

Using NaP3 with the Yaesu FT-1000MP Mark V

This document describes the program “Mark V”, which makes it possible to for NaP3 to talk to the FT-1000MP Mark V. The program also provides for two additional programs to communicate with the Mark V simultaneously with NaP3 without interference. The program was written and tested on a Windows 10 system and should run on both 32 and 64 bit systems.

Program functions

1. Makes the FT-1000MP Mark V appear to be an Elecraft K2 to NaP3 and logging programs (has been tested with NaP3, DXLab Commander, FLDIGI, N1MM, CW Skimmer)
2. Allows up to three applications to access the Mark V at the same time over virtual serial ports with no interference
3. Allows any combination of filters to be selected in any Mark V mode (includes the function of the MPFilters program from K6SE [sk])

The program described here solves the requirement for NaP3 support of the Mark V CAT interface by making the Mark V appear as an Elecraft K2 to the other programs. It does not emulate 100% of the K2 CAT protocol, but includes those commands used by NaP3, FLDIGI and some logging programs. For example, a DXer can use the mouse on the NaP3 spectrum scope window to set both VFO-A and B or he can mouse on a DX spot in the logging program to set the transceiver to the desired band, frequency and mode. Or, he may want to tune VFO-B on the transceiver and have a moving marker on the NaP3 screen to show where VFO-B is tuned.

The program provides four serial port interfaces for connection to programs and all of those interfaces use the K2 protocol. Actions initiated in one of the connected programs are communicated to the Mark V transceiver and the other programs. For example, mousing on a DXLab Spotcollector spot will set the Mark V to the correct frequency and will also set the NaP3 frequency and mode. You must use one of the separate virtual Com port programs to set up the virtual Com ports needed to communicate between the Mark V program, and other programs.

Program Installation

The program is distributed as a Zip file containing a directory and two files. Unzip the file, extracting the files into a directory of your choice. Here's what your directory will look like after extraction of the files:

| Name | Date modified | Type | Size |
|-------------------|--------------------|----------------------|--------|
| Application Files | 1/25/2016 10:39 PM | File folder | |
| MarkV.application | 1/25/2016 10:17 PM | Application Manif... | 6 KB |
| setup.exe | 1/25/2016 10:17 PM | Application | 419 KB |

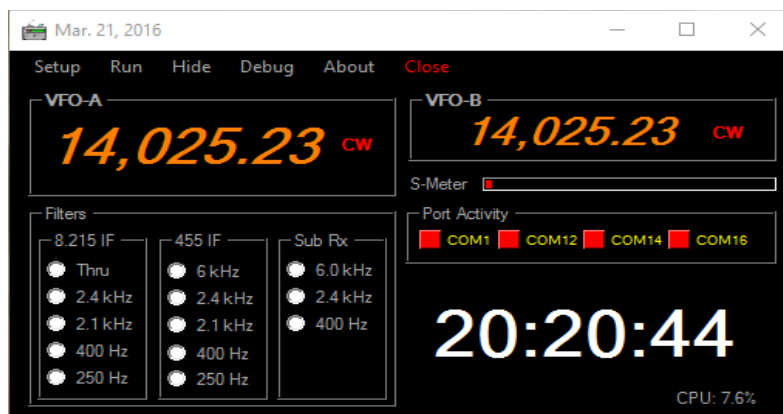
Double click on setup.exe to install the program. It will show up in the list of installed programs in the Windows Control Panel and you can uninstall it from there if desired. You may get a message saying you need to install the Microsoft .NET code and if you do, go ahead and install it. Mark V is written in Microsoft Visual Basic and the .NET code is the necessary runtime environment. You may already have it installed for other applications.

Virtual Com ports

You'll need a pair of virtual ports for each program that is to communicate with the Mark V program, and there are several free programs available to create the ports. I used VSP Manager by K5FR, but VSPE can be used as well as other programs. Create a pair of virtual Com ports for each application you'll be running. I use Com ports 12 and 13 to connect NaP3 to Mark V, ports 14 and 15 to connect Mark V to DXLab Commander and ports 16 and 17 for CW Skimmer.

