

Manual to install experimental firmware on a TYTERA MD380

By Erik, PA0ESH. Monday 28 November 2016



I've been a while in the possession of a MD380/390 Tytera to experiment with DMR.

This Chinese MD380/390 is a delight in use and with the support of Arjan Hogt, PE1SCX well as the various social media resources (Facebook MD380 and HAM DMR website), I managed just fine to keep up with code plugs, firmware etc.

Yet this MD380/390 also has some limitations and quirks, such as text mistakes and too little memory for all DMR's call.

So, I was very interested when the first reports surfaced on the Internet, that the firmware was re-engineered, i.e. the "hackers" could remove the official firmware, and then developed their own version, which contained improvements and functional changes. And flash it back !

Note that this does not apply to the code plug, you must program to make contact through various repeaters, but only relates to the operating software / firmware.

The source code of this experimental firmware is available on GitHub at Travis Godspeed

(<https://github.com/travisgoodspeed/md380tools>).

There it is also described how to perform the flashing.

You will also find a description of the how's and the do's which is not too difficult to understand, so I decided to give it a try

The results are quite impressive, although to my opinion, there is plenty of room for improvements. But then again, I cannot develop this kind of firmware myself and depend on other who provide almost daily updates and improvements.

For those who want to try it once and are not too well versed in Linux, and have a Raspberry Pi or a computer running Linux Ubuntu (distro Xenial), I wrote a script, which you can download from my website or from GitHub. Thereafter, it is and remains fairly easy to keep the MD380/390 up-to-date. I regularly update the script based on requests, comments and ideas from users, so check occasionally if there's an update.

The procedure goes as follows:

1. Create a fresh sd-card for the raspberry with Debian Jesse (if you already have a working sd-card, this is fine because the script can run in addition to other programs.)



2. A new image can be downloaded at <https://www.raspberrypi.org/>. If you have put this image on your SD card and the raspberry has been started, log in with ssh from your desktop PC (also with Putty or any arbitrary terminal and enter **sudo raspi-config**).

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If you work from the GUI, then start the terminal program and enter on the terminal screen **sudo su**, to continue as superuser and then **raspi-config**.

Note: I do all this this by creating an SSH connection with the Raspberry PI from my home computer, but it can also be done via attached keyboard and screen.

Go through all the settings and set them to your liking.

3. The very first login name incidentally is **pi** and the password is **raspberry**
4. Note: This is a link to the (English) website where everything about Raspi-config is done explained. <https://pimylifeup.com/raspi-config-tool/>
5. Reboot at the end of all these changes.

6. Log in again as PI and download the script with the command:

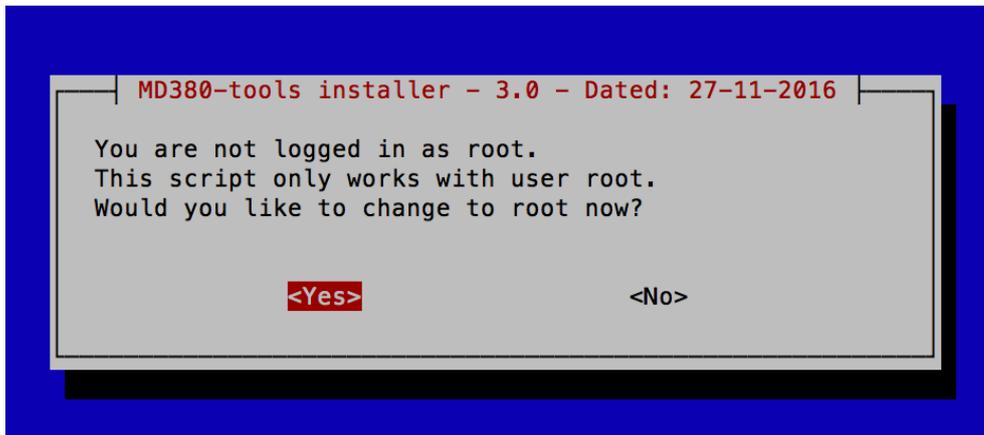
wget <http://www.pa0esh.nl/svn/md380/flash-md380.sh>

Note 1: If you run Ubuntu, you can follow the steps from here

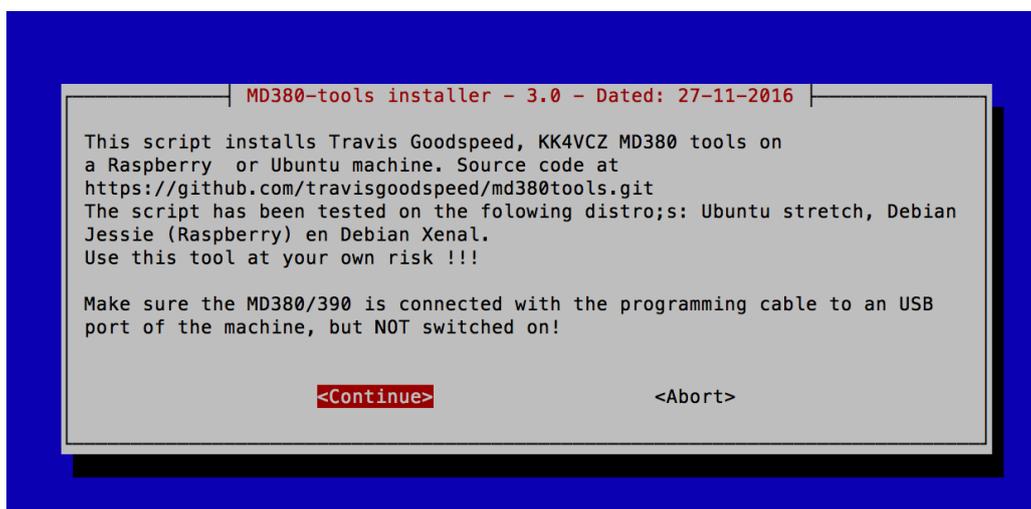
7. Make the script executable: **sudo chmod +x flash-md380.sh**
8. Run the script with the command **./flash-md380.sh**

