

Tech Note

Adjusting squelch calibration in MD-380 / MD-390 / RT3 / RT8 DMR radios to resolve reception issues encountered with version 5 hardware models.

SYMPTOMS:

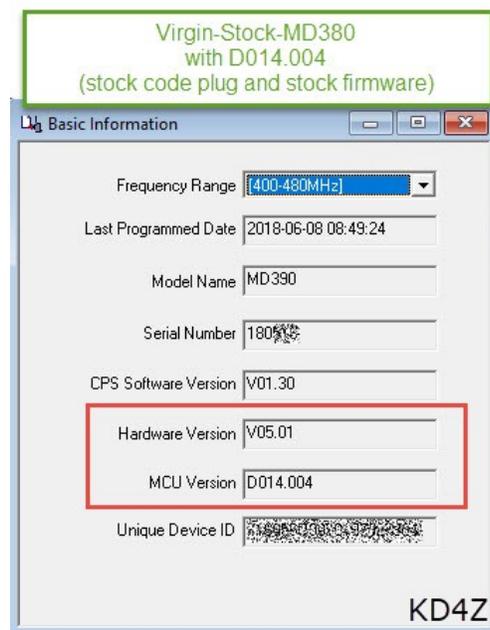
After the radio is updated with any custom firmware based on OEM version 013.020 firmware, the radio seems to stop receiving transmissions approximately 5 seconds after last activity. This includes all MD380tools based custom firmware, and possibly other variants.

Normal reception is restored briefly by adjusting the channel encoder or pressing one of the keyboard buttons. However, the radio falls silent soon thereafter.

Another symptom is the green activity LED does not illuminate during reception. If the radio is then flashed with the original OEM version 014.x firmware, normal operation resumes.

HARDWARE AFFECTED:

Models that shipped with OEM firmware version 014.x are affected. The hardware version from the Basic Information page in the TyT CPS application also may indicate V05.x.



WARNING



The procedure described below may affect your radio in undesirable ways. You will be accessing a settings screen that is used by the factory during the manufacturing process.

These setting values were determined by specialized measurement equipment of which you are unlikely to have access to.

Before changing any values, document existing values with a screen shot or other permanent documentation method.

ITEMS NEEDED:

CPS software from tyt888.com

MD-390 SOFTWARE 0321

<http://tyt888.com/uploadfile/upfiles/20170321133947.zip>

Note: Version 1.37 works with both MD-380 and MD-390 models.

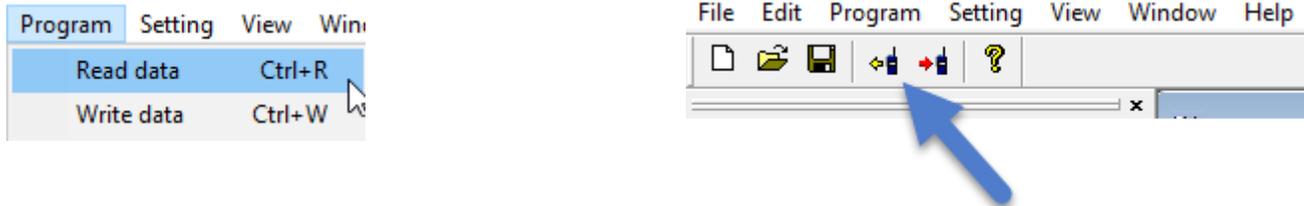
(Without or with GPS) Only a Windows OS version is available. Use the Retevis CPS if you have an RT3 or RT8. The remaining instructions assume use of the TyT CPS.

Programming cable suitable for your radio model.

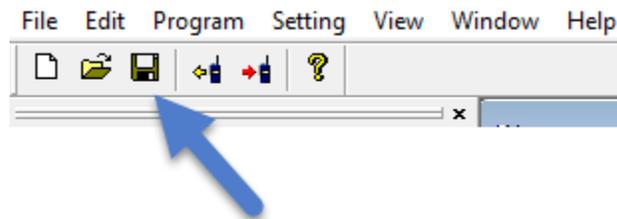
That's it. Likely you already have the CPS program installed. If not, download, and extract the zip file into a temporary location. Then, run the installer as usual. It's name is: CPS MD390 Setup v1.37.exe

STEPS:

Connect your radio, and turn the power on. Verify that CPS can read your radio by executing the Read command from the *Program* | *Read data* menu selection or just click the toolbar icon.



