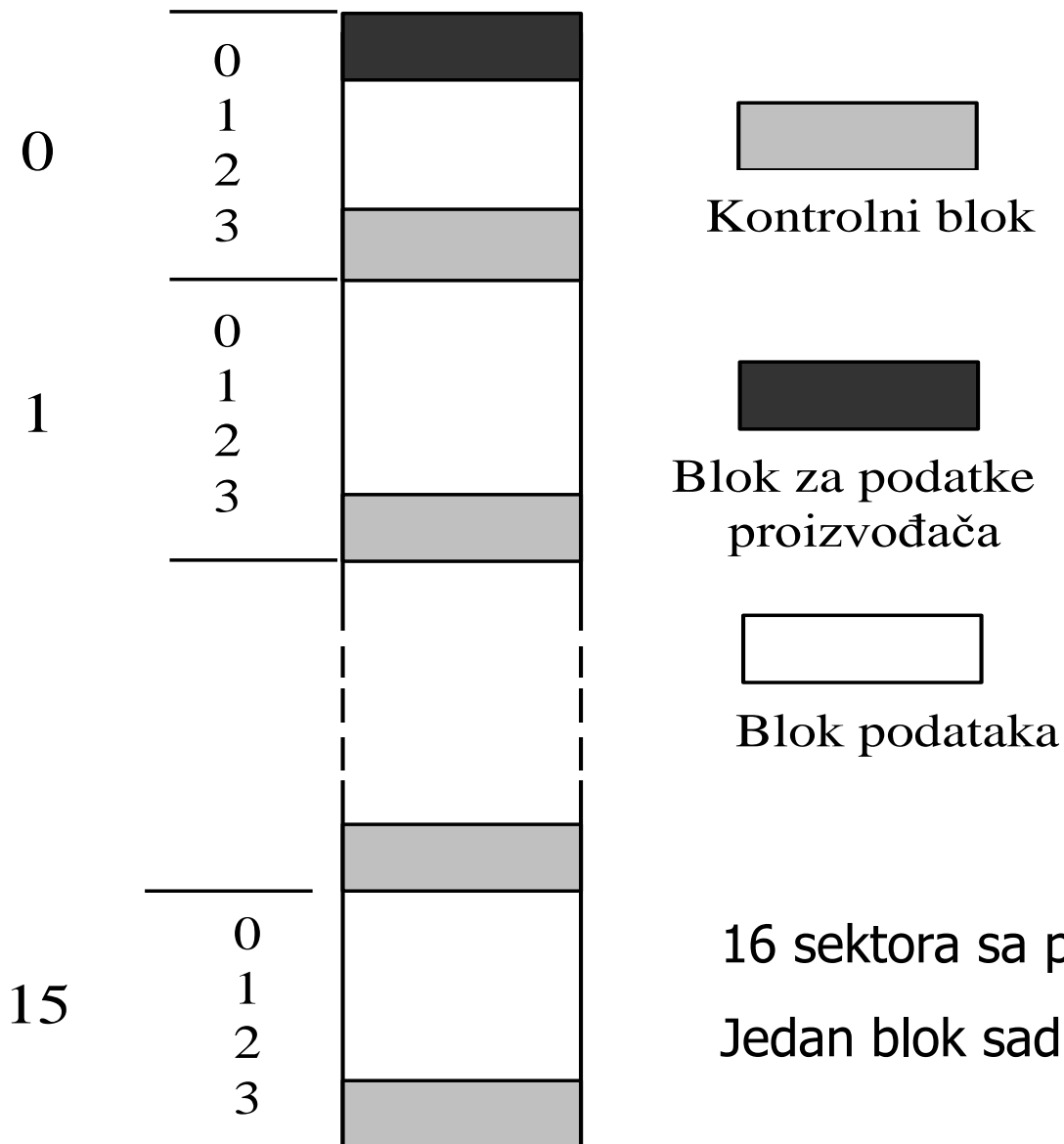
Card UID: BD 31 15 2B

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]

