KD4Z Toolkit v4.0 Tutorial

For Custom firmware TYT / Retevis

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Content:

Overview

This tutorial will lead you through the installation, the configuration and how-to-use the KD4Z Toolkit v4.0 for Custom firmware for TYT and Retevis HAM-radio's, further named as *The Toolkit*.

It is more than a flashtool only. The Toolkit is, as the name referred to, a complete bundle of tools to maintain your radio, including updating custom firmware and the worldwide user database.

> *This tutorial described the complete setup for the Virtual Box (Oracle) for Windows and OS X (Apple).*
>
> *Versions / updates for other VM platforms and the native Linux version will be released soon.*

The KD4Z Toolkit is not the actual MD380Tools, it is, as the name said, a toolkit to flash the custom firmware and write the World-Wide user database into your radio.

The basic code (the "engine") for the MD380Tools is the one-and-only Travis& Friends version, which is up-to-date to the latest available version (build) of GitHub. Warren added some nice-to-have features from other developers too, like the Enhanced Display and Snapshot code from Mike (DL2MF); not only added those functions, but integrated this functions into The Toolkit for easy use too.

But it is a lot more than "just another flashtool". Warren Merkel (KD4Z) wrote a lot of scripts, combined those scripts in simple commands to use; and made, altered and added the best tools together to one simple-to-use toolkit: The KD4Z Toolkit, which contains:

- ✓ **Multi language** menus to navigate you through all the possibilities;
- ✓ **Safety**: build-in backup/restore to earlier versions:
  - o Make a backup manually
  - o Make automatically backups for 9 earlier versions
  - o Go back to the latest known stable version
- ✓ **Snapshot** function which give you the ability to make screenshots from your radio-screen
- ✓ **Password Reset** utilities
- ✓ **Codeplug** "problem solver"
- ✓ **Tweaked Radio Display** and font for better readability
- ✓ Etc…. which we are going to explain ho-to-use in this tutorial

Almost forgotten: Yes, you can flash custom firmware and the World-Wide user database too with this Toolkit ☺ .

If you need help with setting up or with questions how-to-use, there is a large user-support group on Facebook too with a lot of experienced users who can help you.
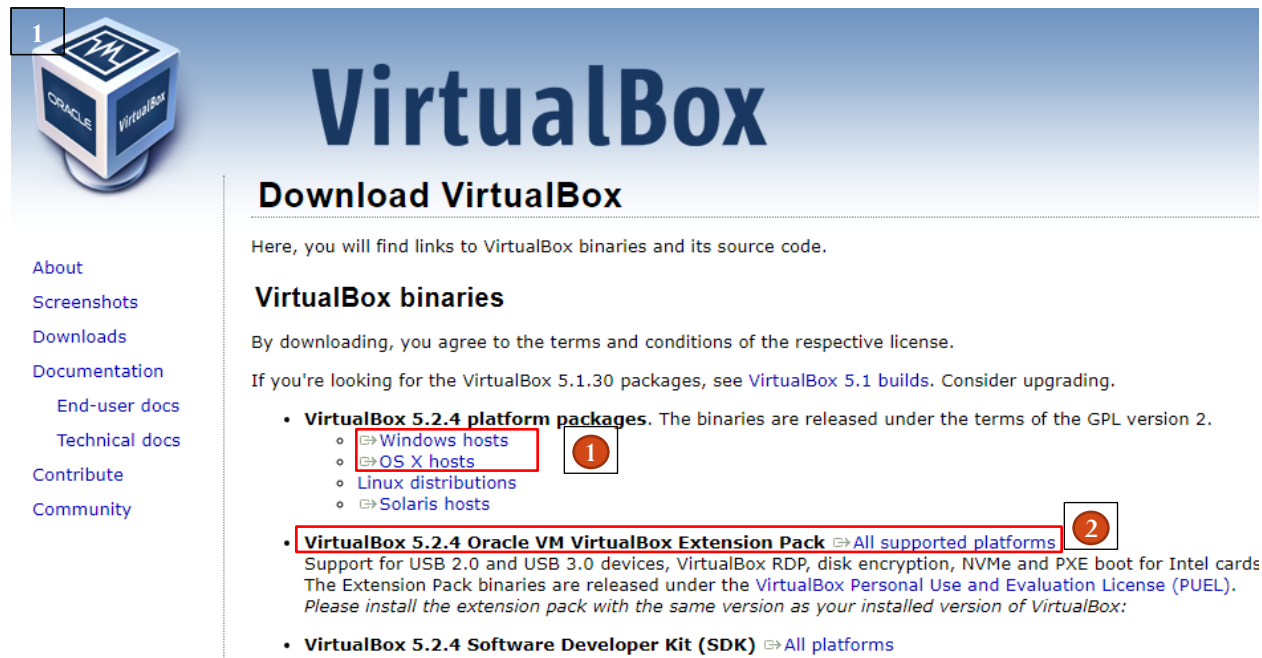
Installation KD4Z Toolkit v4.0 / MD380Tools

First time installation: Download and install the Virtual Box

You can download the latest version, which is mandatory for Toolkit v4, here (it's free 😊):

https://www.virtualbox.org/wiki/Downloads

Here's a screen picture from the download page:

1. Select the correct download: *Windows hosts* for a Windows PC; *OS X hosts* for an Apple.
2. To use the Toolkit, you need also the *Extension Pack* (all supported platforms), so download that one too
3. Install first the *VirtualBox* by following the instructions
4. After installing the VirtualBox, install the *Extension Pack.*
5. **NOW REBOOT YOUR PC**

Update existing VirtualBox

Existing users has to upgrade their VirtualBox to Version 5.2.4 r119785 (Qt5.6.2) or later;

Please note: upgrade the Extension Pack too

If you already have an older version of VirtualBox installed, don't uninstall it before updating!