We now go successively through all the screens with information about what is happening.

If you're not logged in as root you will see this screen. The flash-md380.sh script only works under user root. So, click Yes if you want to go on.



9. After you press **Yes**, the next screen comes up which gives you some general info



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```
MD380-tools installer - 3.0 - Dated: 27-11-2016
You accept the risks of something going wrong when using
this tool ?
You know how to put the MD380 in DFU mode?
Are you ready to start with the MD380 toolbox ?

<Yes>          <No>
```

The script asks you again if you are sure you understand the risks and that you are familiar with the procedure of flashing firmware on the MD380.. Next, you arrive at the main menu, and there you have the following choices.

```
MD380 Experimental firmware - Current Linux user: root - Working dir :/home/pi - Rev: 3.0 - dated: 27-11-2016
MD380-tools installer - 3.0 - Dated: 27-11-2016
Make a choice
Check script      Check for a new version of this script
Linux Update      Update the Operating System on this machine
MD380-tools       MD380 tools 1st time installation.
MD380-SW-NO-GPS   flash software MD380 No GPS
MD380-SW-YES-GPS  flash software MD380 with GPS
MD380-DB-EU       flash user database EU privacy law
MD380-DB-ROW      flash user database ROW privacylaw
MD380-ORG         info on flashing original firmware

<Ok>              <Cancel>
```

Menu: Check script

Let's you quickly see if there is a newer version of this script.

Currently, this script only has the basic functions to flash the firmware and update the user database, but will surely have additional useful functions soon.

Menu: Linux Update

With this menu, basically you run the following commands: apt-get update and apt-get dist-upgrade, whether or not followed by a reboot.

Menu: Raspberry OS check

This script and the md380 tools will work correctly under Debian Jessie – Raspberry PI and Ubuntu Xenial as tested by me. In Debian Wheezy I could not get it to work. Other distributions I have not yet tested

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Menu: MD380-tools

This menu will install or update all experimental software to the latest revision from GitHub. The software is often customized so carry out flashing the MD380/390 quite so often

If you choose this menu, the script will first check whether you can install these tools on your machine. That depends on the Linux version used. This script only works with Debian Jessie, stretch and

Xenial (Ubuntu). Depending on what you are running, the correct support packages are then installed or updated. Click OK, to continue



Menu: MD380-SW-NO-GPS

Through this option you flash the new firmware in your MD380 **without GPS**.

At first, the scripts check for an update at GitHub, then compile the firmware and flash it into the MD380/390

But remember that the MD380/390 must be switched into DFU mode . See below how to do that

Menu: MD380-SW-YES-GPS

The same as above, but for MD380/390 **with GPS**.

Menu: MD380-DB-EU

Through this option you flash the latest list of DRM users in your MD380. At the time of writing this document, there were 42,121 users! User data is flashed according to the EU laws on privacy. If you want to see the data, you can open the file users.csv which you will find in the directory / home / pi / md380tools/ db/.

Remember that the MD380/390 should now be in normal operation mode. **(Not DFU)**

Menu: MD380-DB ROW

The same as above, but now all data on a user are shown.

How to put the MD380 in DFU Mode

Shortly before actually uploading the firmware to your radio, you need to put the MD380 into DFU mode – to accept the new firmware

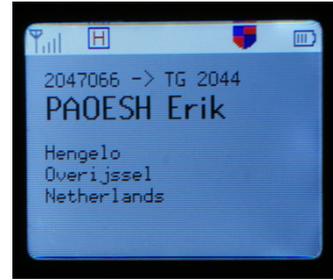
- Turn off the radio (using the volume knob)
- Connect the USB programming cable to your computer / Raspberry
- Disconnect the headphones / mic insert and connect the other end of the programming cable to the MD380 (it can only go one way)
- Press the PTT and the top button at the same time
- Turn on the radio, when both buttons are pressed
- You will see that the LED flashes (red / green)
- Here's a video demonstration: https://youtu.be/v6-pk2znk_c

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And if it all worked and the MD380/390 is switched back on, data is shown as on the picture.

But you can much more, e.g. read along with what comes along, a log print etc.

In that case, the port must be suspended from the raspberry, but that's another story. Soon, the script will be extended to other functions.



Note: These tools can also be installed on a Windows PC, but I don't have one, and I leave it to others to try it and write about it.

There is a perfect description in the GitHub repository

Suc6 and 73's . Erik, PAOESH