1802 Nametag Programmer
v1.0 Instructions

By Claudio Parmigiani

This document describes the procedures for using the *1802 Nametag* programmer based on Arduino and a few external components. It will simplify and speed up the programming of your *1802 Nametag* with the alphanumeric messages of your choice.
The principle of operation is to mimic the operations carried out by the "programming panel". Some functions are carried out by relays, while Arduino translates the messages into appropriate bit sequences for the 1802 microprocessor.

It is assumed that you already have an *1802 Nametag* assembled and working, but not programmed yet.

Preliminary operations:

1) Assemble the necessary circuitry and connection cable as shown in the schematic, according to the Bill of Materials as shown at the end of this document.
2) Load the provided sketch onto an Arduino Uno / Arduino Nano. Make sure that the words "`TMSI Electronikit's 1802 Nametag programmer`" etc. appear when the terminal is opened.
3) Disconnect the *1802 Nametag* from any power source.
4) Connect Arduino to the *1802 Nametag*.
5) Connect the USB Cable to the Arduino. Arduino and *1802 Nametag* will power up.

Programming is done by simply typing in a terminal window the four alphanumeric messages that you want to display on the *1802 Nametag*.
Each message is called *frame* by the program.
After the fourth frame, the relays will click for a few seconds and the 1802 Nametag will be properly programmed with your messages.

Before continuing please keep in mind that:

- Every frame shorter than eight characters will have the last character duplicated until the last available position. Example: HELLO → HELLOOOO
  To avoid this please fill in the empty characters with spaces
- Every frame longer than eight characters will be truncated.
- ENTER/RETURN key must NOT be pressed, *never ever*. After you typed it the desired frame, just do not type anything for a second to automatically move on to the next frame (or to the relay-click phase).

Computer's terminal program (i.e. PuTTY for windows, minicom for Linux or Arduino IDE) must be set to: **9600 bit/s, 8 bit Data, no Parity, 1 Stop bit.**

It is mandatory to set up the terminal program to transmit to Arduino the keypresses "one by one" instead of all in a row after pressing the ENTER/RETURN key (remember? It will not be used!).

This functionality, called “Line-Wrap”, must be turned off:

- In minicom: just press CTRL W
- In PuTTY: in the *terminal* setup screen deselect the checkbox *Auto wrap mode initially on* and then reset the terminal
- In Arduino IDE: within the Terminal choose the option "No line ending" in the pull-down menu in the lower right corner of the window, next to the Terminal Speed.

Please note also that, in order to avoid *blind typing*, “local echo” function should be enabled:

- In minicom: just press CTRL E
- In PuTTY: in the *terminal* setup screen, frame *Line discipline options*, section *Local echo*, select the *Force On* radio-button and then reset the terminal

Other programs may have different options, please refer to their documentations.

Due to the input “character by character”, the DELETE/BACKSPACE keys might cause unexpected results in all terminal program (except Arduino IDE’s Terminal, which is the best option). Try not to make mistakes to have the expected results.

When the timeout expires after inserting the four frame, the 7-segments display will blank and the relays will click for a few seconds. Programmer’s LED will also blink. At the end of the operation, the *1802 Nametag* will cycle through the programmed frames immediately.

During the relays operations the 7-segments display should remain off. If you notice strange behaviours such as segment blinking, please check connections / cables and disconnect 1802’s power before trying again. Be aware that some types of modern edge connectors could provide a poor contact with the PCB and could cause strange misbehaviour. Keep the contacts clean.

To reconnect the *1802 Nametag* to the batteries:

- Open P2 jumper: the 7-segments display will blank and put the microprocessor to sleep.
- Disconnect the *1802 Nametag* from the programmer and immediately reconnect the batteries (at least within 30s / one minute or so). The electrolytic capacitor should keep the settings.
- Check the different frames and … enjoy!

Please feel free to distribute and modify the sketch and the circuitry schematic in order to improve the device functionality.