Just run the installer and it will update the existing version of VirtualBox, and keep your existing installed Virtual Machines (tytv3.ova). Be sure to download and install the newest available VirtualBox Extension Pack as well.

Download and install the KD4Z Toolkit v4.0 environment for the VirtualBox (all users)

To have all the new features available, both existing and new users, you have to install the new appliance **tytV4.ova**

6. Download the *tyt_kd4z_4.0.ova* file from here:

    For the VirtualBox Appliance image file, use these links:

    Single file download (Preferable; 1.2Gb):
    https://drive.google.com/file/d/1YkPIsmj_vsoYK9ALIaKGDNRVGZ70lvrI/view?usp=sharing

    Multiple files download (if the one-file procedure fails)
    Use the above link (preferable), or download all 6 links below. **Don't do both Parts!** - Use these links if you have trouble downloading the large file above:

    [Part 1]
    https://drive.google.com/file/d/1aPXwDEMSZufvzvma_q9uIF6AUV2i9crB/view?usp=sharing

    [Part 2]
    https://drive.google.com/file/d/16mPYbtyIrK49IlBqwmh7kqSf8y_D3aGY/view?usp=sharing

    [Part 3]
    https://drive.google.com/file/d/1C8P00s_QeP_GEr8_h80kxG8VEOFBU1aM/view?usp=sharing

    [Part 4]
    https://drive.google.com/file/d/1IvE_a_KtVgHf75UdY6qX4MBGCLfHb7Gg/view?usp=sharing

    [Part 5]
    https://drive.google.com/file/d/11MhNJLfSrIkdpzov1irY3gQwJyC9Hlp5/view?usp=sharing

    [Part 6]
    https://drive.google.com/file/d/1Emr5QxVP0FBNi2LfRJaw3PELCtSJxUuR/view?usp=sharing

    For the part files, download each one. You will need to use the 7-zip program to extract them back into the actual OVA Appliance file.
    Get 7-Zip here: http://www.7-zip.org/download.html

    Install 7-Zip, and then Right-Click on the first part file, find the 7-Zip menu, and choose the extract option.
    You will end up with a single, large ".OVA" file (*tyt_kd4z_4.0.ova*).
    This file (*tyt_kd4z_4.0.ova*) is imported into the Virtual Box software (explained later).

7. Launch Oracle VirtualBox and Import the *tyt_kd4z_4.0.ova* appliance file from the *File | Import Appliance* menu item.

   Don't start the tytV4 yet!
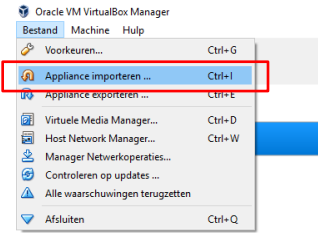
Prepare the "snapshot" functionality

KD4Z Toolkit v4.0 has some nice new features. One of them is to make screenshots from your radio (the "snap" function).

To make this function operational, we have to prepare the Toolkit so you can store the snapshots from your radio screen on your host.
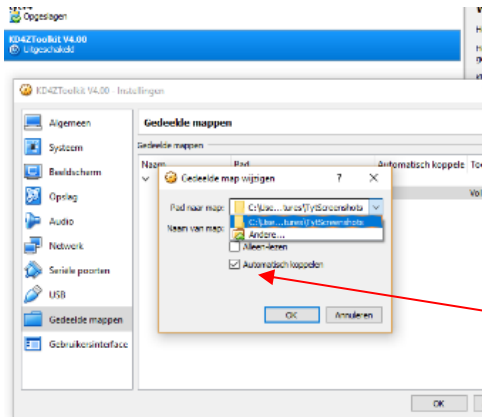
8. On your host machine (Windows or OS X), make a folder with this name: *TytScreenshots* Place the folder preferable in your Documents or Picture folder.

9. Start, if not already open, VirtualBox and go to Settings ➔ Shared Folders and navigate to the path you have defined to the TytScreenshots folder; select that same folder you just created. It will look like this when done, except your selected path will be shown. Be sure to put a check mark in the "Auto-mount" option.:

THE IMPORTANT PART IS: The "Folder Name" as seen in this configuration MUST be named "TytScreenshots" or the snap command inside the VM will not be able to find it.

What does used for? If you run the new snap command followed by the desired (and required) filename. ➔Note that it must have a *.bmp* extension to be viewable. Then, go look in your TytScreenshots folder on your Host machine, you will find your bmp file is already there!
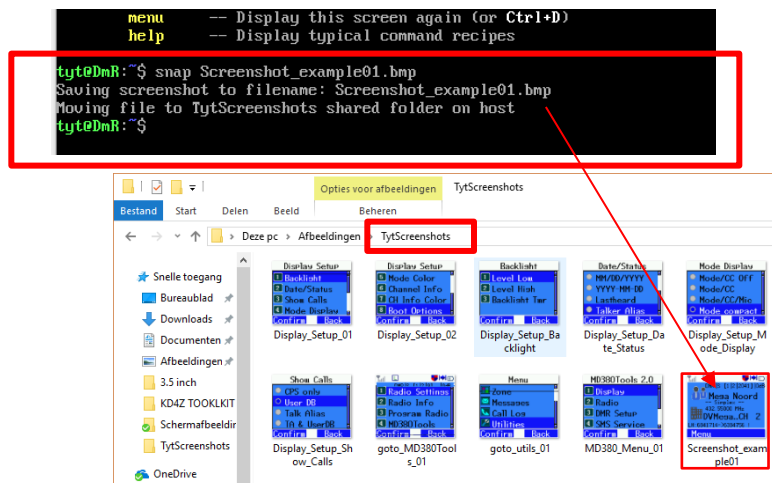
Now you've completed installing the VirtualBox including the KD4Z Toolkit and make full use of it.

The KD4Z Toolkit v4.0 explained

Some notes from Warren (KD4Z – Lead -Developer of The Toolkit):

Over the past year, I had intentionally not updated the 3.x VM image, as the internal Toolkit scripting has ability to fully update itself.

