Update your MD-380 / Retevis RT3 or

MD-390 with GPS / Retevis RT8 with GPS

using a Windows machine and Linux VM

This project is a fork of https://github.com/kd0kkv/md380tools-vm. Thanks go to KD0KKV for releasing the first VirtualBox image that got me interested in doing updates under Windows in the first place. It appears that Travis Goodspeed and Friends may be creating actual Windows binaries, so the usefulness of this VM may be reduced in the near future.

These steps allow you to use MD380tools to keep your radio up-to-date using a Windows based system instead of a linux or Raspberry Pi machine. Actually, you will be running linux in a Virtual Machine to do this.

I've been asked time and time again, "How do I do this with Windows" and so here it goes. I've just documented this stuff as text for now in order to get it out there. As time permits, I'll add screen shots and make it pretty later.

You could freshly install any Linux distribution you like in VirtualBox, however I recently ran across the image made by KD0KKV, and thought it was useful. I created this fork to enhance the image to support MD-390 radios with GPS and provide more detailed instructions in its use.

Step 1: Download the image file containing the VM

You need to download the VirtualBox Appliance image file from github.

With your favorite web browser, navigate to: **https://github.com/KD4Z/md380tools-vm**

Download the image file from the Dropbox link mentioned on that site.

Currently it links to: **https://dl.dropboxusercontent.com/u/24789865/VM/tyt_kd4z.ova**

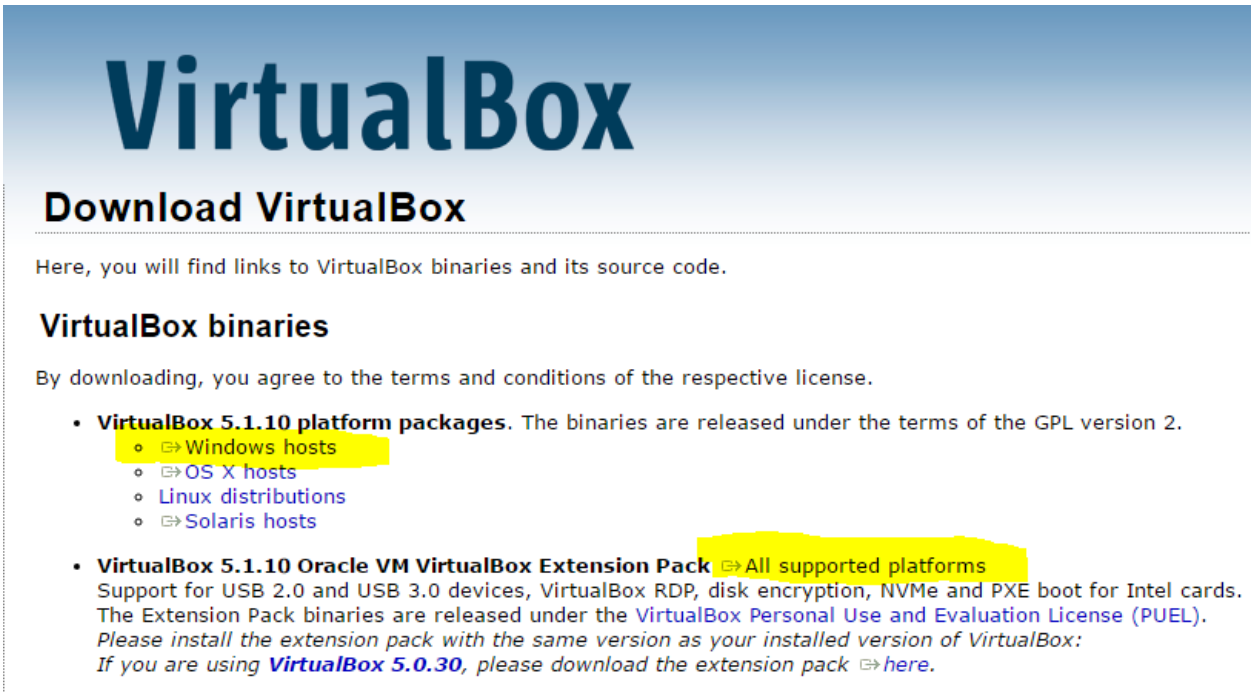
You will end up with the file named tyt_kd4z.ova. It's 811MB, so it may take a while to download. Save it where you can find it again. If you have trouble getting this large file to download, you may optionally download it in parts. You will need to use the RAR utilty to extract / combine all of the parts back into the original appliance image file.

