https://www.halvorsen.blog

Eccel Technology Ltd OEM-MICODE-USB RFID Reader

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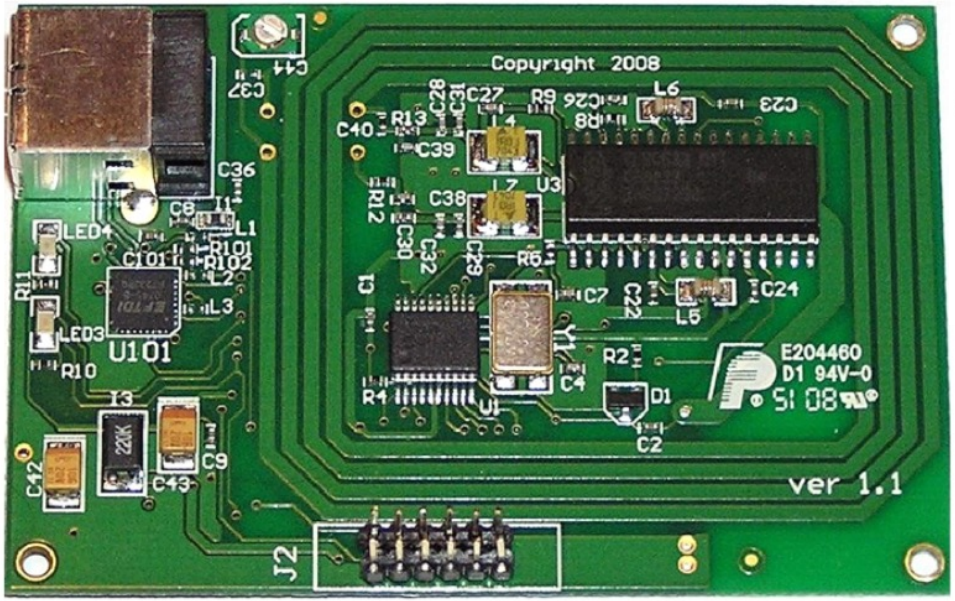
RFID 13.56MHz

Eccel Technology Ltd OEM-MICODE-USB (000128) RFID Reader



Board Case

RFID Tags

RFID standard:
13.56MHz ISO14443-A
MIFARE Classic Card 1K 13.56mhz

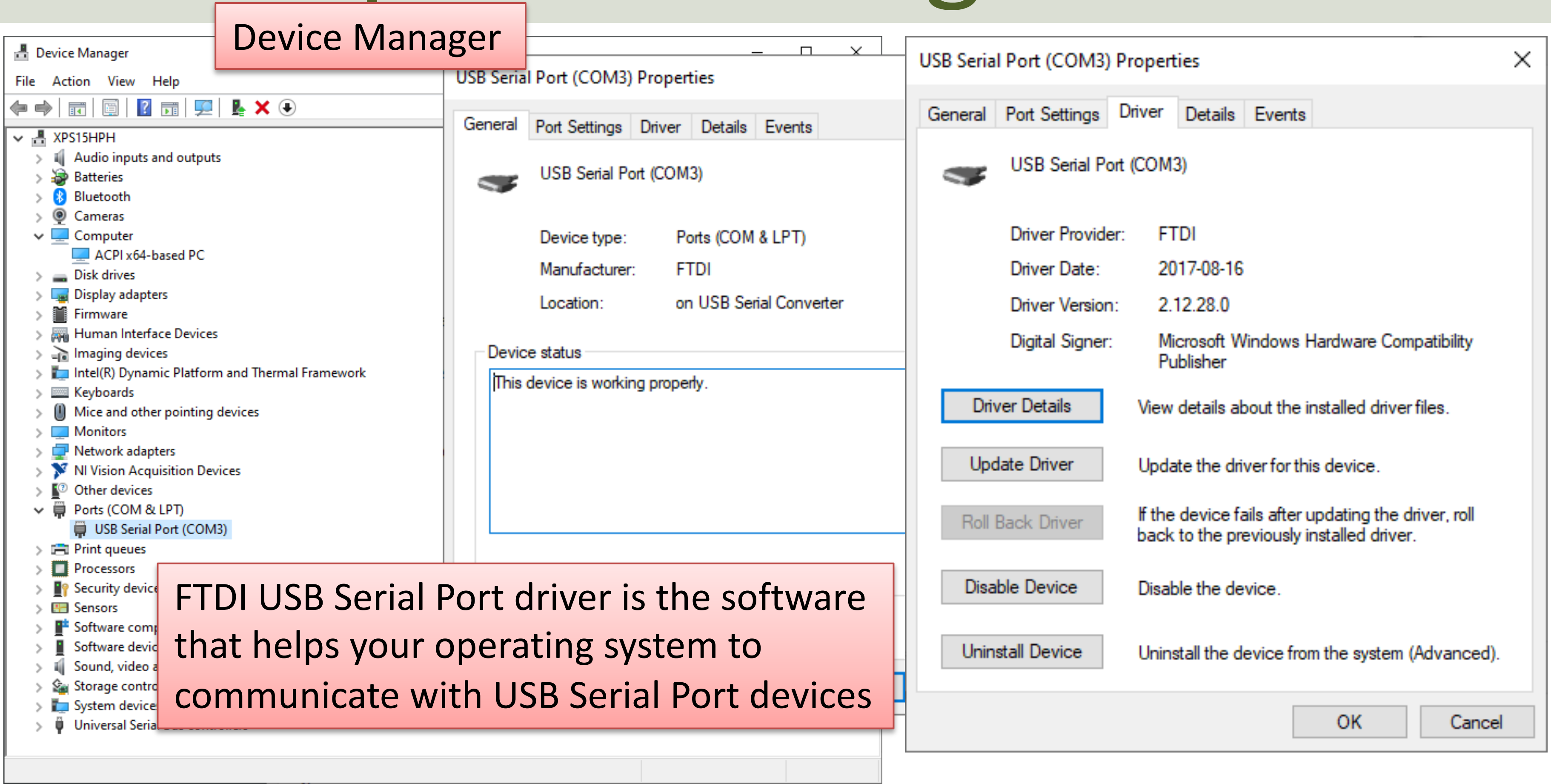
USB A-B Male Cable 1m

RS Online: https://no.rs-online.com/web/p/rf-modules/1262181/

Setup and Configuration

- Connect the Device to your PC using the USB Cable
- Open the **Device Manager** in Windows and find the allocated **COM Port** for the device
- Make sure the Device and the **FTDI USB Serial Port driver** is installed properly
- Install the Configuration and Test Software (Micro RWD MFIC) from https://eccel.co.uk/product/oem-micode-usb/
- Read the Datasheet
- Start developing a Test application that can read data from the RFID reader

Setup and Configuration



Device Manager

Device Manager

- XPS15HPH
  - Audio inputs and outputs
  - Batteries
  - Bluetooth
  - Cameras
  - Computer
    - ACPI x64-based PC
  - Disk drives
  - Display adapters
  - Firmware
  - Human Interface Devices
  - Imaging devices
  - Intel(R) Dynamic Platform and Thermal Framework
  - Keyboards
  - Mice and other pointing devices
  - Monitors
  - Network adapters
  - NI Vision Acquisition Devices
  - Other devices
  - Ports (COM & LPT)
    - USB Serial Port (COM3)
  - Print queues
  - Processors
  - Security device
  - Sensors
  - Software comp
  - Software devic
  - Sound, video a
  - Storage contro
  - System device
  - Universal Seria

USB Serial Port (COM3) Properties

USB Serial Port (COM3)

Device type: Ports (COM & LPT)

Manufacturer: FTDI

Location: on USB Serial Converter

Device status

This device is working properly.