This has worked out very well, as I know it is a very large download. I wanted to avoid forcing the user to keep downloading large image files – just for updates.

As you already know, that design works quite well to that end. However, some of the new features I had in mind needed to be added using the root user.

The VM is designed to run everything as a non-privileged user in order to protect the user from breaking anything.

So, I collected my notes over the past 12 months, and rev'd up the VM image with those features in mind.

The KD4Z Toolkit Virtual Machine image is born!

Differences from the 3.x VM Image at a glance:

- ✓ The VM now has the Virtual Box Guest Additions installed: This adds much better mouse handling! Adds ability to create a shared folder to the Host machine for easy file transfer in or out. Adds the ability to scale the window size of the running VM.
- ✓ The VM now has an SSH server running on port 22. (Openssh server)
  This allows you to "shell" into the VM. Mainly, this gives you the ability to scroll back the screen using your SSH terminal client such as Bitvise SSH Client.
  Be aware that a shell session does not redirect the USB port, so you can't initiate any "flash" operations from the shell. You still have to run those operations from the normal VM console.
  Also, the SSH server allows a SFTP client (like the one in Bitvise) to connect and make easy work of file transfer in or out of the VM using secure FTP. If you haven't heard of Bitvise, you should go check it out. It's FREE! https://www.bitvise.com/ssh-client-download
- ✓ The VM also has a normal FTP server running. You can connect directly to the VM from your host machine using your favorite FTP client such as Filezilla. (https://filezilla-project.org). You could use this feature to upload your codeplug file into the VM for use with the rtdwrite() command.
- ✓ The VM has a mini HTTP server running to serve up the screenshot directory. This allows you to browse to the IP address of the VM using a normal web browser.
  The base directory is "screenshots". This is the landing directory for the new "snap" screenshot command.
- ✓ Also, after a **glv** or **glvusers** command, the two freshly created firmware.bin and user.bin files will be available here.

So, you can simple download them using a web browser if you wish to use them with another flash tool such as **TyteraFlashToolv1.03NL**, a simple Windows flashtool which you can find in the files section (zipped file) of the Facebook group.

An introduction

The MD380Tools v2.0 which are used in this Toolkit is a compiled .bin file from the Travis & Friends GitHub site.

> *There are more flash tools and more custom firmware versions; those are NOT described or explained in this tutorial, nor will they be supported by the KD4Z Toolkit support group on Facebook.*
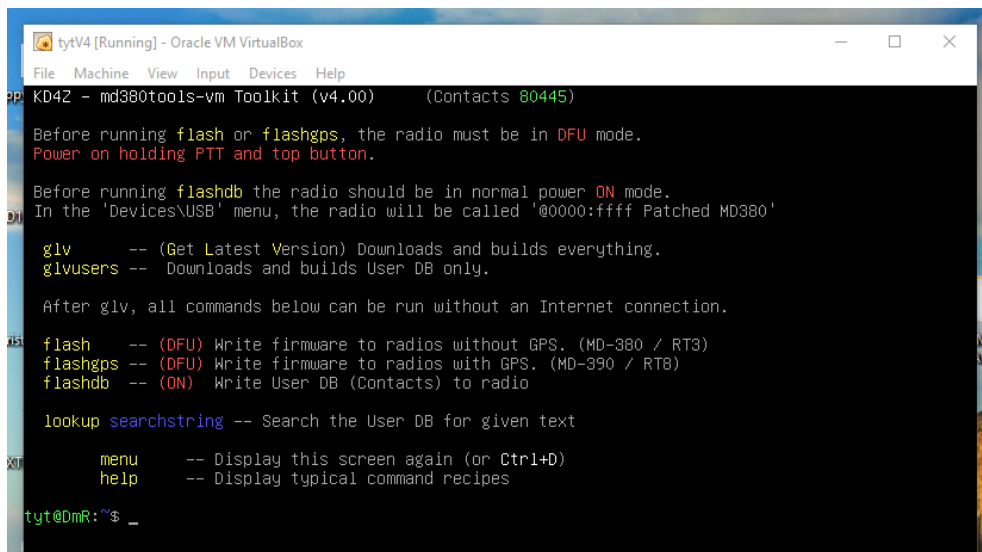
Warren has added some extra code for display- and font handling and added some code from second party developers too, like the snapshot feature and enhanced display features from Mike – DL2MF (Credits to Mike, buy him a cup of coffee).

In this part of the tutorial, we will lead you step-by-step to the main features of the custom firmware:

- ✓ How to flash the latest firmware to your radio;
- ✓ How to write the userDB to your radio;

Preparing

After installing the KD4Z Toolkit and started it up, you should see this screen:

The upper-line shows you the version and the number of contacts in the world-wide user database (in this document: the userDB).

There are two commands which needs an internet connection (well, basically there is one and a "shortcut" for the userDB only), all other commands can be executed without internet, including flashing the firmware and writing the userDB!

The idea is for use at club meetings: you don't need the internet to help your club members to flash/write the custom firmware or userDB.

First step after starting the Toolkit is to **G**et the **L**atest **V**ersion (**glv**) from the custom firmware and the userDB. Just type **glv** on the prompt line and the Toolkit will:

- ✓ Pull and compile the latest version of the KD4Z Toolkit;
- ✓ Pull from the GitHub sources the latest firmware-files and compile it to the latest version firmware;
- ✓ Pull the latest userDB onto your computer.

So, with just simple executing **glv**, you have it all!

If you only want to update the userDB, there is a shortcut: **glvusers**. This command only pulls the latest userDB to your computer without the latest firmware.

If you want, you can disconnect from the Internet now.

Flashing the custom firmware to your radio

Next step is to flash the custom firmware (aka experimental firmware) to your radio; you have to know if you have a GPS or a NON-GPS model.

