

Using Smartphone to Read NFD tag

What is NFC?

NFC (Near Field Communication) is a short-range wireless technology that allows two electronic devices to communicate when they are within a few centimeters of each other. It's most commonly used in contactless payments, digital keycards, smart tags, and tap-to-share features. NFC works by using magnetic field induction and doesn't require pairing like Bluetooth — just a simple tap is enough to exchange data.

In this tutorial, we are using an iPhone to tap on the NTAG203 to open up a website.

Wiring and Library

We will be using DFRobot PN532 module, please refer to [**this tutorial**](#). We will be using

`Adafruit_PN532` library, we have a tutorial on [**how to install a library**](#) here.

Types of Tag

In this tutorial, we are using **NTAG203**, NTAG215 or NTAG216 should work fine as well. You **cannot** use MIFARE Classic tag or card.

Code for Writing Data

```
#include <Wire.h>
#include <Adafruit_PN532.h>

#define SDA_PIN A4
#define SCL_PIN A5

Adafruit_PN532 nfc(SDA_PIN, SCL_PIN);

void setup(void) {
  Serial.begin(115200);
  Serial.println("Starting NFC writer with Adafruit PN532");

  nfc.begin();

  uint32_t versiondata = nfc.getFirmwareVersion();
```

```

if (!versiondata) {
    Serial.println("Didn't find PN53x board");
    while (1);
}

nfc.SAMConfig(); // configure board to read RFID
Serial.println("Waiting for an NFC tag...");
}

void loop(void) {
    uint8_t uid[] = { 0 };
    uint8_t uidLength;

    if (nfc.readPassiveTargetID(PN532_MIFARE_ISO14443A, uid, &uidLength)) {
        Serial.println("Tag detected!");

        const char *url = "youtube.com"; // Keep short due to 144 byte limit & omit the "https://" part
        uint8_t urlPrefix = 0x01; // 0x01 = http://www.

        // Build NDEF URI record
        uint8_t urlLength = strlen(url);
        uint8_t payloadLength = 1 + urlLength; // Prefix + URL

        uint8_t ndef[] = {
            0xD1, // MB, ME, SR, TNF=0x01 (well-known)
            0x01, // Type Length = 1
            payloadLength, // Payload Length
            0x55, // Type = 'U'
            urlPrefix // URL Prefix
        };

        uint8_t messageLength = sizeof(ndef) + urlLength;
        uint8_t totalLength = messageLength + 3; // TLV: 0x03 len + msg + 0xFE

        uint8_t full[totalLength];
        full[0] = 0x03; // NDEF Message TLV tag
        full[1] = messageLength; // Length of NDEF message
        memcpy(&full[2], ndef, sizeof(ndef));
        memcpy(&full[2 + sizeof(ndef)], url, urlLength);
        full[totalLength - 1] = 0xFE; // Terminator TLV
    }
}

```

```
// Write to tag starting at page 4
int page = 4;
for (int i = 0; i < totalLength; i += 4) {
    uint8_t buffer[4] = {0x00, 0x00, 0x00, 0x00};
    for (int j = 0; j < 4 && (i + j) < totalLength; j++) {
        buffer[j] = full[i + j];
    }

    if (!Infc.ntag2xx_WritePage(page, buffer)) {
        Serial.print("Failed writing to page ");
        Serial.println(page);
        return;
    }
    page++;
}

Serial.println("  Wrote NDEF URL to NTAG203 successfully!");
delay(5000); // prevent immediate re-trigger
}
}
```

Revision #2

Created 25 April 2025 16:04:17 by Joanne Leung

Updated 25 April 2025 16:17:06 by Joanne Leung