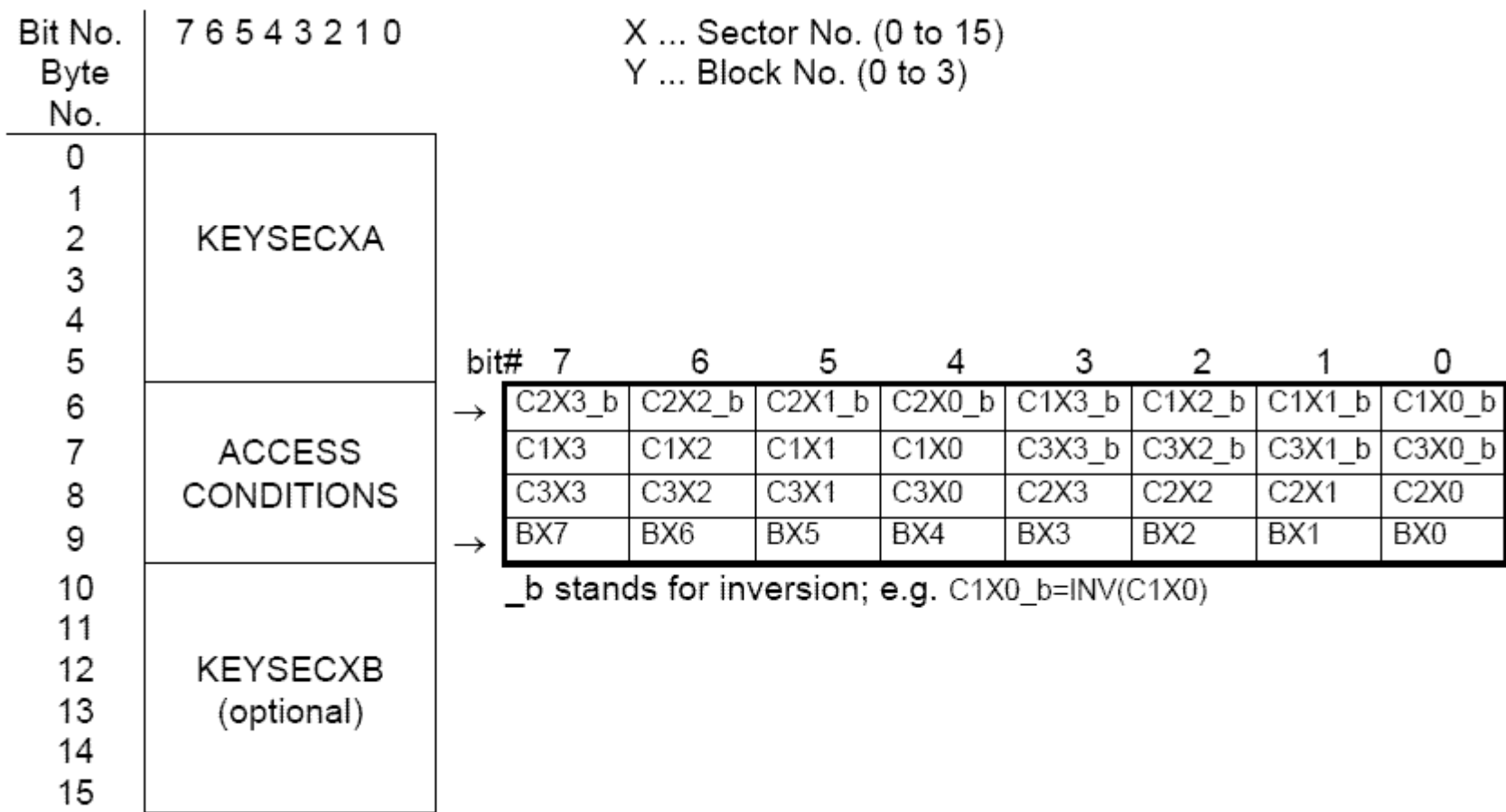
MIFARE MF1ICS50 KARTICA

Blok dijagram EEPROM-a kartice



16 sektora sa po četiri bloka.
Jedan blok sadrži 16 bajtova.

Kontrolni blok



C1XY do C3XY, $Y \in \{0, 1, 2, 3\}$ – bitovi kojima se određuju ulovi pristupa svakom pojedinom bloku sektora.

Upisani su dva puta radi sigurnosti.

MIFARE MF1ICS50 KARTICA

Uslovi pristupa kontrolnom bloku

C1X3	C2X3	C3X3	KEYSECSXA		ACCESS COND.		KEYSECSXB	
			read	write	read	write	read	write
0	0	0	never	key A	key A	never	key A	key A
0	1	0	never	never	key A	never	key A	never
1	0	0	never	key B	key A B	never	never	key B
1	1	0	never	never	key A B	never	never	never
0	0	1	never	key A	key A	key A	key A	key A
0	1	1	never	key B	key A B	key B	never	key B
1	0	1	never	never	key A B	key B	never	never
1	1	1	never	never	key A B	never	never	never

key A|B znači ključ A ili ključ B. Kada se **key B** može pročitati **ne** može služiti kao ključ.