This needs some explanation: The non-gps version is mostly referred by (model) MD380 (TYT) or RT3 (Retevis), the GPS version by (model) MD390 (TYT) or RT8 (Retevis).

This is not always the case: there are MD380 *with* GPS and MD390 *without* GPS! The same for Retevis RT3 and RT8. So be sure which 'flavor' you have, there are differences in the command (and firmware) for each flavor!

1. Connect your radio to the computer with the proper programming cable;
2. Switch your radio to an unused (or not programmed) channel and switch off any hotspot/repeater in the direct surroundings of your radio;
3. Put your radio in DFU mode: Switch OFF the radio; press PTT and the button directly above the PTT simultaneously and switch ON the radio; display stays black, but the LED on top of the radio should flash RED/GREEN;
4. Start flashing the firmware to you radio with this command from the prompt line (terminal window):
    a. NON-GPS: **flash**
    b. GPS models: **flashgps**
5. Flashing will start and you see the progress in your VM terminal window. When flashing is ready, wait 10 seconds and switch OF and ON your radio; ready.

Writing the userDB to your radio
This is equal for both non-GPS and GPS:

1. Connect your radio to the computer with the proper programming cable;
2. Switch ON your radio in normal operation mode;
3. Switch your radio to an unused (or not programmed) channel and switch off any hotspot/repeater in the direct surroundings of your radio;
4. If you didn't already: start the Toolkit and execute **glv** (firmware & userDB) or **glvusers** (only userDB)
5. Start writing the userDB to your radio by typing in the terminal window command line: **flashdb** + **enter**; you radio screen should display *PC Program / USB Mode*. If the writing is completed, your radio should automatically reboot to normal operation mode. Finished!
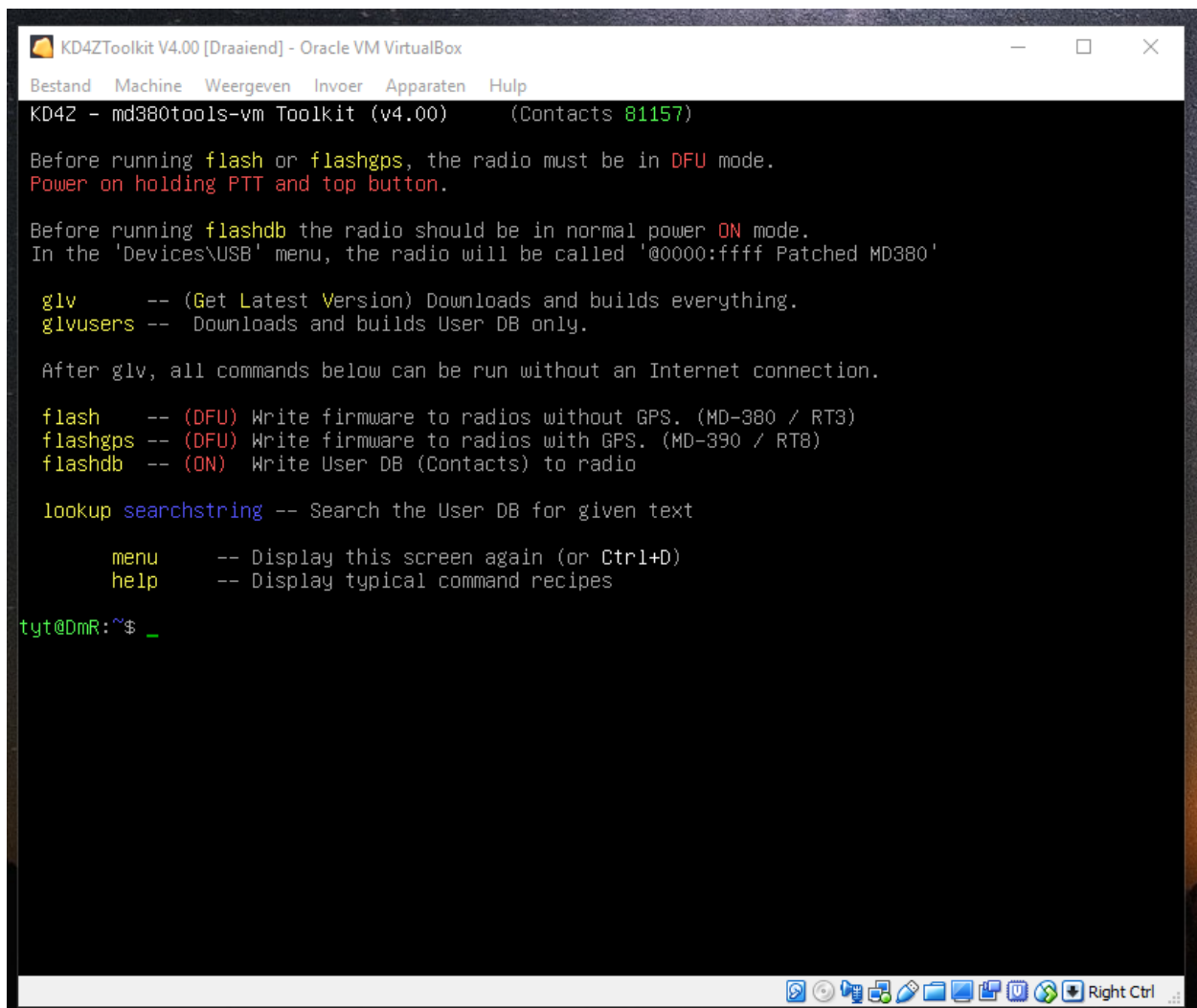
The KD4Z Toolkit, what's the difference with others?

The tools explained:

As explained, you can use the Toolkit for flashing the custom firmware and writing the userDB to your radio. For that, it is connected to the one-and-only source for "The Engine": the Travis & Friends code.