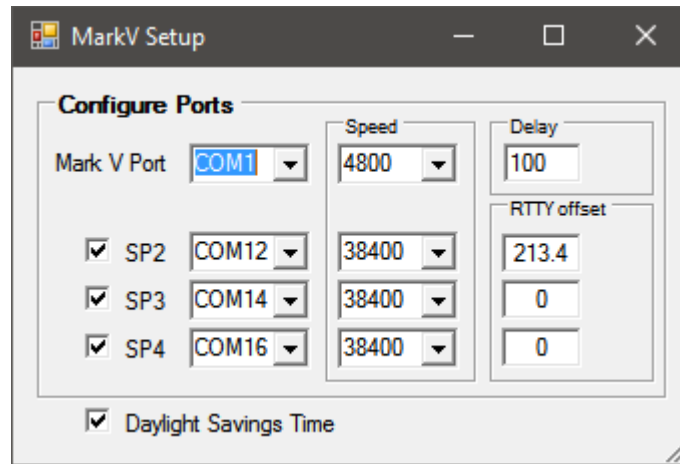
Program configuration

When you start the program, you'll first see the main window, which looks like this:



The frequencies displayed are fixed and will be replaced by the transceiver VFO frequencies when you press RUN. The white numbers are a UTC clock. The total CPU utilization is displayed in the lower right corner of the window and is updated every three seconds.

Now select Setup from the menu and you'll then see a small window like this:

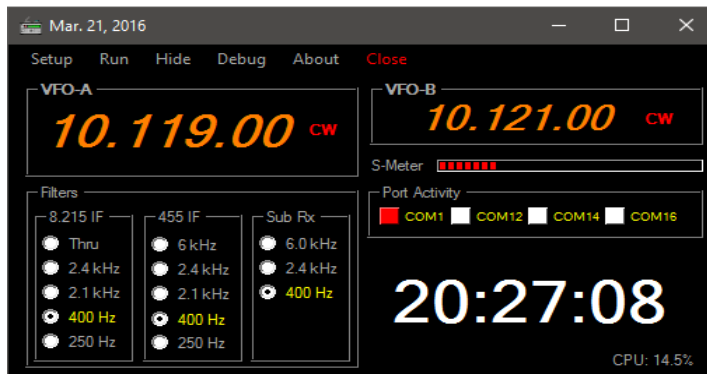


The first time you run the program none of the information will be filled in. Each of the boxes in which you see a Com port number will have a pull-down list of all the Com ports that Windows knows about in your system. Select the port the Mark V is attached to and then select one end of each of the virtual port pairs. The other end of the virtual port pair for NaP3 is Com 13 in this case and that's the port you specify to NaP3. The other Com port for your logging program port pair is the number you'll specify to your logging program. Specify the speeds as shown here. Leave the delay specified as 100 for best performance. Check the Daylight Savings Time box if your area observes DST. The UTC time displayed in the main window is derived from the PC time and will be incorrect if you fail to check this box when applicable.

When a properly tuned RTTY signal is observed in NaP3, the signal should be centered in the filter passband shadow and the zero line should line up perfectly with the right peak of the signal. With NaP3 set for a narrow enough frequency span to allow you to easily see the two signal peaks that are 170 Hz apart, you should then be able to mouse on the right peak of any signal and your RTTY program should then be perfectly tuned to the signal. With the K2, NaP3 applies an offset so that mousing on a signal will result in your RTTY program and the Mark V transceiver being incorrectly tuned by the value of that offset. So, the Mark V program allows you to specify a value to correct that offset and you may specify different values for each application you're using in the event that any of them also creates such an offset. I've found that the value of 231.4 corrects the offset perfectly for NaP3. You may run into such offset problems when you mouse on a spot in your logging program and if you do, you can correct it by experimenting with the offset value as shown in the setup window.