USB Serial Port (COM3) Properties

USB Serial Port (COM3)

Driver Provider: FTDI

Driver Date: 2017-08-16

Driver Version: 2.12.28.0

Digital Signer: Microsoft Windows Hardware Compatibility Publisher

View details about the installed driver files.

Update the driver for this device.

If the device fails after updating the driver, roll back to the previously installed driver.

Disable the device.

Uninstall the device from the system (Advanced).

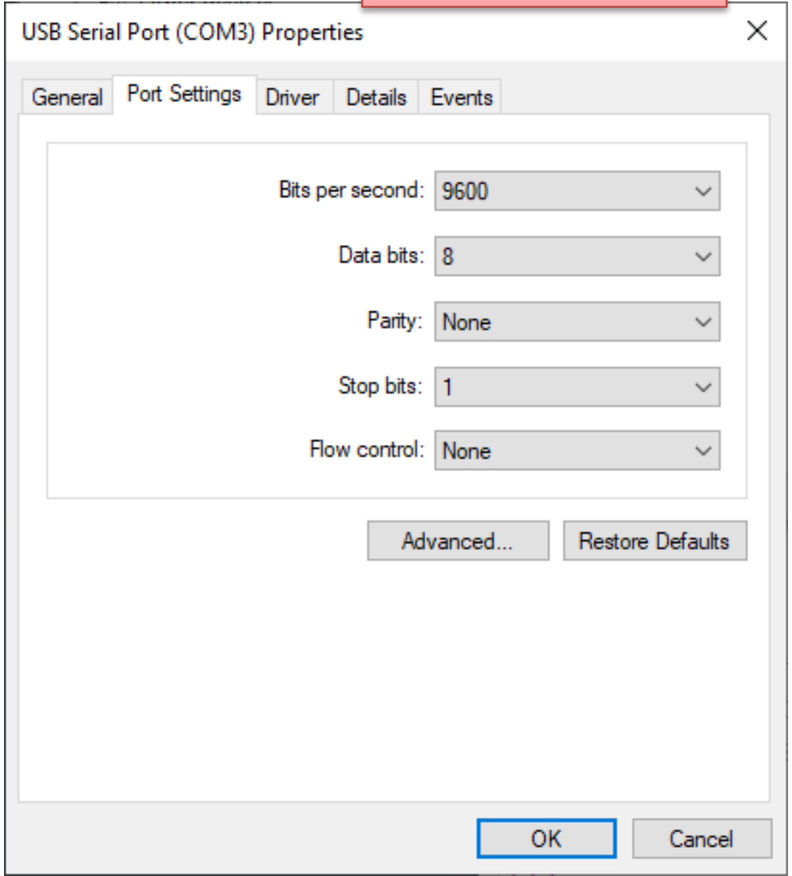
FTDI USB Serial Port driver is the software that helps your operating system to communicate with USB Serial Port devices

Eccel RFID Reader

Communication (from the Datasheet):

- 9600 baud
- 8 bits
- 1 stop
- No parity

Device Manager



USB Serial Port (COM3) Properties

Bits per second: 9600

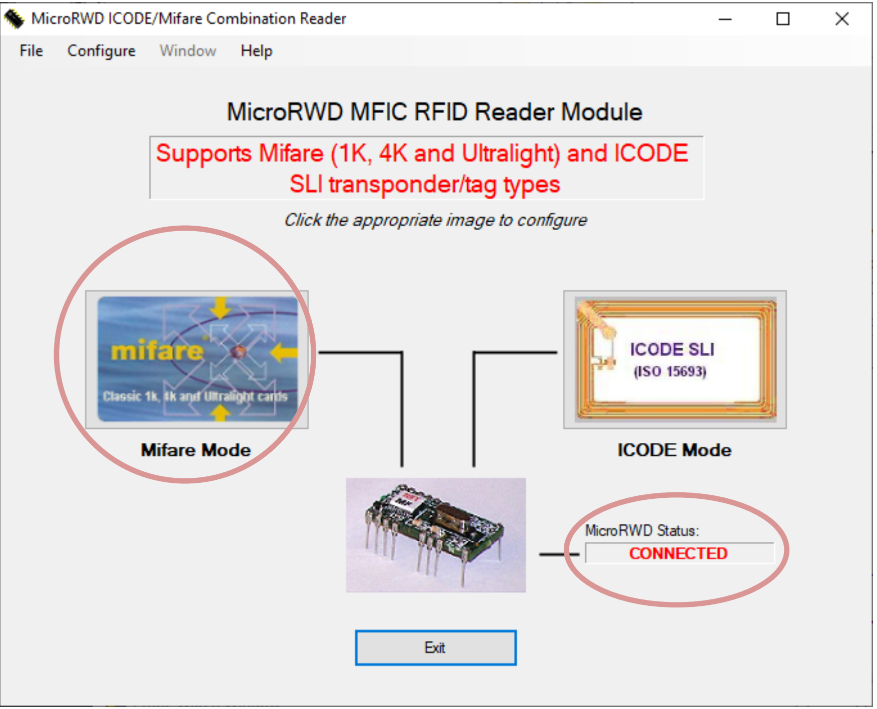
Data bits: 8

Parity: None

Stop bits: 1

Flow control: None

Configuration and Test Software


MicroRWD ICODE/Mifare Combination Reader
File
Configure
Window
Help
Exit

MicroRWD MFIC RFID Reader Module

Supports Mifare (1K, 4K and Ultralight) and ICODE SLI transponder/tag types

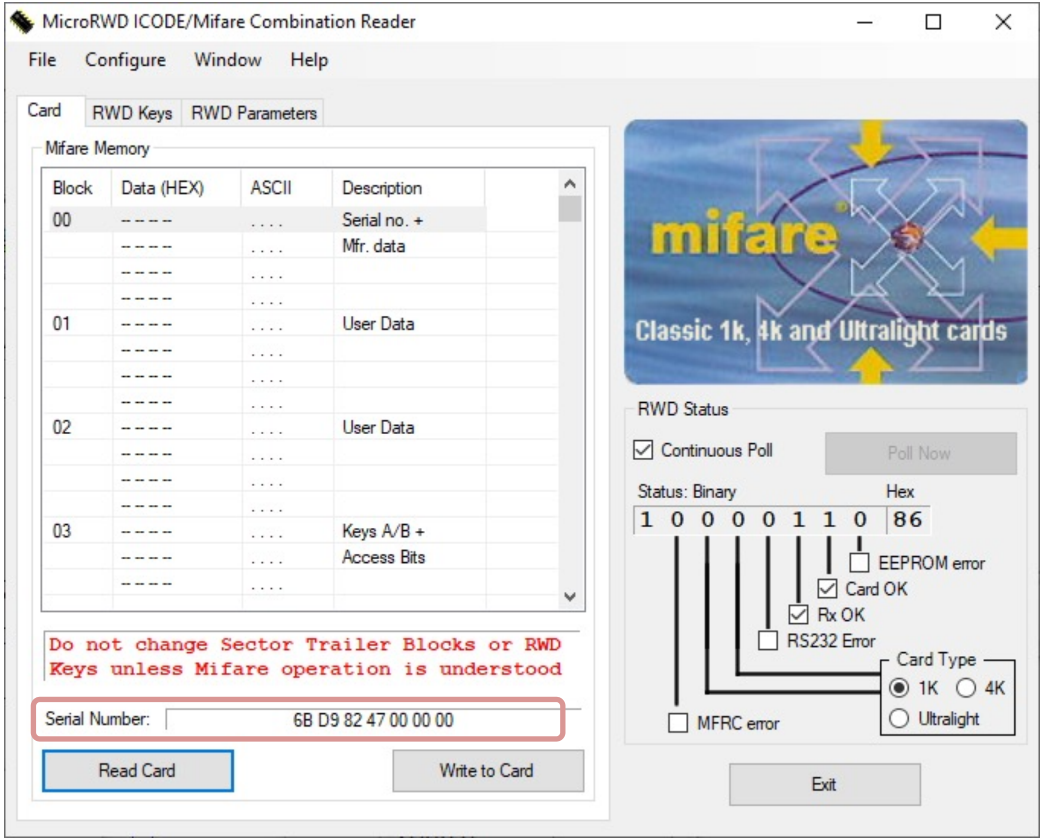
Click the appropriate image to configure

mifare
Classic 1k, 4k and Ultralight cards
ICODE SLI
(ISO 15693)