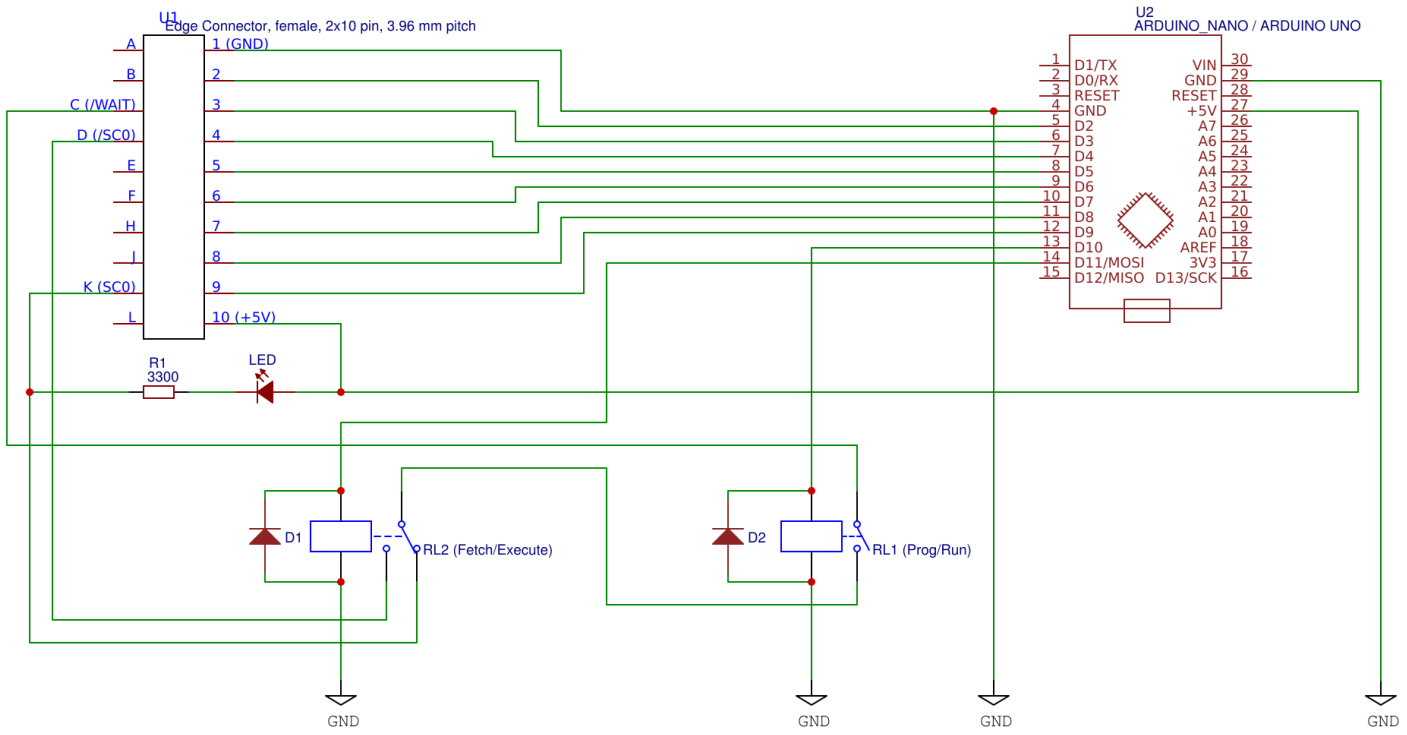
Claudio Parmigiani -- 2019

BILL OF MATERIALS

( ) 1x relay: coil voltage 5V, max coil current drain 40 mA. SPST (Single Pole Single Throw), Normally Open
( ) 1x relay: coil voltage 5V, max coil current drain 40 mA. SPDT (Single Pole Double Throw) *
( ) 2 x flyback diodes (i.e. 1N4007 or similar) **
( ) 1 x 3300 Ohm resistor
( ) 1 x red LED
( ) 1x Card edge connector, double row 2x10 (20 Pin), 3.96mm pitch, slot solder socket
( ) 1 x prototyping PCB
( ) 1 x Arduino Nano V3 with ATmega328p (OR 1 x Arduino UNO R3)

*alternatively, a second SPST relay can be used.

**flyback diodes should be choosed depending on the relay used.



RL1: Open = RUN Mode -- Closed = PROGRAM Mode

RL2: Normally Closed = FETCH (SC0) -- Normally Open = EXECUTE (/SC0)

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