But it is a real Toolkit. Warren did a great job to combine "The Engine" with some interesting developments, for example, the code written by Mike (DL2MF) for the Enhanced Display Options. And Warren tweaked the Display fonts and -presentation for a better readability on your radio screen.

But there's a lot more which we're going to walk through by the menu-system of the Toolkit:

In this Menu screen are the commands for the Basic operations and they are self-explaining. It shows the power of the Toolkit: just one command instead of a bunch of Linux command line commands.

```
KD4ZToolkit V4.00 [Draaiend] - Oracle VM VirtualBox                    —   □   ✕

Bestand   Machine   Weergeven   Invoer   Apparaten   Hulp

                    KD4Z - md380tools-vm Toolkit - Recipes

MD-380 / RT3 / No GPS:                 glv   flash   flashdb

MD-390 / RT8 / with GPS:               glv   flashgps   flashdb

Downloads and builds User DB only.:    glvusers   flashdb

Save / Restore build set:
        save setname
        restore setname or restore without setname for previous build
        restore X                -- Restore X numbered prior build ( X => 1 to 9)
        restore stable           -- Restore to known stable version

Recover Locked Radio:
        rdtpassreset             -- Clear Codeplug Password
        rdtblank                 -- Force Blank Codeplug to Radio

Utility:
        snap filename.bmp        -- Create screenshot in 'screenshot' folder.  Must be named .bmp
        rdtread codeplug.bin     -- Read codeplug out of radio into binary file.
        rdtwrite codeplug.rdt    -- Write codeplug to radio from RDT,DFU or BIN file.

        shutdown or reboot       -- Safely Shutdown or Reboot the Virtual Machine

        stats                    -- VM information menu
        tweaks                   -- Tweaks menu
        menu                     -- Back to main menu  (or Ctrl+D)

tyt@DmR:~$ _
```

HELP SCREEN (SCREEN 2)

In the Help screen are some powerful extra's, most of them are self-explaining too. Worth to mention are:

Save / Restore build set

With those commands, you can make a backup ('snapshot') of your firmware and userDB before updating your radio. Use **save setname** to make that snapshot, where setname is any name you chose (within Linux conventions: use as an example the date for that name as 20180125 for 2018, January 25). Use **restore setname** to restore that set back to your radio.

The Toolkit makes automatically a snapshot every time you execute glv, which can be restored to the radio with just **restore.** Remember, this file is renewed every time you do a glv! A better workflow is to make a 'named' snapshot (save) every time before you use glv to update your firmware and userDB as described before.

If you ran into serious troubles, there's always an exit: use restore stable to write the latest and tested firmware build to your radio; this build could be some weeks or even months old, but your radio is working again and you can update it from hereon.

Recover a (locked) Radio

Another great tool.

If your Radio is asking for a password and the password is unknown, you can reset the password with this utility: **rdtpassreset**

After using this utility, read your Radio's codeplug with the stock CPS program which came with your radio, connect the radio, do a 'read from radio' and replace the password settings with known password(s) or remove the password. Write the codeplug back to your Radio and you have control again.

It happens that your radio isn't responding to the reset utility too. As a last escape, write a complete blank codeplug to the radio with **rdtblank**. After doing so, read that blank codeplug with the stock CPS program which came with your radio, connect it and save that blank codeplug for future use. Replace the codeplug with a known working codeplug. Write that working codeplug back to your Radio and you have control again.

The **snap** function is explained in the *Prepare the "snapshot" functionality* (Download and install the KD4Z ..) of this tutorial.

Use **shutdown** or **reboot** for a save exit/reboot the VirtualBox Toolkit v4 environment.

```
            KD4Z - md380tools-vm - Tweaks

Option settings are controlled by file existence in the home directory.
These take affect during your next glv.  * indicates tweakfile present.

 Add setting: touch tweakfile    Remove setting:  rm tweakfile

 Example:  touch ~/filter.countries.enable

-- tweakfile list  --
 ~/extra.data.disable   Disable Extra Contact Data
 ~/filter.countries.enable   Enable Country abbreviation
 ~/filter.us.states.enable   Enable US State abbreviation
 ~/lang.nl     Enable Dutch text
 ~/lang.pt     Enable Portuguese text
 ~/lang.it     Enable Italian text
 ~/lang.es     Enable Spanish text
 ~/lang.de     Enable German text
 ~/lang.fr     Enable French text
 ~/lang.sl     Enable Slovenian text

menu -- Back to main menu  (or Ctrl+D)

tyt@DmR:~$
```

TWEAKS (SCREEN 3)

There are some handy tweaks too. This screen is self-explaining, but notice: the abbreviation setting is for known (not exotic) countries default set to ON. This is done because the userDB is growing rapidly and there is a sizing limit to that database.

The MD380Tools v2.0

A Step-by-Step walk-through the new possibilities

After completed flashing the custom firmware and writing the userDB, you have a ton of extra's which you not even see on high-end handhelds. So, let's explore the most used features (I don't go into the Developer menu's and features; if you want to use or understand those too, please search on internet (Google is your friend ☺) to explore them too).

First, go into your radio menu to **Utilities** and Confirm (all radio-screenshots are made with the KD4Z Toolkit utility **snap** ☺).

Here's your first new menu item: **MD380Tools**.

Select this item and Confirm to access all the MD380Tools functions.

Display Setup

The advanced status line and channel information display feature does not have any prerequisites like enabling developer mode or netmon features.
After flashing the new firmware, the display setup menu contains four new options, giving you full control over these new features.

Now we see the first 4 options which you can select; first we are going to explore what's possible with the **Display Setup** features; the "specials" from Mike – DL2MF will be explained too in this part of the manual.

Backlight: select and confirm to set:

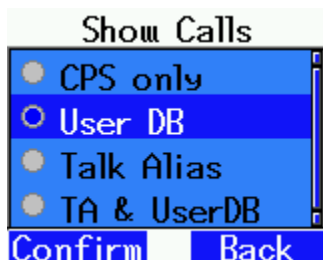**Level Low**: set the desired value
Level High: set the desired value
Backlight Tmr: set the timer (or Always) for Display ON

Date/Status

Set the date format or use the bottom line on your radio display to Lastheard or Talker Alias info (Who needs date/time on the radio screen?).