Mifare Mode

ICODE Mode

MicroRWD Status: CONNECTED



Mifare Memory

Block	Data (HEX)	ASCII	Description
00	- - - -	. . . .	Serial no. +
	- - - -	. . . .	Mfr. data
	- - - -	. . . .	
	- - - -	. . . .	
01	- - - -	. . . .	User Data
	- - - -	. . . .	
	- - - -	. . . .	
	- - - -	. . . .	
02	- - - -	. . . .	User Data
	- - - -	. . . .	
	- - - -	. . . .	
	- - - -	. . . .	
03	- - - -	. . . .	Keys A/B +
	- - - -	. . . .	Access Bits
	- - - -	. . . .	

Do not change Sector Trailer Blocks or RWD Keys unless Mifare operation is understood

Serial Number: 6B D9 82 47 00 00 00

RWD Status

☑ Continuous Poll

Status: Binary 1 0 0 0 0 1 1 0 Hex 86

□ EEPROM error
☑ Card OK
☑ Rx OK
□ RS232 Error
□ MFRC error

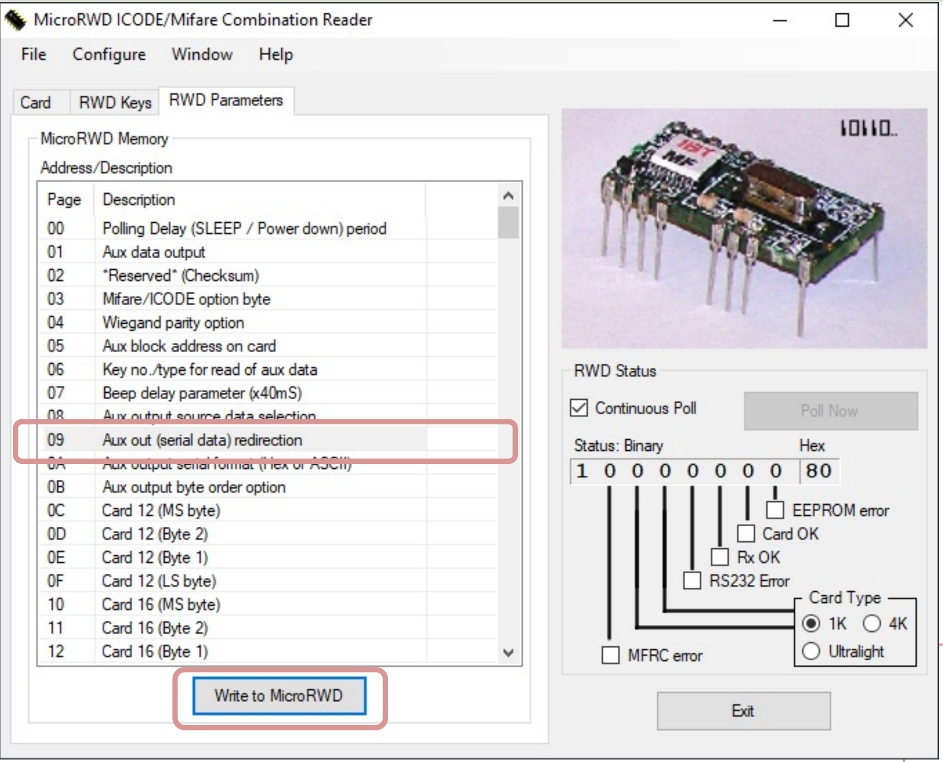
Card Type: ● 1K ○ 4K ○ Ultralight

Configure Tx Output

!

- The default for the OEM-Micode and RWD products is to output the received UID number on the OP0 pin. (Connector J2, Pin 2 on the OEM products).
- If you want the automatic output to be redirected to the TX pin of the serial port instead, then you must program a control byte from its factory default to do this.
- See datasheet, page 12). Link to Datasheet: https://eccel.co.uk/wp-content/uploads/2018/05/MF_ICBprot_030518.pdf
- If the UID automatic output is redirected to the TX pin, then there will be no acknowledge byte sent by the reader after you send any commands to it. This is to avoid data clashes with the automatic UID transmission.
- To change the direction of the UID output to the TX pin you have to program byte 9 of the EEPROM control registers to 0x01.
- So, send a command string as follows : 0x50, 0x09, 0x01.
- You will receive no acknowledge but after presenting a card/tag, you should receive the UID back on your terminal screen.

Configure Tx Output



MicroRWD ICODE/Mifare Combination Reader

File   Configure   Window   Help

Card   RWD Keys   RWD Parameters

MicroRWD Memory

Address/Description

Page	Description
00	Polling Delay (SLEEP / Power down) period
01	Aux data output
02	*Reserved* (Checksum)
03	Mifare/ICODE option byte
04	Wiegand parity option
05	Aux block address on card
06	Key no./type for read of aux data
07	Beep delay parameter (x40mS)
08	Aux output source data selection
09	Aux out (serial data) redirection
0A	Aux output serial format (Hex or ASCII)
0B	Aux output byte order option
0C	Card 12 (MS byte)
0D	Card 12 (Byte 2)
0E	Card 12 (Byte 1)
0F	Card 12 (LS byte)
10	Card 16 (MS byte)
11	Card 16 (Byte 2)
12	Card 16 (Byte 1)

Write to MicroRWD

RWD Status

☑ Continuous Poll   Poll Now

Status: Binary   Hex

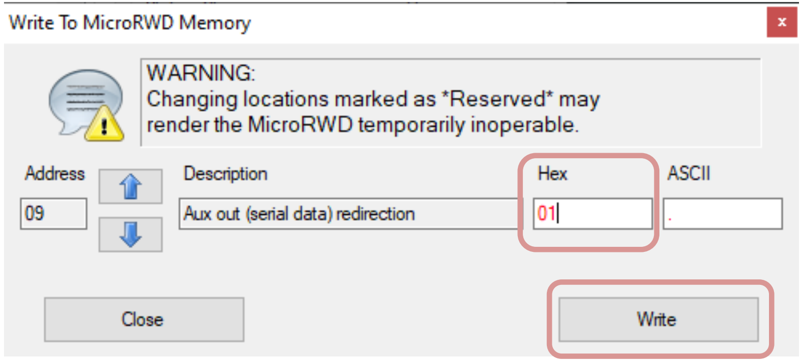
1 0 0 0 0 0 0 0   80

□ EEPROM error
□ Card OK
□ Rx OK
□ RS232 Error
□ MFRC error

Card Type
● 1K   ○ 4K
○ Ultralight

Exit

To change the direction of the UID output to the TX pin you have to program byte 9 of the EEPROM control registers to 0x01



Write To MicroRWD Memory

WARNING:
Changing locations marked as *Reserved* may render the MicroRWD temporarily inoperable.