You might take this opportunity to save the code plug data you just read out to a file. Click the Save icon (floppy disk) and give it a suitable filename.

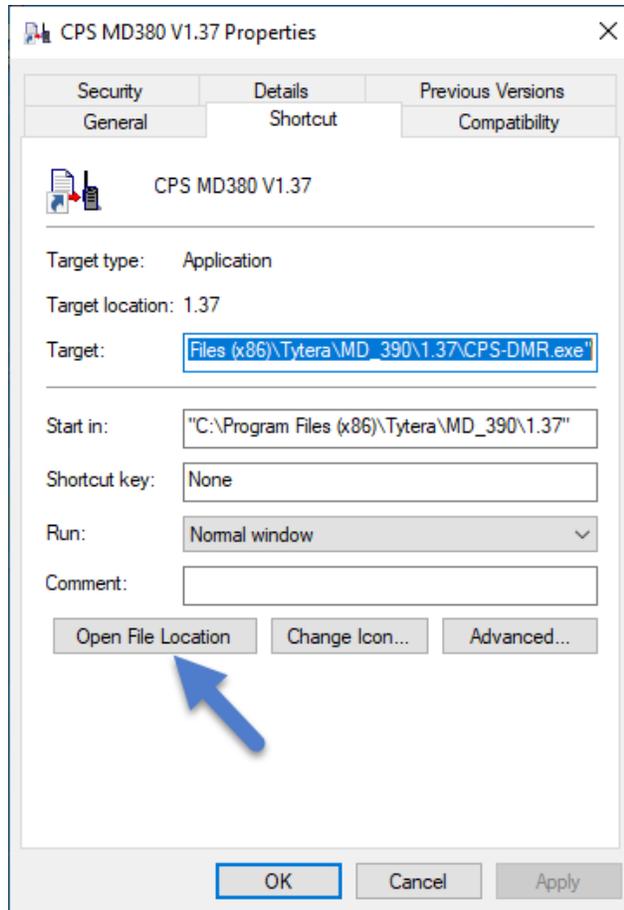


Now, close the CPS program.

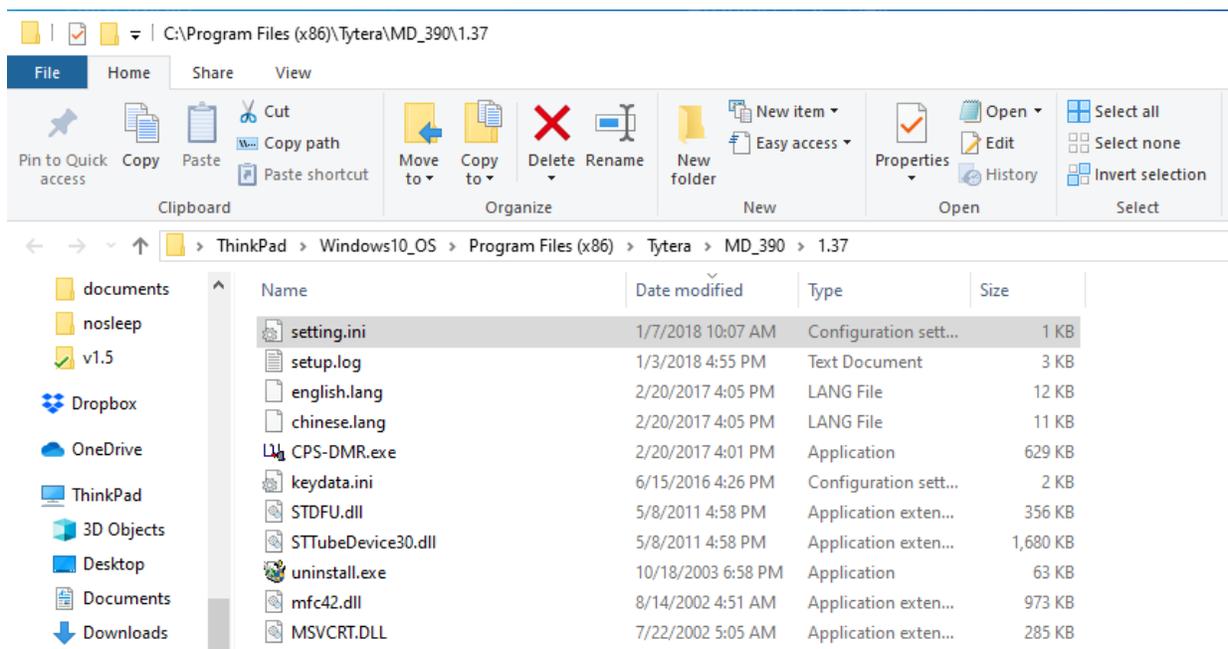
You now need to make a slight edit to the “settings.ini” file located in the program directory with the CPS program. To find the file location, locate the icon for CPS on your desktop, **right click** on it.