This PDF document is also linked in the github page, so you can always find the latest version posted there.

Step 2: Download VirtualBox

Download and Install Oracle VM VirtualBox on your system. It's a free download from:
https://www.virtualbox.org/

Choose the appropriate version of VirtualBox for your OS. If you are reading this, you likely are interested in the Windows version. At the time I wrote this, version 5.1.10 was the current version.



Download the installer for Windows from the highlighted link “Windows hosts.” Install it as you normally would any other application. You will need to be a local Administrator on your workstation.

Step 3: Install the Oracle VM VirtualBox Extension Pack.

You must download and install the VirtualBox Extension Pack as well. Click on the other highlighted link “All supported platforms,” and save the Extension Pack file. Double-click on the Extension Pack file after downloading to install it.

I had trouble installing version 5.x when I was upgrading it from 4.x a version already on my workstation. See **Known Issues** below for what I had to do to get past a rather nasty blockage.

Step 4: Reboot your workstation

It might be prudent to reboot your workstation at this point. It shouldn't be required, however doing so may be helpful in making the USB device enumeration go smoothly in the next few steps. Might as well do it now, before starting up the VM for the first time. If your radio isn't connected with the programming USB cable, do so now. Turn the radio on normally for now. Let it sit while you are doing the other steps. It takes Windows a long time to install the USB driver the very first time.

Step 5: Import the Virtual Machine Appliance Image file

Launch Oracle VM VirtualBox Manager.

From the File menu, choose "Import Appliance." Click on the file folder button to browse for the image file. Navigate to where you saved the tyt_kd4z.ova file, select it and choose OK.

Take the defaults for everything else. It will take a few minutes to complete the import. When completed, you will see a VM listed in VirtualBox Manager as a linux VM having the name "tyt."

Don't start the VM yet. You need to check the configuration of the network adapter first. These settings worked for my situation, however you may need to tinker to get it to work on your hardware.

With the tyt VM selected,

Click on Settings in the Oracle VM VirtualBox Manager

Click on "Network" on the left side menu.

Click on "Advanced so you can see everything.

Change the values for Adapter 1 to these if not already set that way:

Attached to : **NAT**

And under advanced,

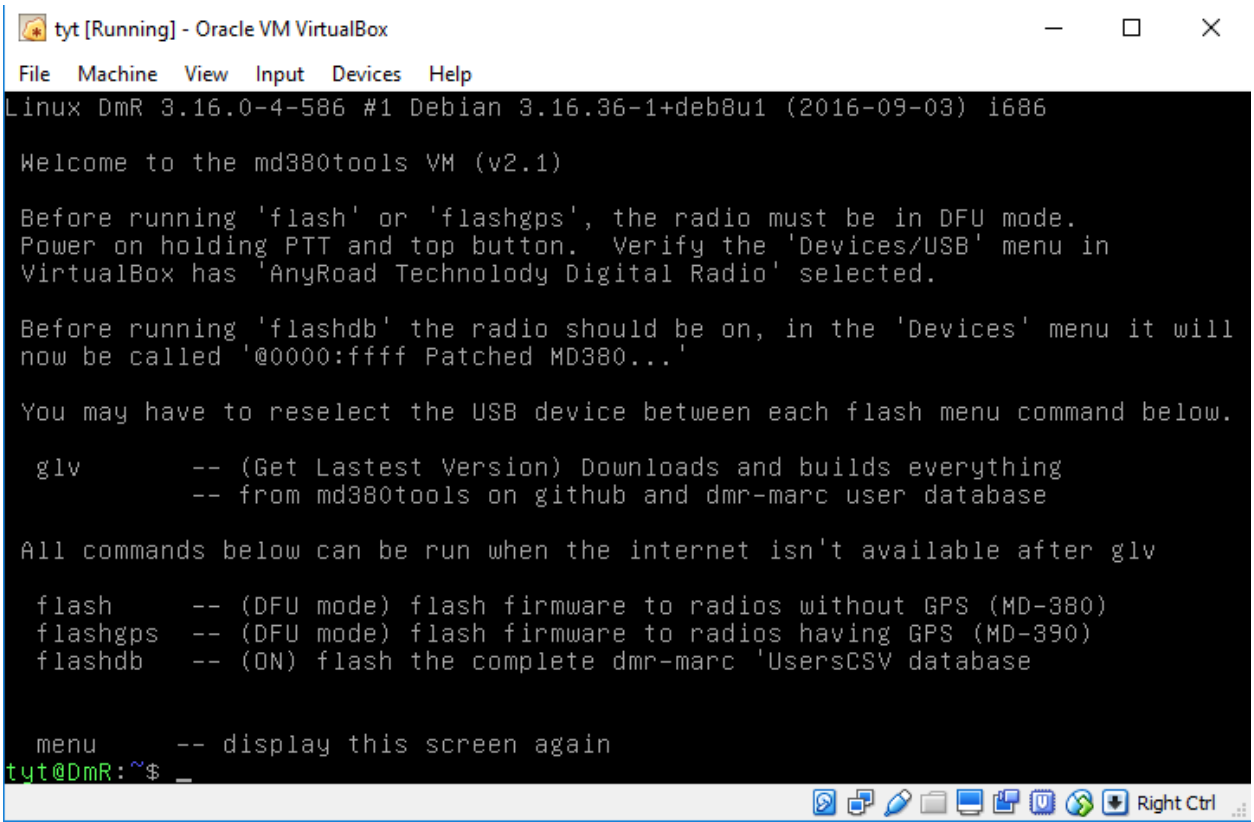
Adapter Type: **PCnet-FAST III (Am79C)**

Click OK.

As far as System memory goes, this image is very small and actually will run at the default setting of 256MB, so no need to adjust it higher.

Step 6: Start the VM

Now start the VM by clicking on the Green Arrow toolbar icon. You want to leave it set at the default option of “normal start.” After the VM finishes loading, you will be presented with a menu screen of options.



Notice that you have a linux prompt in the lower left corner of the VM window. You should be automatically logged in with the user “tyt” The “@DmR” indicates the host name of the VM is “DmR.” The prompt will look like this:

tyt@DmR:~$

If you are new to linux, note that commands are Case Sensitive! In this VM, every command is in lowercase.

The VM has a screen saver that completely blanks the screen. When the screen go all black, don't panic. Press the ESC key to get back to your screen.

To safely shutdown the VM, try not to “X” the window away. Instead, choose "ACPI Shutdown" from the “Machine” menu. This will be the only correct way to shutdown the VM as you are not running as root.

You can run the **menu** command anytime you need to see the options again.

Step 6: Verify networking is working

You will need to verify that you have the network adapter working and can get to the Internet.

Try pinging a well-known host. Type this at the prompt.

ping www.google.com

Press Ctrl+C to stop the ping command after a few lines go by.

If you get successful ping replies, you are good to go. If nt, look to see if your network adapter received an IP address from your router.

/sbin/ifconfig

The network adapter is "eth0". The ifconfig command should show that you have an IP address associated to eth0. If not, you will need to tinker with the Network adapter settings until you get connectivity. Start Googleing for resolution ideas if this is the case.

In order to run the commands in the VM, you will need to have the VM successfully connected to the Internet. Don't bother continuing until you can get ping responses.

Now what?

The VM can be used to manually run any of the available commands provided by the MD380tools project. However, a menu of commands has been provided to make operations much simpler for beginners.

***** MENU OPTIONS (for noobs) *****

glv - (Get Latest Version) Downloads all required files from the md380tools project on github.com. It also compiles the firmware files for both types of radios. (non-GPS and GPS enabled) Finally, it downloads the current worldwide dmr-marc user database, and prepares it to be sent to the radio.

Nothing happens to the radio with this command. You must always do this step first, and watch out for any errors before continuing to the next command. This step may take a minute or two to finish. Don't worry about all of the gobble-gook scrolling by --that is totally normal.