Address: 09

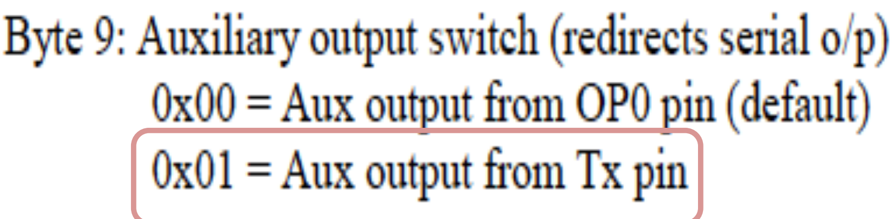
Description: Aux out (serial data) redirection

Hex: 01

ASCII: .

Close   Write

From the Datasheet:



Byte 9: Auxiliary output switch (redirects serial o/p)

0x00 = Aux output from OP0 pin (default)

0x01 = Aux output from Tx pin

RealTerm

- RealTerm is a tool for capturing, entering and debugging Serial Communication
- RealTerm is a very old program
- RealTerm is available to download from SourceForge: https://sourceforge.net/projects/realterm/files/Realterm/
- Use RealTerm in combination with the Datasheet for the device to learn more about the communication protocol used for the device

https://learn.sparkfun.com/tutorials/terminal-basics/real-term-windows

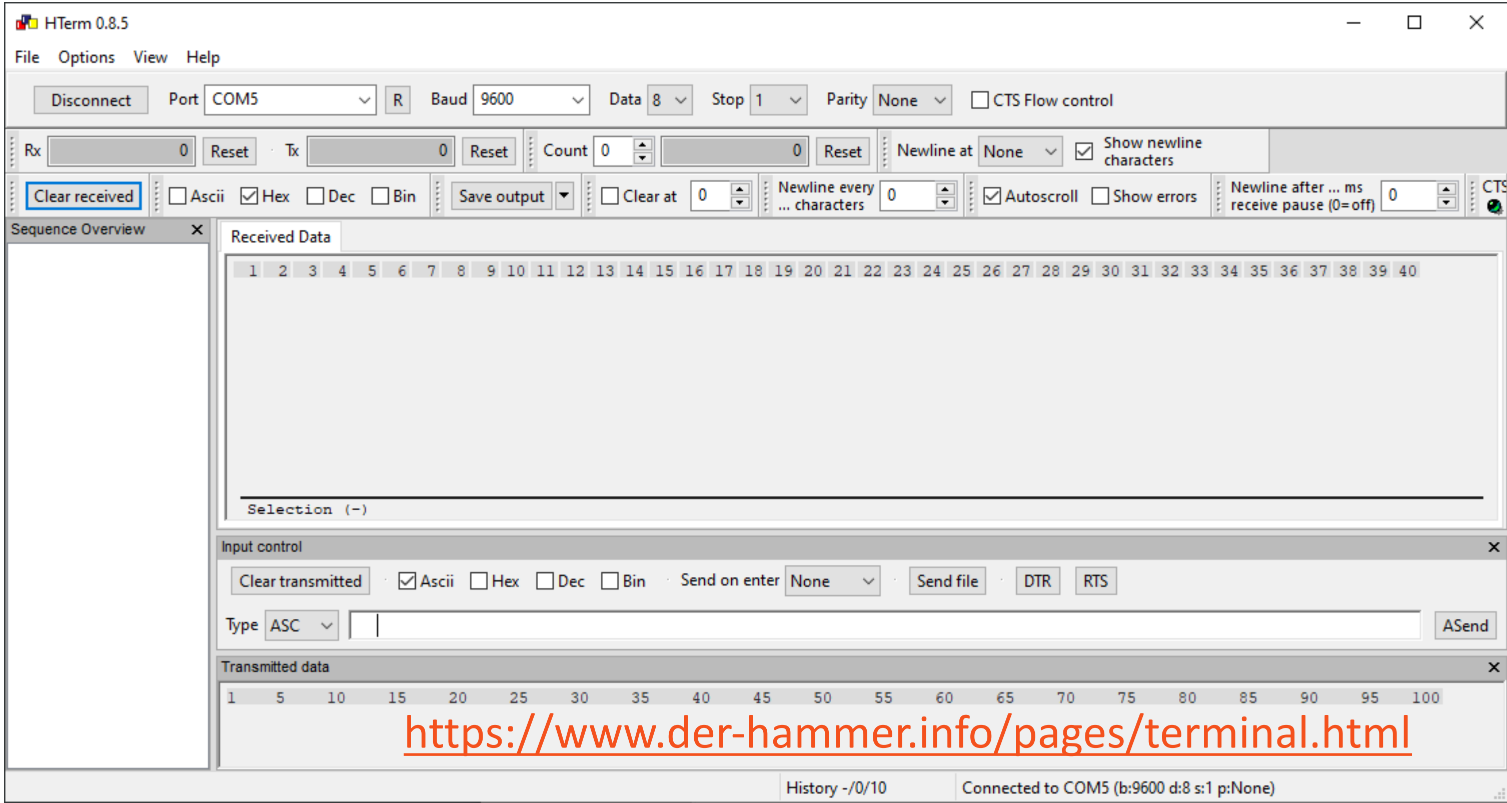
YAT

- Another program is YAT. It as a more modern graphical interface than RealTerm.
- YAT is a tool for capturing, entering and debugging Serial Communication, etc.
- YAT is available to download from SourceForge: https://sourceforge.net/projects/y-a-terminal/files/
- Use YAT in combination with the Datasheet for the device to learn more about the communication protocol used for the device

https://learn.sparkfun.com/tutorials/terminal-basics/yat---yet-another-terminal-windows

HTerm

Another Terminal Program like RealTerm and YAT



Port COM5 Baud 9600 Data 8 Stop 1 Parity None ☐ CTS Flow control

Rx 0 Tx 0 Count 0 0 Newline at None ☑ Show newline characters

☐ Ascii ☑ Hex ☐ Dec ☐ Bin ☐ Clear at 0 Newline every ... characters 0 ☑ Autoscroll ☐ Show errors Newline after ... ms receive pause (0=off) 0