Show Calls: with this setting, you can choose which info is displayed by receiving a qso:

CPS Only: is the info from your **Codeplug**, mostly only the call; when receiving a non-programmed call: the DMR-ID

User DB: This is the most powerful setting: display shows the info from the userDB :   ➔

Talker Alias:Shows whatever is sended as Talker Alias; this is showing the TA info, provided by some radio's or what is set in the Brandmeister Selfcare.

TA& UserDB: combination from both.

Select **Mode Display:**

Select the option you want to use, Mode/CC will display operation mode and current ColorCode in the top status line. If you are using the Mic gain feature, you can optional display the current Mic gain setting in the top right corner of the advanced status line.

An additional nice and very useful feature is the Mode compact setting, offering a very compact display of all previous listed information in top of the channel, including color code (CC), current timeslot (TS) talk group (TG) and Mic gain (dB) into a very compact status indicator.

Next, select **Channel Info** Menu:
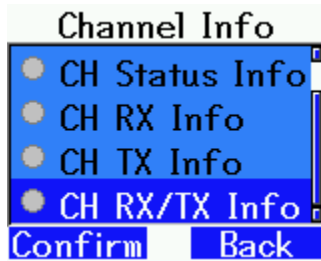
Channel info shows information of TS and TG below the selected channel and is being read from the codeplug settings of your radio. This provides more space for the channel name now, because most often this info has been added to the display name.

Depending on the setting of Mode display the selected options of the Channel info menu are dynamically arranged. When "Mode compact" was selected in Mode display, due to information like TS/TG/Tone being display in the top status line, the RX frequency of each channel is being automatically displayed too if CH Status info has been selected.

Full control and the most information you can get during operation is being provided, if you select:
- Mode compact - in mode display
- CH RX/TX Info - in channel display

Operating hints:
- Select Mode/CC/Mic option for comfortable operation status information
- Select Mode compact if you prefer CC/TS/TG status in a compact format like this: [1|1|91]
- Use CH RX/TX info when you are operating in other than your home area

When using scan mode, the TS / TG information is being read and displayed during scanning. The channel name from the stock firmware will be static, until scan stops at another channel when receiving a signal.

Radio Setup

This menu consists of 3 items:

Backlight: This is the same as describes earlier (Display Setup, Backlight, (yes, it is in two menu's); this one is legacy from the Travis version versus the Enhanced Display features from DL2MF). Don't use this option here.

Mic Bargraph: Switch ON/OFF the microphone bargraph

Mic gain: option to change Mic gain settings between 0db/Off, 3dB or 6dB. This might be helpful when operating via several repeaters, in different environments (like hotspots) or using external microphones.

DMR Setup

Set Talkgroup: normally the only way to enter a talkgroup is to create a channel and assign the contact containing the Talkgroup number. With Set Talkgroup you can temporary override of the used Talkgroup number.

This allows you to manually type in the number of the Talkgroup you want without having to reprogram the radio.

NetMonitor: Enable or Disable the Netmon hotkeys that open things like Last Heard log and debug information. The different Netmon screens and functions are tied to the number keys. This does not remove the ability to use DTMF tones while transmitting.

Promiscuous: this setting allows the reception of all of the transmissions on a DMR slot (ie Slot 1 or 2 but not both). For example, if you are on Slot 1 and TG North America for example, and you want to hear all the activity on Slot 1 on your local repeater. you can turn this ON and hear all the activity. If it is turned OFF, you will only hear the programmed channel, North America. You must still have the correct color code programmed to hear anything. If the green light on your radio is turning on but you are not hearing anything, you may need to enable this. The other reason you may not hear audio could be because the activity is on the other repeater slot. There is also an option for programming a side button to toggle promiscuous mode. When promiscuous mode is enabled, it will be indicated on the main screen with an icon that looks like an eye.

Edit DMR ID Allow the editing of your actual DMR ID as set in the CPS software. This is the ID which you received when you registered your call sign. If this value is random or incorrect, you may be denied access to transmitting into the repeater.

SMS Setup
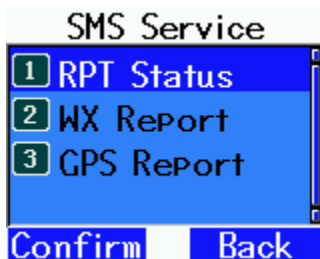
[TO BE IN NEXT REVISION OF THIS TUTORIAL]

Keyboard Setup

Keyb Mode: select between Legacy (as in V1.0 from the MD380Tools), Modern (v2), MD-446 or Develop.

REMARK: Do NOT select MD-446 if you don't have that specific model, it has a limited keyboard. It is hard to navigate when you select this keyboard on other models than MD-446

Side Buttons: First select Top Pressed, Bottom Pressed Top Held or Bottom Held, then select the function for that button.

**Scroll Mode**: Select the scroll speed: Off, Fast or Slow.

Tones Setup

M. Rogerbeep: This lower the frequency of the sound that the radio makes when keying up. Only used if talk permit tone option is enabled in radio settings.

Morse Output: This feature was added to assist visually impaired HAM operators. Enabling the options in this category will cause the radio to output in Morse code the menu text as you navigate the radio, speed of wpm is in this setting too. This does not transmit anything, it is explicitly for the operator using the radio.

Developer
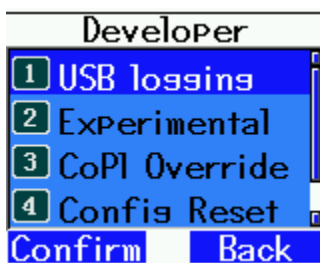
USB Logging: Switch ON/OFF USB Logging

Experimental: Switch OFF/ON the Experimental mode.