Uslovi pristupa blokovima podataka

C1XY	C2XY	C3XY	read	write
0	0	0	keyA B ¹	key A B ¹
0	1	0	keyA B ¹	never
1	0	0	keyA B ¹	key B ¹
1	1	0	keyA B ¹	key B ¹
0	0	1	keyA B ¹	never
0	1	1	key B ¹	key B ¹
1	0	1	key B ¹	never
1	1	1	never	never

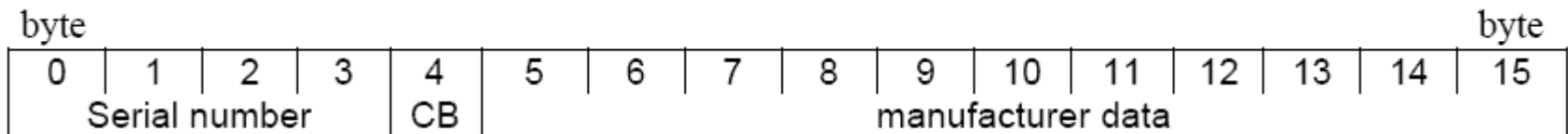
Predefinisane vrijednosti

- C1X0, C2X0, C3X0 = 0 0 0 block 0 (data block)
- C1X1, C2X1, C3X1 = 0 0 0 block 1 (data block)
- C1X2, C2X2, C3X2 = 0 0 0 block 2 (data block)
- C1X3, C2X3, C3X3 = 0 0 1 block 3 (Sector Trailer)

MIFARE MF1ICS50 KARTICA

Proizvođački blok – BLOK 0

Prvi blok memorije kartice je rezervisan za podatke proizvođača, kao što je 32-bitni serijski broj. Ovaj blok se može samo čitati.



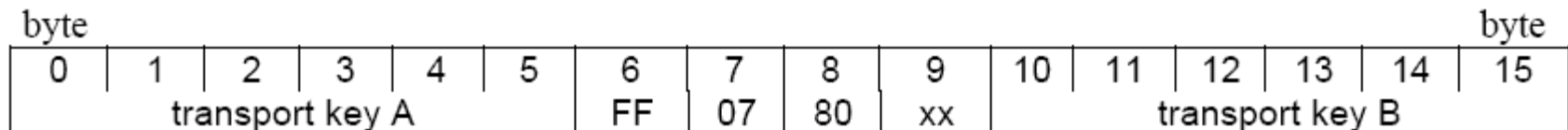
CB: “serial number check byte“ $CB = \text{byte } 0 \wedge \text{byte } 1 \wedge \text{byte } 2 \wedge \text{byte } 3 \quad (\wedge \dots \text{ XOR})$

Bloкови podataka

Sadrže promjenjive podatke.

(blocks 1,2 / 4,5,6 / 8,9,10 / 12,13,14 / 16,17,18 / 20,21,22 / 24,25,26 / 28,29,30 / 32,33,34 / 36,37,38 / 40,41,42 / 44,45,46 / 48,49,50 / 52,53,54 / 56,57,58 / 60,61,62)