☑ Ascii ☐ Hex ☐ Dec ☐ Bin Send on enter None

Type ASC

History -/0/10

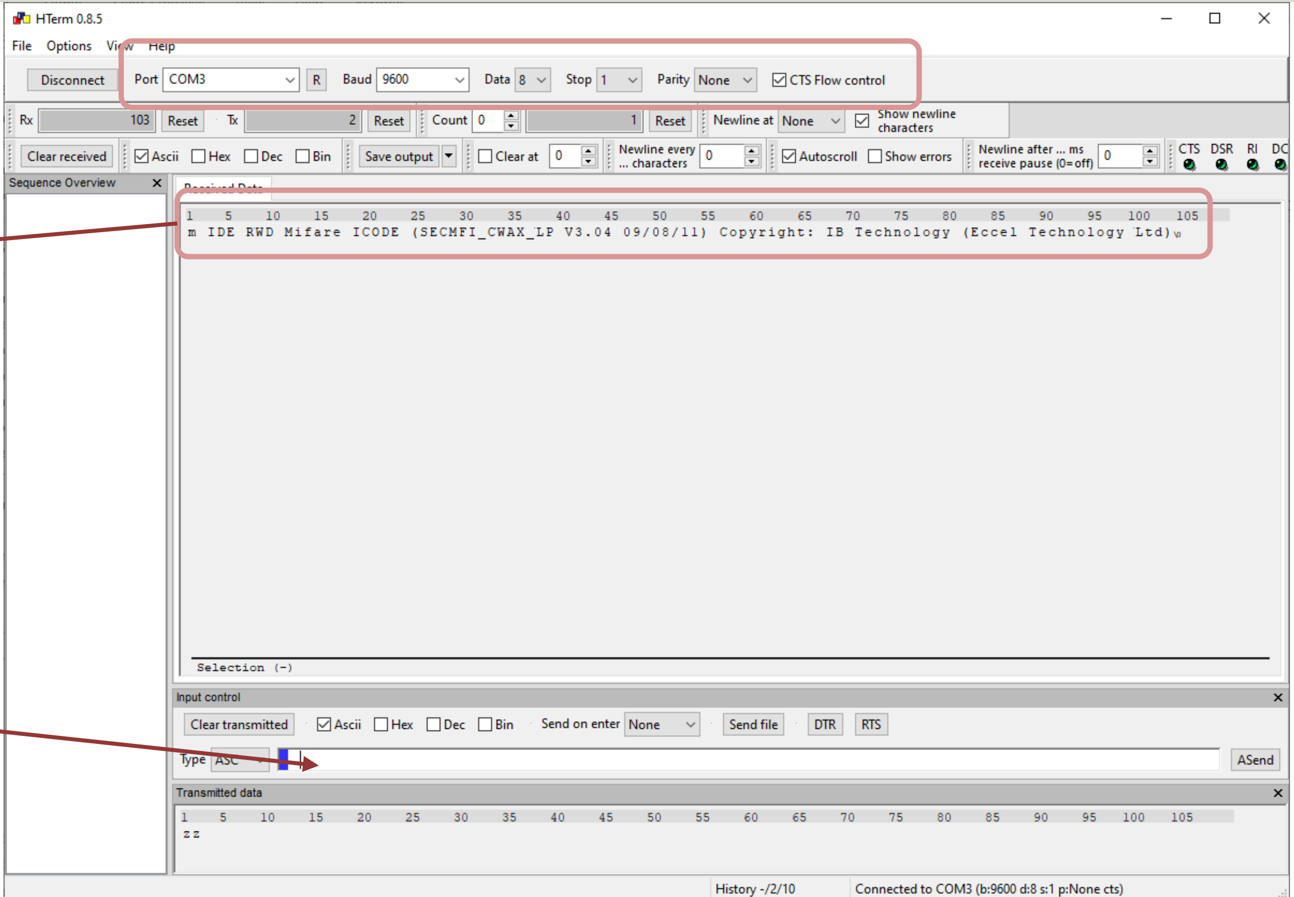
Connected to COM5 (b:9600 d:8 s:1 p:None)

https://www.der-hammer.info/pages/terminal.html

Hterm – Check Device

The RFID reader then respond with information about him self

Enter "z"



HTerm 0.8.5
File Options View Help
Disconnect
R
Rx 103 Reset Tx 2 Reset Count 0 1 Reset Newline at None ☑ Show newline characters
Clear received ☑ Ascii ☐ Hex ☐ Dec ☐ Bin Save output ☐ Clear at 0 Newline every ... characters 0 ☑ Autoscroll ☐ Show errors Newline after ... ms receive pause (0=off) 0 CTS DSR RI DC
Sequence Overview
Received Data
Selection (-)
Input control
Clear transmitted ☑ Ascii ☐ Hex ☐ Dec ☐ Bin Send on enter None Send file DTR RTS
Type ASC ASend
Transmitted data
History -/2/10

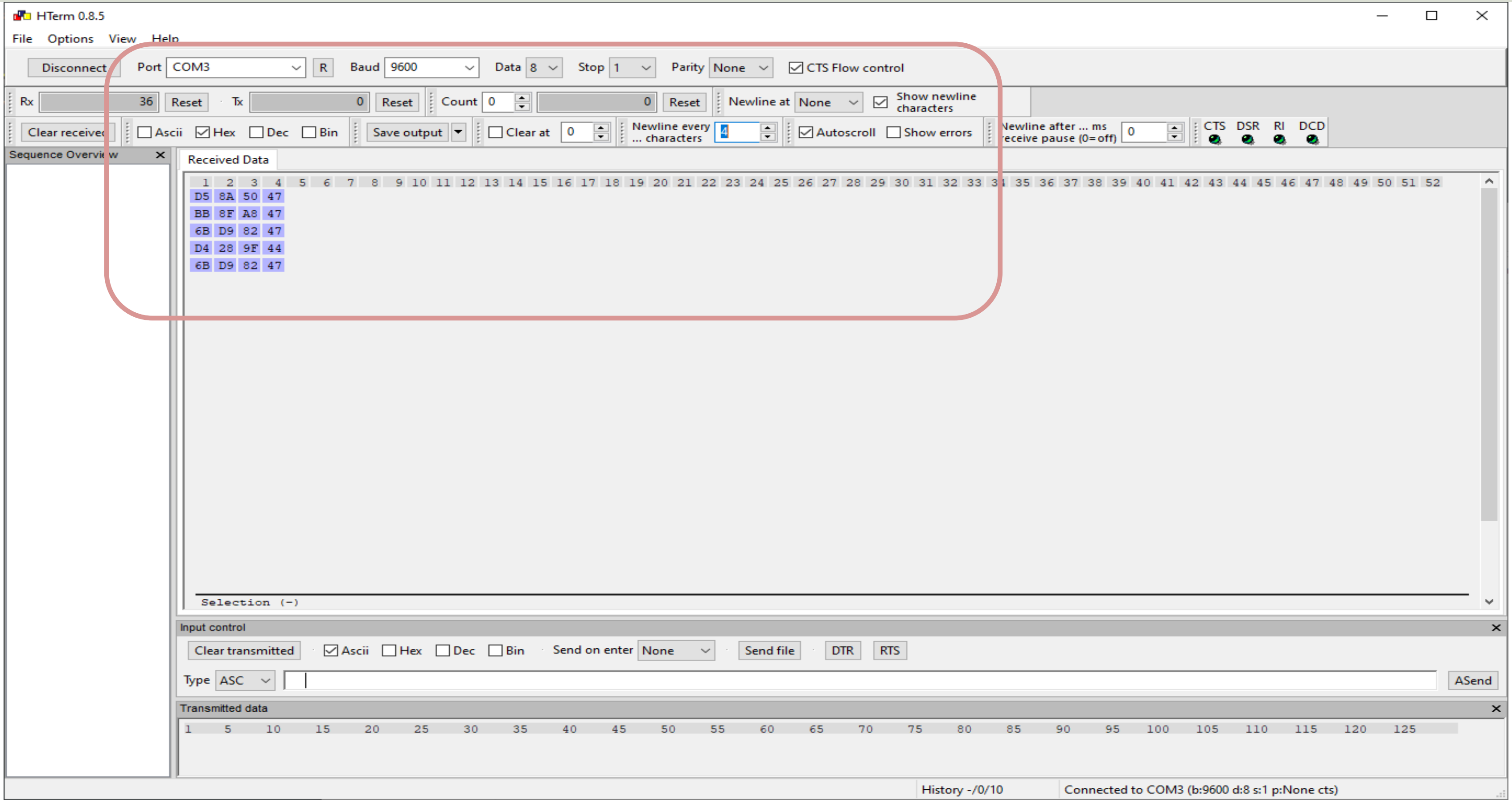
Port COM3 Baud 9600 Data 8 Stop 1 Parity None ☑ CTS Flow control

```
1   5    10   15   20   25   30   35   40   45   50   55   60   65   70   75   80   85   90   95   100  105
m IDE RWD Mifare ICODE (SECMFI_CWAX_LP V3.04 09/08/11) Copyright: IB Technology (Eccel Technology Ltd)
```

```
1   5    10   15   20   25   30   35   40   45   50   55   60   65   70   75   80   85   90   95   100  105
zz
```