Select **Properties** from the pop-up context menu.

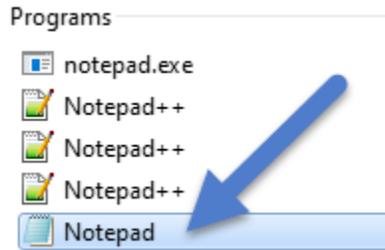


Click on the **Open File Location** button. Your location could be different, but the files should be the same. Make note of this location.

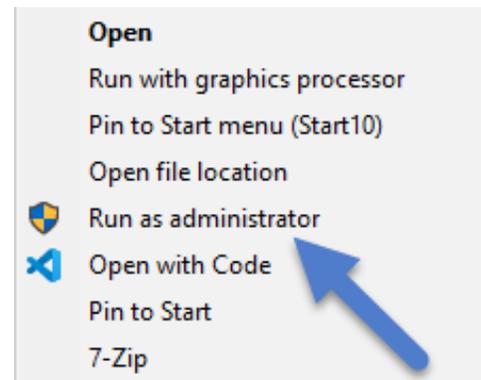


Click on the Start button in the lower left corner of your screen. Choose “Search” if it offers it to you or just start typing the word “notepad”. A windows search should begin, resulting in a list of files named notepad on your computer.

Hover the mouse cursor over the program line containing Notepad.exe and then **Right-Click**. The context menu should pop-up.



Now, **Left-Click** on *Run as administrator*.



If you are prompted by Windows to allow the program to “*make changes to your computer*”, choose “Yes.” The Notepad program should now be open with a blank document. You need to run Notepad as administrator because you will need to have elevated permissions to save changes to the settings file.

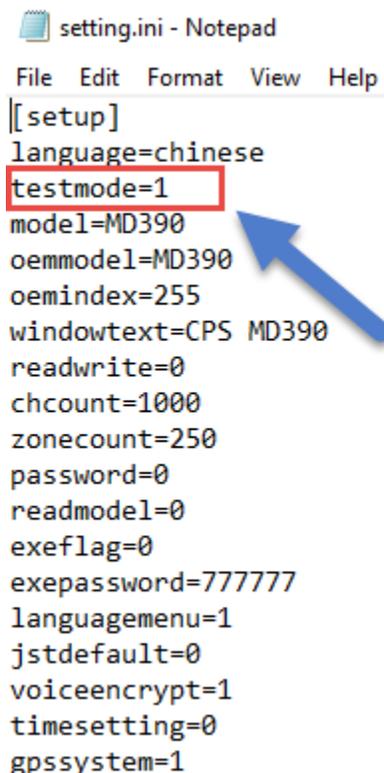
Use the *File | Open ..* menu in Notepad to navigate to the Program Files directory you noted above for the CPS program. Choose the file “settings.ini” and open it in Notepad.

Your file will look similar to this. Scan down the [setup] section looking for a setting called “testmode”.

If found, change it to “1”

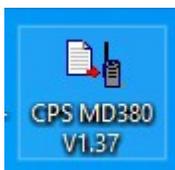
If not present, add a line as shown here.

Save the file and close Notepad.



Next, verify your radio is still connected to your computer with the programming cable, and is powered on.

Launch the CPS program again.



Here where the fun begins.

Press Ctrl + T at the same time. It takes a moment for the CPS application to connect to the radio, and retrieve the calibration data.

If you get a “connection failed” error message, try Ctrl + T again. If you still get the connection error. Turn off your radio, **remove the battery** for a few seconds, then replace it. Power the radio back on. Now try Ctrl + T again.

You should be presented with the *Test Mode* screen. The data values are specific to your radio, so don't worry as the numbers certainly will be different than mine.

WARNING: The values in this screen are set at the factory and are specific to your radio. Do not copy values from radio to radio!