When the glv command is finished, you have all you need to flash and update radios in the VM. The Internet connection isn't needed for any of the remaining commands.

flash (DFU Mode) - Flashes the firmware to NON GPS radios. Use this for MD-380 and MD-390 radios that do NOT have a GPS. Your radio must be in DFU mode for this command. See the next section "DFU Mode" for the simple procedure to start your radio in DFU mode.

Check the USB Device menu to make sure the device for the radio is selected, before executing this command.

When actually writing to the radio, a value indicating percentage of completion will indicate progress. It should take less than a minute to complete this process.

flashgps (DFU Mode) - Flashes the firmware to GPS enabled radios. Only use this command for radios that has GPS support. If you flash this by accident, your non-gps radio will hang at startup. (Ask me how I know this!)

Your radio must be in DFU mode for this command. Like the flash command, check the USB Device menu to make sure the device for the radio is selected, before executing.

flashdb (ON) - Flash the user database to radio. You can use this command on any supported model of the radio.

The radio is in the turned on state, not in DFU mode. But you still need to check that the USB device as noted before entering the flashdb command.

The USB device may display differently than in DFU mode. It will be listed something like @00000010:ffffffff Patched MD380

When running, it will first erase the flash area for the user contact data, then flash in the new user contact data. This will take a few minutes to complete.

When it first starts, a count of how many contact records are being written will be printed. At this point, you should sit back and say "*Wow*" to yourself.

Your recipe will be to run three commands, one at a time, in sequence. Follow any directions displayed to restart the radio when done with the **flash, flashgps and flashdb** commands.

After running a command, you can execute the **menu** command to see the menu options again.

MD-380 Recipe: **glv**, **flash**, **flashdb**

MD-390 with GPS: **glv**, **flashgps**, **flashdb**

At this point, you are done! If you are going to flash multiple radios, there is no need to run the **glv** command each time. Just run the appropriate flash command for each radio type.

As mentioned above, the glv command pulls down everything needed from the Internet, and compiles the latest firmware and contact user data file. You can run this command anytime you want to bring down the latest features / bug fixes / user data.

You don't need to use the **flash** or **flashgps** commands every time. Likely, all you may want to do is **flashdb** when you start seeing DMR IDs that are showing up as “Unknown ID” instead of the usual name / callsign data. Just run **glv**, then **flashdb** to keep your radio up-to-date.

***** Fun Times *****

If this is the first time you have flashed the MD380tools firmware into your radio, you will need to enable a few new settings to fully utilize the new abilities. Go into the radio *Utilities* menu and navigate to the new sub menu item *MD380tools.*

You will need to enable the menu item *UsersCSV.* This enables the new firmware to utilize the massive contact database now stored in your radio. Currently, that includes almost 50 thousand records from the DMR-MARC user registry. When this option is disabled, the contacts embedded in the code plug are used as did the stock firmware.

Other fun things to do in the MD380tools menu:

Change Date Format to: **Alt. Status**

> It's all the way down at the end of the scrolling list of date formats. This turns off the Date and Time display and shows you Last Heard information instead. Trust me, you will like this.
>
> You will notice the date and time display will be gone, to be replaced by: "lh" followed by the call sign, and an arrow pointing to the Talkgroup number they were using.

Promiscuous Mode: **Enabled**

> This is the feature that started it all. Enable it to hear any activity on the time slice of the channel you have selected. Any talkgroup will come in, so be sure to look at the Last Heard data to see <u>where</u> they were talking before going back to them. It's a lot like having Scan enabled all the time.

Edit DMR ID:

> You can now change the radio's DMR ID without using the CPS software. Handy if you need to switch identities in the field.

Mic Bargraph: **Enabled**

> This enables a cute flashing VU Meter when you are transmitting. Use it to see how hot your voice level is and adjust your mouth-to-radio distance or voice to make it consistent. Digital radio voices that are too hot sound awful, so use this feature as a reference for good operating practice.

**** DFU Mode (aka Download Firmware Mode or Bootloader Mode) ****

If your radio is ON, turn it off and connect the USB cable to your radio and your computer's USB port.