Connected to COM3 (b:9600 d:8 s:1 p:None cts)

Hterm – Retrieving Tag Id



Port COM3 Baud 9600 Data 8 Stop 1 Parity None ☑ CTS Flow control

Rx 36 Tx 0 Count 0 0 Newline at None ☑ Show newline characters

□ Ascii ☑ Hex □ Dec □ Bin □ Clear at 0 Newline every ... characters 4 ☑ Autoscroll □ Show errors Newline after ... ms receive pause (0=off) 0

```
 1  2  3  4
D5 8A 50 47
BB 8F A8 47
6B D9 82 47
D4 28 9F 44
6B D9 82 47
```

Selection (-)

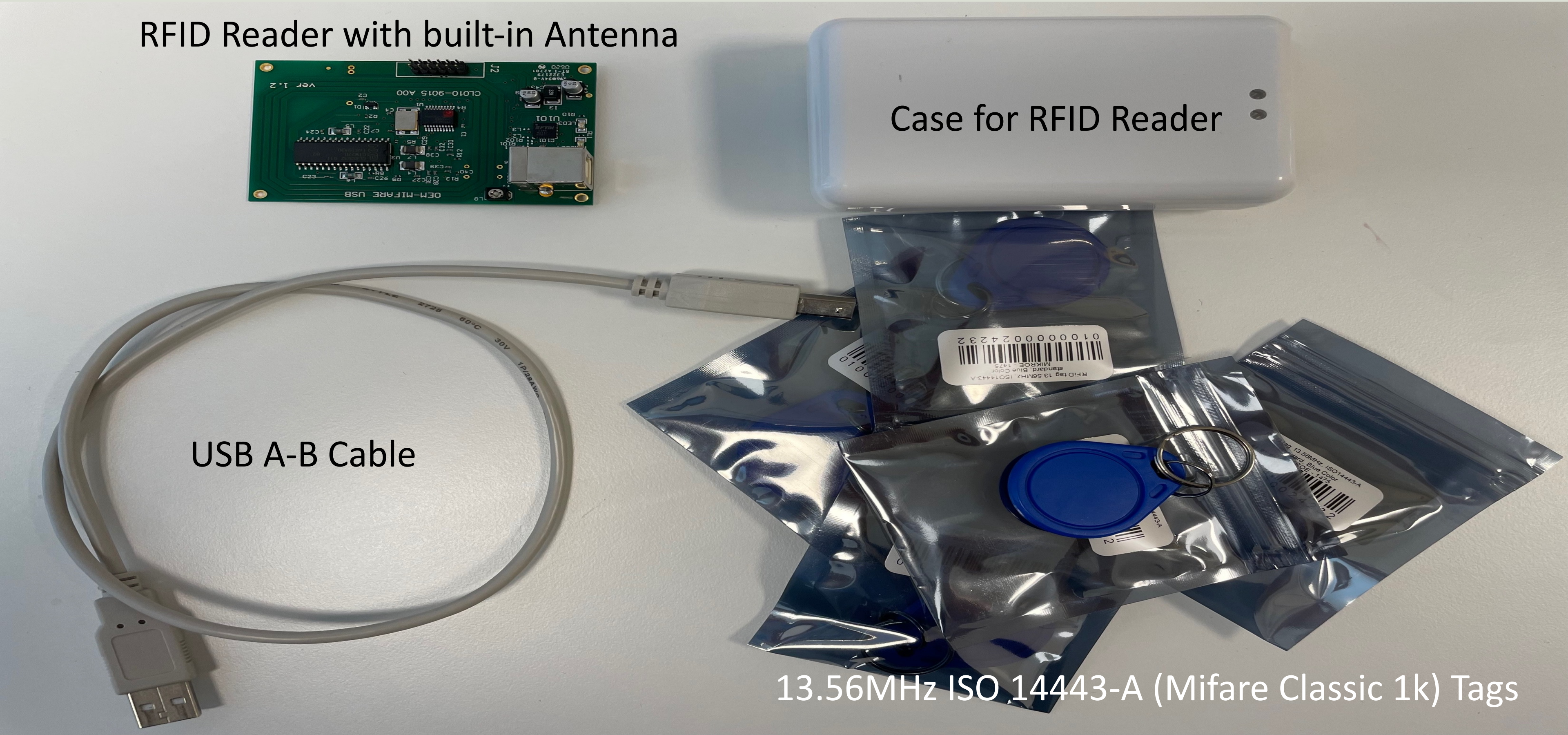
☑ Ascii □ Hex □ Dec □ Bin Send on enter None

Type ASC

History -/0/10 Connected to COM3 (b:9600 d:8 s:1 p:None cts)

Code Examples

Eccel OEM-MICODE-USB RFID Reader



RFID Reader with built-in Antenna

Case for RFID Reader

USB A-B Cable

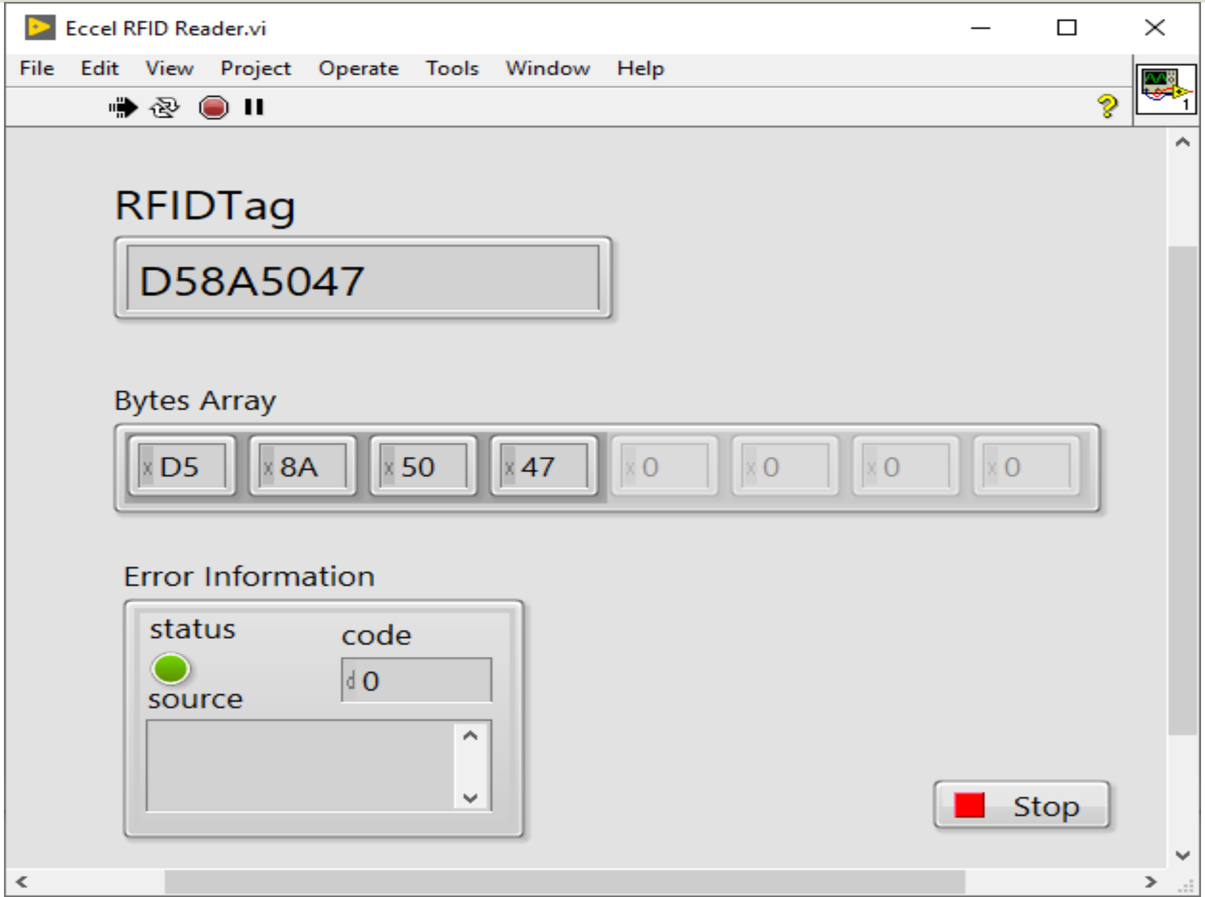
13.56MHz ISO 14443-A (Mifare Classic 1k) Tags