CoPl Override: Contains options for different display formats for the text shown during the radio boot screen.

Config Reset: Reset al MD380Tools to the default settings.

Addendum 1: Installation notes for native Linux

(Toolkit version 3.xx only at the time)

Md380tools-menu
Menu subset of the md380tools-vm Virtual Machine
Warren Merkel, KD4Z

Installation instructions to install the KD4Z md380tools-vm scripting framework on bare metal Linux.

This is not a fork of the md380tools-vm project, but merely a subset.
You will be running exactly the same scripting framework, and will enjoy the automatic update features of the main VM type of installation.

If you would like to take advantage of the easy-to-use menu features of the md380tools-vm project, but would rather run the scripts natively in your preferred flavor of Linux, these steps will allow you to do just that.
If you are running MMDVM on a Raspberry Pi, you are almost ready to go!

PREREQUISITES:
You must have an existing installation of Linux. You can use a stand-alone Linux machine. Or you could run Linux inside a Virtual Machine of your own choosing. Or you can use Raspian running on a Raspberry Pi.

INSTALLING THE MD380TOOLS-MENU FRAMEWORK:
Start in a non-privileged user' home directory. (*Don't miss the space "tilda" at the end*)

> *cd ~*

If you have already been using the md380tools, you might need to remove it first.
Depending on how it was installed, md380tools needs to be installed as a non-privileged user.
Some "pre-built" images for MMDVMHost and other md380tools VM images, install md380tools as "root".
Since we will be running as a non-privileged user here, we need to just remove it using super-user elevation.
When you run "glv", the md380tools and md380tools-vm folders will be completely removed.
This needs to be able to occur as a non-privileged user.

So, from your current user's home directory. (*cd ~* to get there) run this:

> *ls md380tools*

If you see a bunch of files fly by in the listing, fine. We need to just remove them. This is the easiest way to clean house in case they are owned by the root user.
They will be put back each time you run glv anyway.

Run this command to remove the existing folder, if it exists. (If your Linux distribution doesn't have sudo, be sure to "su -" to become root first)

> *sudo rm –rf md380tools*

If you didn't see the md380tools folder had pre-existed in your image, you will need to perform installation of md380tools prerequisites as described here:

https://github.com/travisgoodspeed/md380tools#preparation-of-build-environment

Be sure to perform these steps as well:

https://github.com/travisgoodspeed/md380tools#additional-steps-for-linux-based-installations

Don't forget this last important step as listed on the main md380tools page.

> *cd md380tools*
> *sudo cp 99-md380.rules /etc/udev/rules.d/*

You will need to log back in after running the above line, and before attempting to use the flash commands. You can wait to do this until the end of the instructions however. If you forget to do this, you will get an error when attempting to access the USB device.

If you see weird errors pop up during the **glv** (explained later), you might need to go back to the above links and make your you didn't skip a step!

Additional requirements for running md380tools-menu:

You will also need to install the zip and unzip programs. If you have apt-get installed, run this s root user or use sudo:

> *sudo apt-get install zip unzip*

Otherwise, you will need to determine how to install the zip and unzip programs based on your particular Linux distribution.

Pull down the md380tools-vm scripts from github:
If you su'd to root user, exit now, back to your non-privileged user. (run the *exit* command or *Ctrl+D*)
Make sure you are in the user's home directory again with:

> *cd ~*

Then, run these next three commands:

> *git clone https://github.com/KD4Z/md380tools-vm.git*

> *mv .bash_aliases .bash_aliases.original*

(Ignore the file not found message if you didn't have the aliases file already. This command will make a backup of your original, just in case you had something in there you want to keep)

> *cp md380tools-vm/root/.bash_aliases ~*

(**don't miss that last space and "tilda"** at the end of the command above!) Note, this will overwrite your existing .bash_aliases file.

Now, we need to verify that the .bash_aliases script will get run from

> *.bashrc*

With your favorite text editor (vi or nano for example), open the .bashrc file. Scan down looking for an if [] construct like this:

> *if [-f ~/.bash_aliases]; then*
> *~/.bash_aliases*
> *fi*

If you can't find it, scroll all the way to the bottom, and add all three lines into the **.bashrc** file. Be sure to enter it exactly as listed above, including the spaces and periods!
Save your changes, and exit the editor.

Fedora note:
If you are using Fedora, you might need to create a small bash script to redirect the SHA256 calculations to a different binary file than normal. Fedora seems to have removed the "shasum" program, and replaced it with multiple versions that calculate different size SHA hashes.
Run this to check to see if you have (or are missing) the shasum binary file.

> *ls /usr/bin/shasum*

If you see a message "no such file or directory", then you need to follow these next simple steps to create a bash script replacement for the missing file. Otherwise, if you have the shasum binary file, skip to "Ready-Set-Go" section

You should also check to see if you have the sha256sum binary, as you will need it to be present!

> *ls /usr/bin/sha256sum*

Hopefully, you will see a listing returned for this file.

As root user, use your favorite text editor, create a file named /usr/bin/shasum

You can use sudo nano or sudo vi for this. Add these two lines in the file and save it.

> *#!/usr/bin/bash*
> */usr/bin/sha256sum $3*

You will need to set this new file to be executable with this:

> *sudo chmod +x /usr/bin/shasum*

That should now allow the md380tools scripts to run on Fedora. That bash script becomes a replacement for the missing shasum binary, and just redirects it to the newer sha256sum program.

One more thing! The current instructions for installing md380tools on Fedora are missing something quite basic! It appears that Fedora 26 (the current version as of this document) does not have Python installed by default. You will need to install Python too!