Hold down PTT and the Upper user programmable button at the same time, then power the radio back ON. The busy LED should be flashing Red/Green. If the busy LED isn't flashing, turn the radio off and try again.

From Devices menu in the select USB, then "AnyRoad Techology Digital Radio" if you see it, or anything mentioning the MD-380. The menu should show a check mark in front of the radio selection if you were successful.

I received an error every time I tried this setup the very first time. See the Known Issues section below for possible tips to get past issues I encountered. You must have the USB port selected before continuing with the rest of the firmware update steps.

Note that when the radio is simply powered on, the USB device may display differently than in DFU mode. It will be listed something like @00000010:ffffffff Patched MD380. This is normal, and you would want to have it selected so you can perform run the **flashdb** command.

***** Power users *****

If you aren't into using hardwired menus. You can forgo using the menu commands completely and follow the notes that Travis has clearly documented here:

https://github.com/travisgoodspeed/md380tools/blob/master/README.md

In a nutshell, this VM will have all the of the MD380tools project files, so you can build, and flash new firmware and users by following the directions starting with "Flash updated firmware for linux based installations" in the README.md file on Travis Goodspeed's github page. (This should be required reading by the way.)

Just change to the MD380tools directory if you want to manually before invoking any of the commands provided by MD380tools.

Observant users may notice a shell script named l**ookup** in the tyt home directory. This little wrapper script allows you to do quick case-insensitive searches in the user database.

usage:

. /lookup data

Data can be anything in the dmr-marc datafile. Callsigns, names, city, or DMR-ID will work.

For example:

./lookup kk4vcz

./lookup travis

./lookup 313180

***** Known issues *****

When installing VirtualBox 5.x, the installer got stuck with an error dialog that stated:

> *"The application "iphlpsvc.dll" needs to be closed for the installation to continue"*

If you run into this message, you may be able to solve it without canceling the installation.

Go to your search box in Windows and search for "*View local Services*" Launch the Services Snap-in. Scroll down and find "*IP Helper*", Click on "*Stop Service*"

Then click on Retry. You also may cancel the installation and run the VirtualBox installer again. It will likely think the last install was partially finished and offer up "*Repair*" or "*Remove*" options. Choose "**Repai**r" and it will run the installer for you again and finish things up. You can restart the IP Helper service after Virtual Box has finished installing.

You might just want to stop the IP Helper service ahead of time to avoid this issue.

Those stupid USB devices!

I ran into another issue where I couldn't get the USB port to attached to the radio. USB devices seem to be the hardest issue to overcome with Virtual Machines in general. The USB driver for the MD-380 was no exception.

You may have to do these steps with the radio connected and turned on:

> From the Devices menu in the tyt VM window:
>
> Choose Settings | Ports | USB | USB Settings ...
>
> Click the icon on the right side with a USB plug and a + sign, to add a new USB Filter
>
> Choose the device which cannot be attached. (*Patched MD380*)
>
> Click on the next icon down from the + icon, it looks like it is a USB plug with a dot.
>
> This should bring up a window that allows editing of the USB device properties.
>
> Clear all fields **except the name**, and click Save.
>
> Unplug the USB device. (***You must do this!***)
>
> Plug in the USB device again.
>
> Go back to the Devices | USB menu, and try to attach the USB device again.

If this doesn't work, shutdown the VM, then restart it and try again. Still stuck, I'm out of ideas, start Googleing.

I had to do the unplug / plug back in dance a few times in order to get the USB Device selected.

When you get a check mark in front of the radio device, you are good to go.

Good luck and your mileage may vary! Note that you are responsible for issues experienced with any of this. Use the MD380tools Yahoo forum to post questions.

If you run into Travis Goodspeed, KK4VCZ be sure to buy him a beer for his trouble. I'd accept the same for mine.

73 de KD4Z

Version History:

1.0 December 9, 2016

Release of documentation only.

2.0 December 13, 2016

Initial release of forked project.

2.1 December 16, 2016

Removed the “flashlast” commands. Refactored the glv command to compile everything needed. The compiled firmware bin files are copied to the tyt home directory for use by the flash commands. You can use ftp to copy them elsewhere if desired.

Refactored the flash, flashgps and flashdb command to be executable when not connected to the Internet.