Code Examples

Note!

- The examples provided can be considered as a “proof of concept”
- The sample code is very simplified for clarity and doesn't necessarily represent best practices.

LabVIEW



RFIDTag

D58A5047

Bytes Array

D5 8A 50 47 0 0 0 0

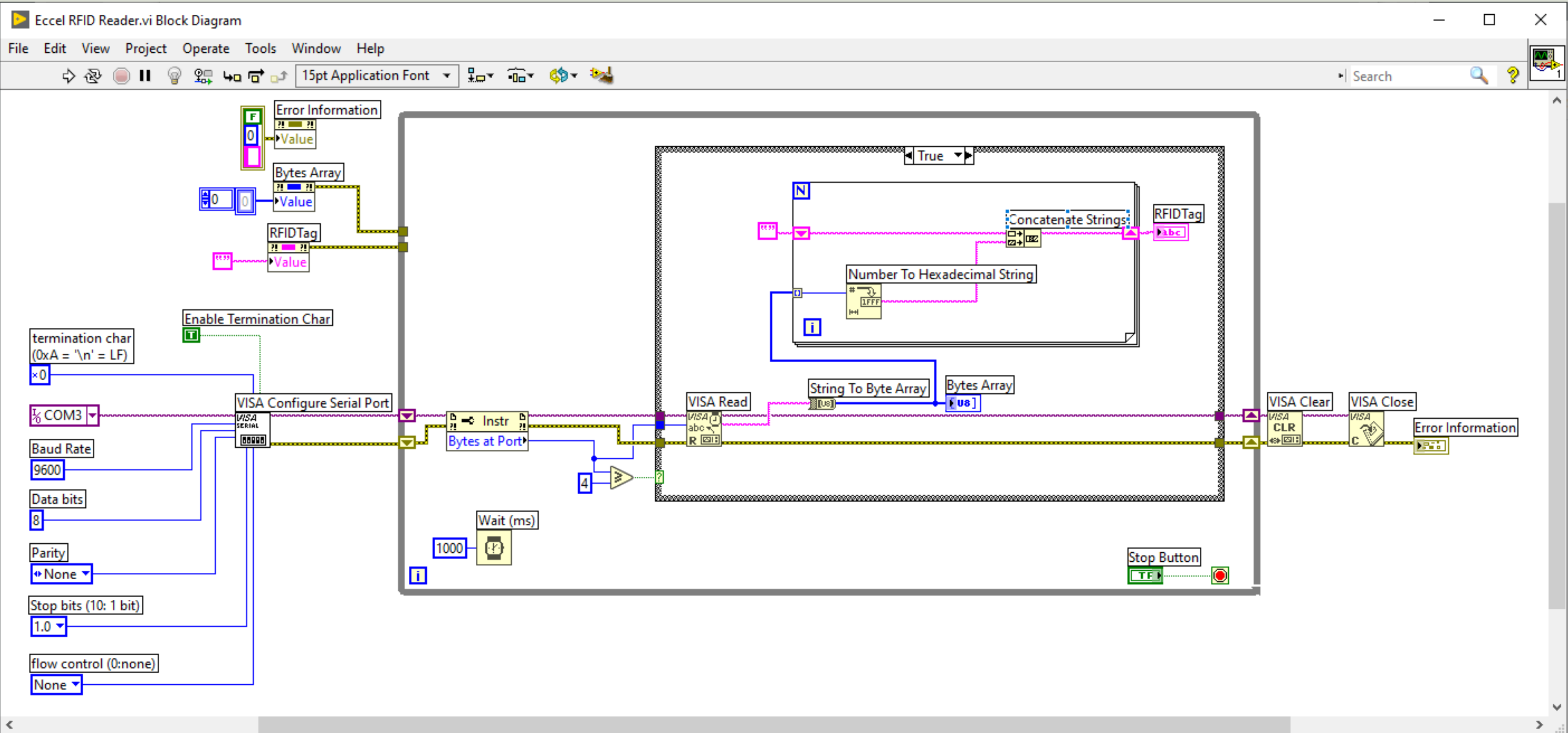
Error Information

status

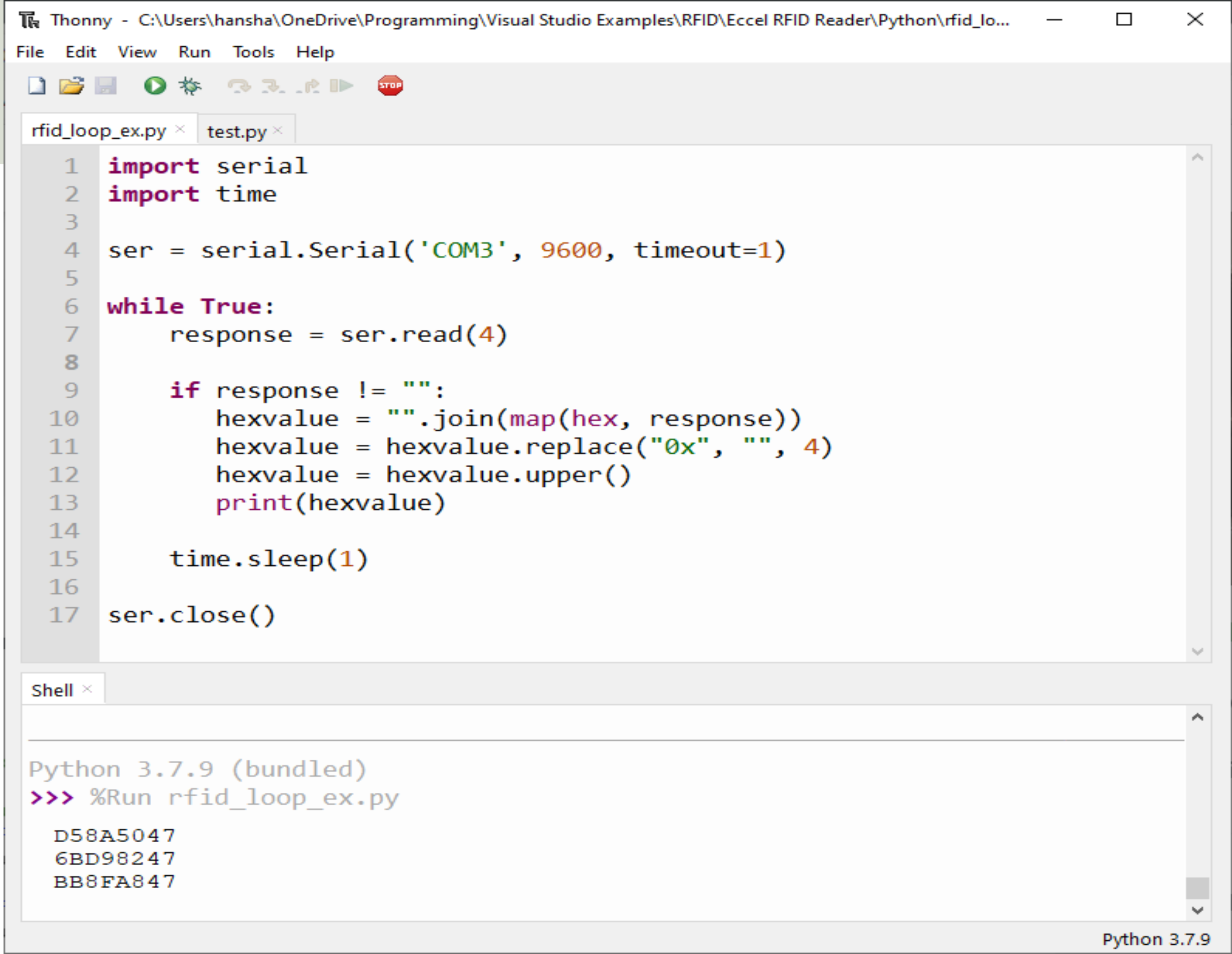
code 0

source

LabVIEW


Eccel RFID Reader.vi Block Diagram
File
Edit
View
Project
Operate
Tools
Window
Help
15pt Application Font
Search
Error Information
F
0
Value
Bytes Array
0
0
Value
RFIDTag
""
Value
Enable Termination Char
T
termination char (0xA = '\n' = LF)
x0
COM3
VISA Configure Serial Port
VISA SERIAL
Baud Rate
9600
Data bits
8
Parity
None
Stop bits (10: 1 bit)
1.0
flow control (0:none)
None
Instr
Bytes at Port
4
Wait (ms)
1000
i
True
N
""
Concatenate Strings
Number To Hexadecimal String
1FFF
i
RFIDTag
abc
VISA Read
String To Byte Array
U8
Bytes Array
U8
VISA Clear
CLR
VISA Close
Error Information
Stop Button
TF

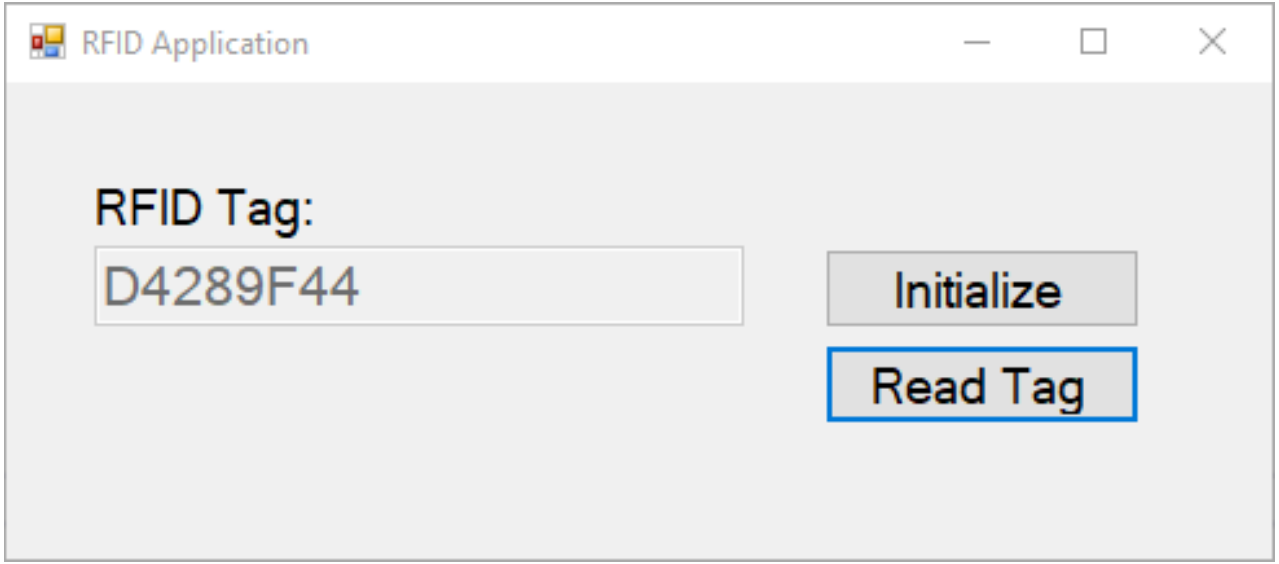
Python


Thonny - C:\Users\hansha\OneDrive\Programming\Visual Studio Examples\RFID\Eccel RFID Reader\Python\rfid_lo...
File
Edit
View
Run
Tools
Help
STOP
rfid_loop_ex.py
test.py
Shell
Python 3.7.9

```python
import serial
import time

ser = serial.Serial('COM3', 9600, timeout=1)

while True:
    response = ser.read(4)

    if response != "":
       hexvalue = "".join(map(hex, response))
       hexvalue = hexvalue.replace("0x", "", 4)
       hexvalue = hexvalue.upper()
       print(hexvalue)

    time.sleep(1)

ser.close()
```