> *sudo dnf install python*

Ready-Set-Go

Logout of your terminal by running the exit command:
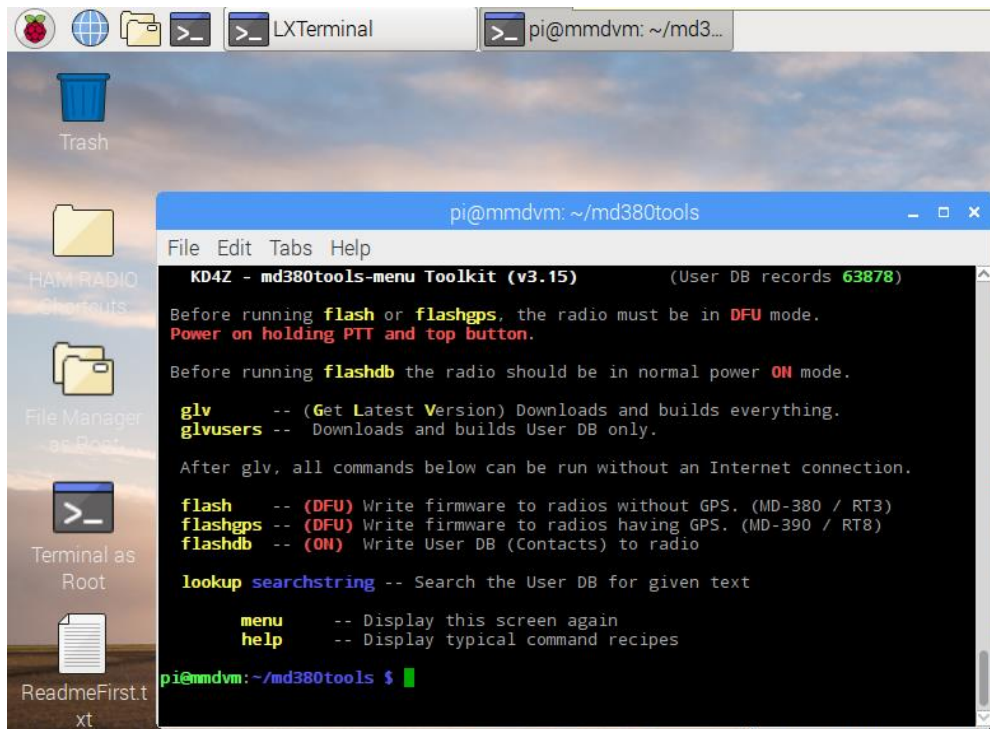
> **exit**

Login again or open a terminal window again.
Run the main glv command in the KD4Z Toolkit: **glv**

You see a lot of scripts running and source code flying by!
When all of that is done, you will be left back at the Linux prompt. Remember, to display the menu again, at any time, run:

> **menu**

You should see this screen:

In this example, I installed the KD4Z Toolkit scripting in Russell's excellent *KB5RAB MMDVMHost* raspberry Pi image.
He already had the stock md380tools installed, but I wanted to have full use of the KD4Z Toolkit as well.

The commands are exactly as described in the installation documentation for the KD4Z/md380tools-vm project as described in this tutorial.

If you want to have the menu automatically display when the terminal window is opened, you can add this line at the end of your *.bashrc* script using your favorite editor. Don't miss the dot at the beginning of the filename.

If you have nano: (or use vi if you prefer):

    nano .bashrc

Go all the way down to the end of the script, and add this line:

    ~/md380tools-vm/menuopts

Then save and exit with Control+X, press y, then press Enter.

Enjoy.
73 de KD4Z
Warren Merkel
revision 1.0 3 February 2017
revision 1.1 18 June 2017
revision 1.2 27 July 2017

Questions & Answers[1]

Q: How do I login to the tools via Linux with SSH
A: The username is **tyt** , the password is **tyt** Since it is Linux, it is case sensitive, use lower case!

Q: After flashing the custom firmware, I have a blank screen on the radio
A: Probably you flashed the wrong version (non-GPS/GPS) into your Radio. Don't panic, just flash your radio again with the correct version custom firmware.
Occasionally this could be a hardware failure: the flat cable between the radio board and the screen are not proper connected anymore. Look on YouTube how to repair.

Q: Do I have to upgrade to v4 or can I stay on the version 3.xx
A: You can stay on version 3.xx but you don't have all the Toolkit extensions and the better working VirtualBox environment. It is not yet known when support for v3.xx will stop, but for sure we will make an announcement for that.

Q: Firmware is behaving odd and/or the userDB isn't correct.
A: Before any flash or writing to your radio, switch it to an unused / unprogrammed channel and switch off any hotspot in your surroundings; then flash or write again.

Q: Is there a 'native'Linux version available and where to find?
A: If you are linux savy, and would rather just use the scripting framework on your existing Linux box, see the linux install pdf document for brief installation instructions (https://github.com/KD4Z/md380tools-vm/raw/master/MD380tools_Menu_installation_on_native_linux_KD4Z.pdf) . This allows you to use your existing linux environment such as Debian, Ubuntu or Raspian on a Raspberry Pi, there's no difference in terms of functionality between the various versions. The guide will describe how to install exactly the same scripting framework used in the VM. Once installed, it will self-update in the same way the VM does.

Q: Where can I find the link for the latest info for both documentation and software?
A: Go to the GitHub project page from Warren Merkel (KD4Z)and scroll down for more info:
https://github.com/KD4Z/md380tools-vm

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[1] If your question is not answered in this tutorial, put your question on the Support group for The Toolkit:
https://www.facebook.com/groups/KD4ZToolkit/

Document history and Disclaimer / Copyright

Document history

Version	Date published	Author	Remarks
1.0	Dec 29, 2017	RvR	First publishing
1.0a	Dec 29, 2017	RvR / WM	Corrected some typo's
1.0b	Dec 30, 2017	RvR / WM	Added install notes for native Linux (Toolkit v3.xx only!) from Warren Merkel

RvR   = Rob van Rheenen | PD0DIB
WM   = Warren Merkel | KD4Z