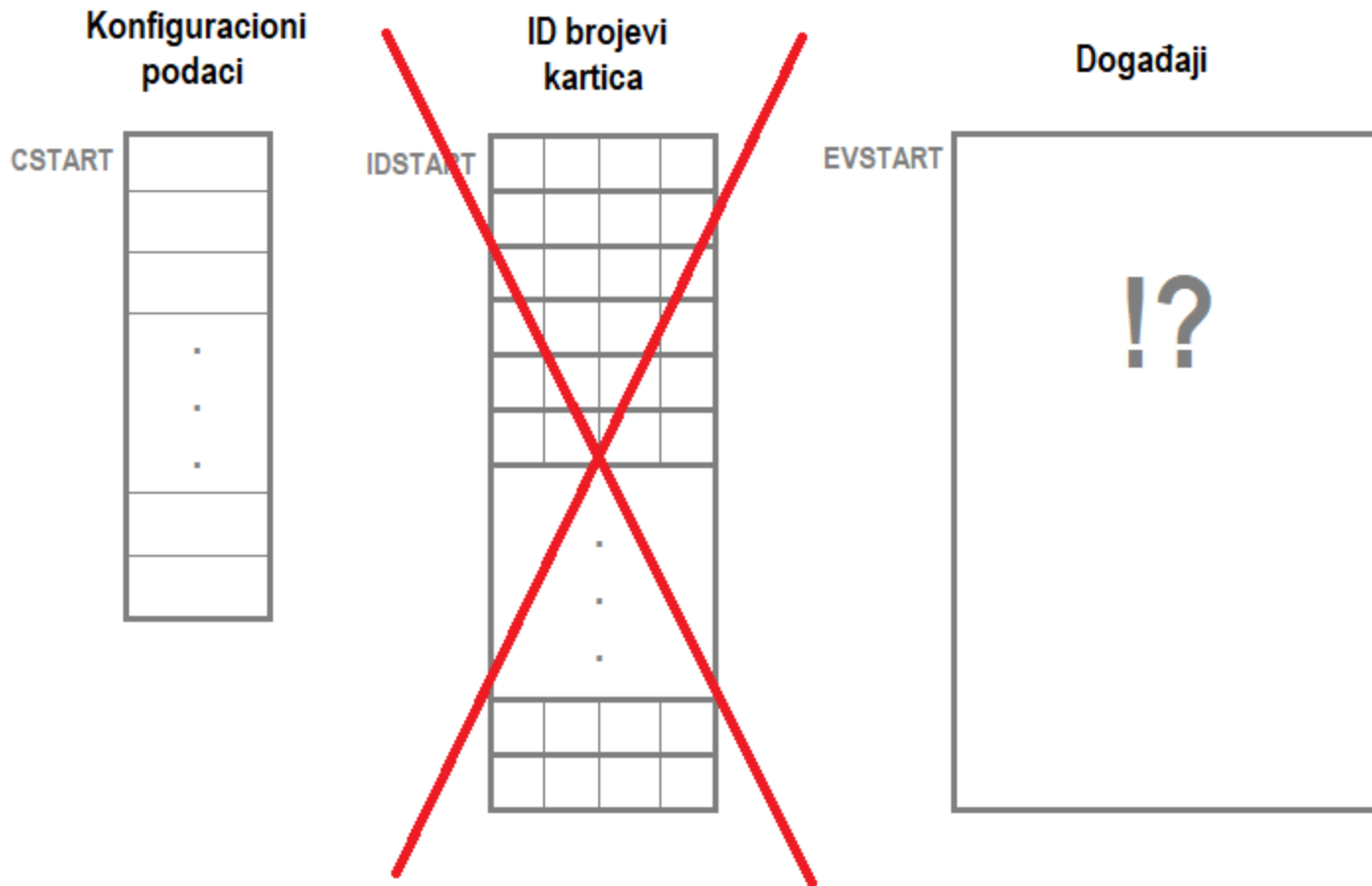
Kontrolni blokovi



(blocks 3 / 7 / 11 / 15 / 19 / 23 / 27 / 31 / 35 / 39 / 43 / 47 / 51 / 55 / 59 / 63)

Vrijednost 9-tog bajta u svakom kontrolnom bloku nije definisana.

ID u EEPROM IDENTIFIKATORA



READ WRITE EXAMPLE

ReadAndWrite | Arduino 1.8.12

File Edit Sketch Tools Help

- New Ctrl+N
- Open... Ctrl+O
- Open Recent
- Sketchbook
- Examples
- Close Ctrl+W
- Save Ctrl+S
- Save As... Ctrl+Shift+S
- Page Setup Ctrl+Shift+P
- Print Ctrl+P
- Preferences Ctrl+Comma
- Quit Ctrl+Q

```
Serial.println(
}

/**
 * Main loop.
 */
void loop() {
  // Reset the loop
  if ( ! mfr522.P
    return;

  // Select one of
  if ( ! mfr522.P
    return;

  // Show some det
  Serial.print(F("
dump_byte_array(mfr522.uid.uidByte, mfr522.u
Serial.println();
Serial.print(F("PICC type: "));
MFR522::PICC_Type piccType = mfr522.PICC_Get
Serial.println(mfr522.PICC_GetTypeName(piccTy

  // Check for compatibility
```