```
Python 3.7.9 (bundled)
>>> %Run rfid_loop_ex.py

  D58A5047
  6BD98247
  BB8FA847
```

Visual Studio/C#



RFID Tag: D4289F44

Here you need the COM Port that has been assigned on your PC

```
using System;
using System.IO.Ports;
using System.Windows.Forms;

namespace ReadRfidApp
{
    public partial class Form1 : Form
    {
        string rfidTag;
        SerialPort port = new System.IO.Ports.SerialPort("COM3", 9600, System.IO.Ports.Parity.None, 8, System.IO.Ports.StopBits.One);

        public Form1()
        {
            InitializeComponent();
        }

        private void Form1_Load(object sender, EventArgs e)
        {
        }

        private void btnInitialize_Click(object sender, EventArgs e)
        {
            port.Open();
            port.DtrEnable = true;
            txtTagData.Text = "";
        }

    }
}
```

```
private void btnReadTag_Click(object sender, EventArgs e)
{
    int numberBytesToRead = 4;
    byte[] data = new byte[numberBytesToRead];
    port.ReadTimeout = 1000;
    port.Read(data, 0, numberBytesToRead);

    rfidTag = "";
    for (int i = 0; i < numberBytesToRead; i++)
    {
        rfidTag = rfidTag + data[i].ToString("X");
    }

    txtTagData.Text = rfidTag;

    port.Close();
}
```

Resources

- https://en.wikipedia.org/wiki/Barcode
- https://en.wikipedia.org/wiki/Radio-frequency_identification
- https://www.atlasrfidstore.com/rfid-beginners-guide/
- https://no.rs-online.com/web/p/rf-modules/1262181/
- https://eccel.co.uk/product/oem-micode-usb/

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