Make a screen shot of your original values here for safe keeping. You can always put them back in. However, the risk is on you if you mess up.

Tight Squelch
Normal Squelch

Func Para/Freq	1	2	3	4	5	6	7	8	9
Rx Freq	401.03500	411.03500	421.03500	431.03500	441.03500	451.03500	461.03500	471.03500	479.99500
Tx Freq	401.14500	411.14500	421.14500	431.14500	441.14500	451.14500	461.14500	471.14500	479.95000
VOX 1					10				
VOX 10					150				
Rx Low Voltage					137				
Rx Full Voltage					173				
RSSI 1(-120dBm)					75				
RSSI 4(-70dBm)					130				
Analog Mic					123				
Digital Mic					127				
Freq Adjust(High)					98				
Freq Adjust(Mid)					107				
Freq Adjust(Low)					110				
Tx Hight Power	139	138	138	137	136	139	143	140	137
Tx Low Power	88	85	82	82	82	78	75	72	69
Rx Sentivity	110	125	140	160	180	191	203	218	233
Open SQL 9	4	4	4	14	25	14	4	4	4
Close SQL 9	9	10	12	11	10	9	8	9	11
Open SQL 1	20	21	22	23	25	24	23	27	31
Close SQL 1	37	34	31	34	37	34	32	33	35
Max Volume	3	3	4	4	4	4	4	4	4
CTCSS(67Hz)	40	39	39	38	37	36	35	34	34
CTCSS(151.4Hz)	47	46	45	43	42	41	41	40	40
CTCSS(254.1Hz)	63	63	63	60	57	55	54	53	53
DCS Mod2	100	100	100	100	100	100	100	100	100
DCS Mod1	33	31	30	29	29	28	28	28	28

Squelch calibration value changes that may be needed for v5.x hardware MD-380 / MD-390 radios using custom firmware based on 013.020 firmware.
If your values in these two boxes are less than 25, you may be experiencing the "5 second sleep" issue. Make note of your original values before changing anything!

The two fields have similar meaning, but are specific to the memory channel's setting for Squelch: Normal or Tight
You may need to adjust both of them upward. Start by adding 8 to the original value. Click Write to save it to the radio. Only adjust upward until you get reliable results.

Open Test Data Save Test Data Enter Adjust Read Write Cancel

At this point, take a screen shot of this window **NOW**. You can use the “Snipping Tool” in Windows to do so. Save this screenshot with a filename denoting it is the original factory calibration values.

Note, I have added a LOT of informational text to this screen shot that won’t be on your screen!

The important values that we want to change are on the lines labeled *Open SQL 9* and *Open SQL 1*. These values correspond to the “Tight Squelch” and “Normal Squelch” selections for each channel memory. In case you have set some of your channel memories to “Tight”, we will need to change the values in both places.

They are likely different values from each other right now.

The only important ones are the values in the column with complete information. In my sample screenshot, that is column #6. That may vary, depending on what frequency band your radio is configured for. Just use the column that has full values and ignore the other columns.

The next part is not scientific. You may need to experiment a little to obtain success. As a guide, try taking the original value, and add 8 to it, and edit the value in the box.

My radio began to operate normally with the edited numbers equal to 24. I added one to that value to make sure it didn’t fall back over the edge. So for this radio, they both ended up as 25.

When you are ready to save the new values back into the radio, click the *Write* button. The complete set of values will be written back to the radio and it will reboot.

The easiest way to test out the changes is with another radio. Select the same simplex frequency on both, and transmit from the other radio, and see if the receiver opens up. You should be able to wait only about 10 seconds and try it again. If the operation seems normal, you are done! If not, go back into the Test Mode screen and increment each of the two values until the radio acts normally.

Finally, I would go back into the Test Mode screen, and take another screenshot. Save it with an appropriately different filename denoting the fixed values.

Since we just changed the thresholds for Normal and Tight squelch, it is possible that they won’t act as they were originally intended.

Fortunately, these calibration values persist, even if you update the firmware.

You are done. Be sure to document what you have changed, so you can retrace your steps in the future.

Warren Merkel, KD4Z

Document revision: 1 31 October 2019

This document may change as more feedback is received. The latest version of this document can be found on the KD4Z Toolkit project page on Github here:

<https://github.com/KD4Z/md380tools-vm>

Be sure to visit the support page for the KD4Z Toolkit on Facebook here:

<https://www.facebook.com/groups/KD4ZToolkit/>