Robot Control

Robot Motor

SD

Servo

SpacebrewYun

Stepper

Temboo

RETIRED

Examples for Arduino Uno

EEPROM

SoftwareSerial

SPI

Wire

Examples from Custom Libraries

Adafruit Fingerprint Sensor Library

Adafruit Unified Sensor

Arduino-LiquidCrystal-I2C-library-master

DHT sensor library

IRremote

LiquidCrystal_I2C

MFRC522

TimerOne

TimerOne-r11

AccessControl

ChangeUID

DumpInfo

firmware_check

FixBrickedUID

MifareClassicValueBlock

MinimalInterrupt

Ntag216_AUTH

ReadAndWrite

ReadNUID

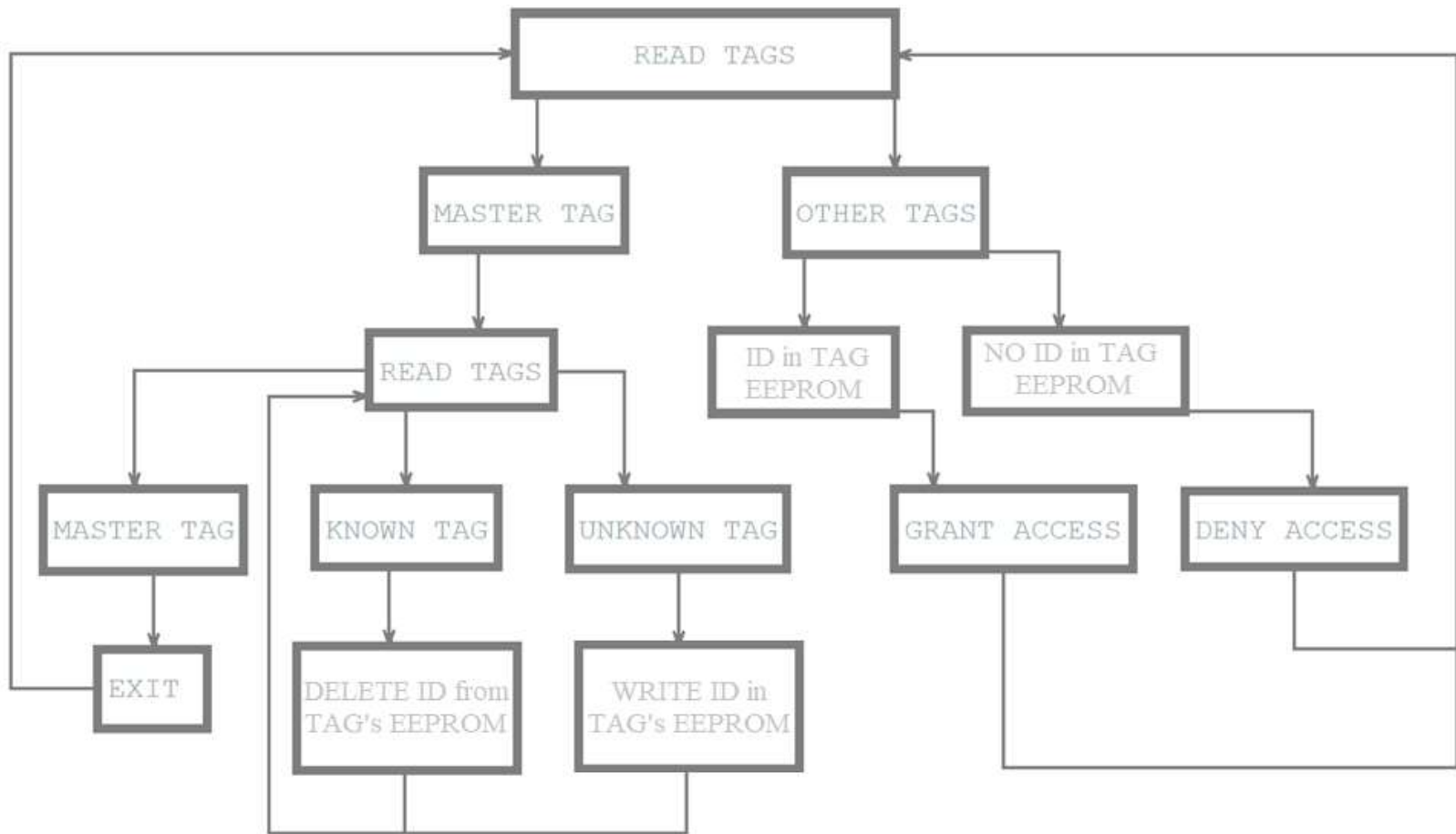
to demonstrate read and write.");

to the PICC, in sector #1"));

sensor/reader. This saves the ent

DIJAGRAM TOKA

Modifikovanje skeča sa pedhodnog časa, tako da se uslov pristupa nalazi u bloku EEPROM-a kartice.



1. Uslov pristupa na strani čitača, čuvati u konfiguracionom fajlu EEPROM-a. Preuzeti ga iz EEPROM-a neposredno po startovanju uređaja i prikazati na serijskom monitoru. Maksimalna dužina uslova pristupa je 16 bajtova (2-1 poen).
2. Uslov pristupa zadavati putem serijskog monitora (2-1 poen).

I ovoga puta poeni riješenih zadataka se sabiraju!