After you finish entering this information, close the window and your information will be permanently

saved. You'll now be back at the main window, where you can hit Run on the menu bar to start the program. Now your window should look like this:

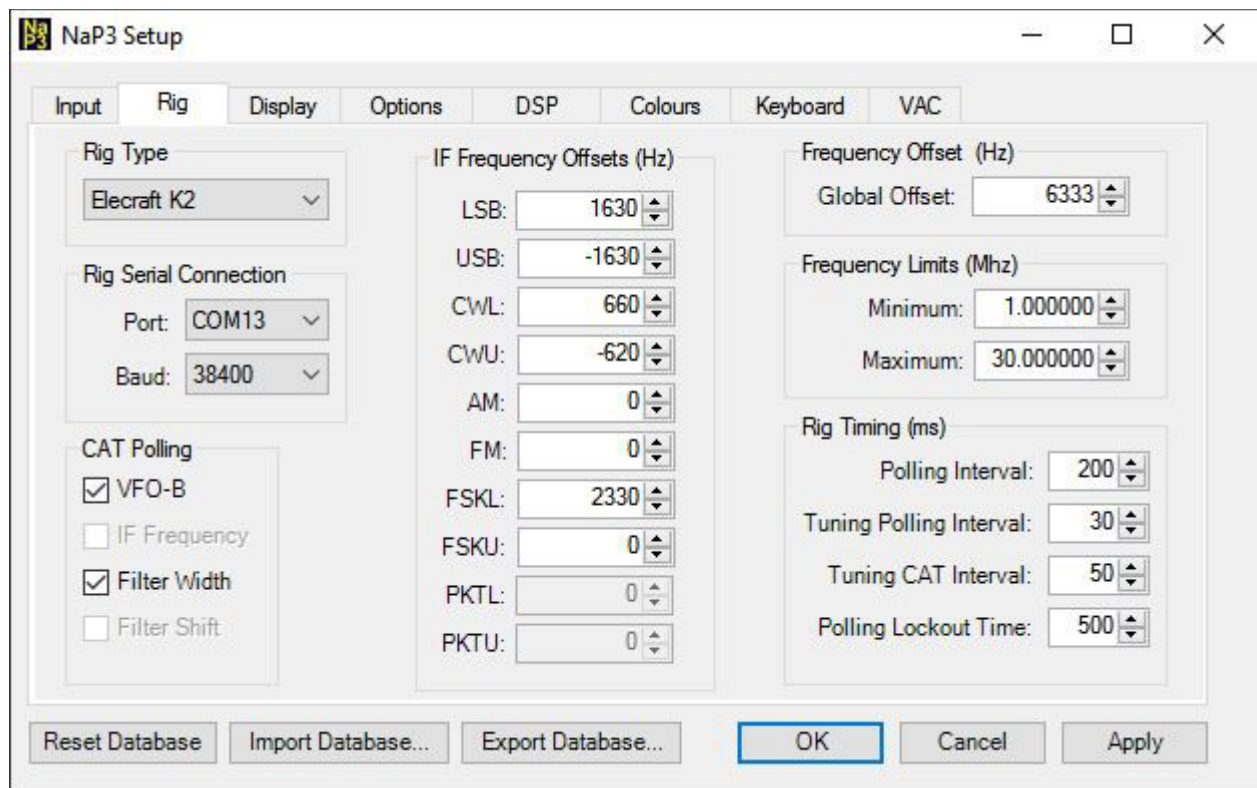


At this point, if you tune VFO-A or B on your transceiver, you should see the VFO frequency change in the window. The small horizontal bar below the VFO-B window reflects the S meter on the Mark V and if you're tuned to a signal that moves the S-meter, you'll see this red bar moving. The currently selected filters are shown in yellow. You can select any combination of filters in any mode using the buttons. The operating modes are also shown in the boxes to the right of the VFO readouts. Unless you're experimenting with filter selections, there's really no need to keep this window displayed and you can hide it by selecting Hide on the menu bar. Configuration information you entered on the Setup screen will be saved automatically when that screen is closed.

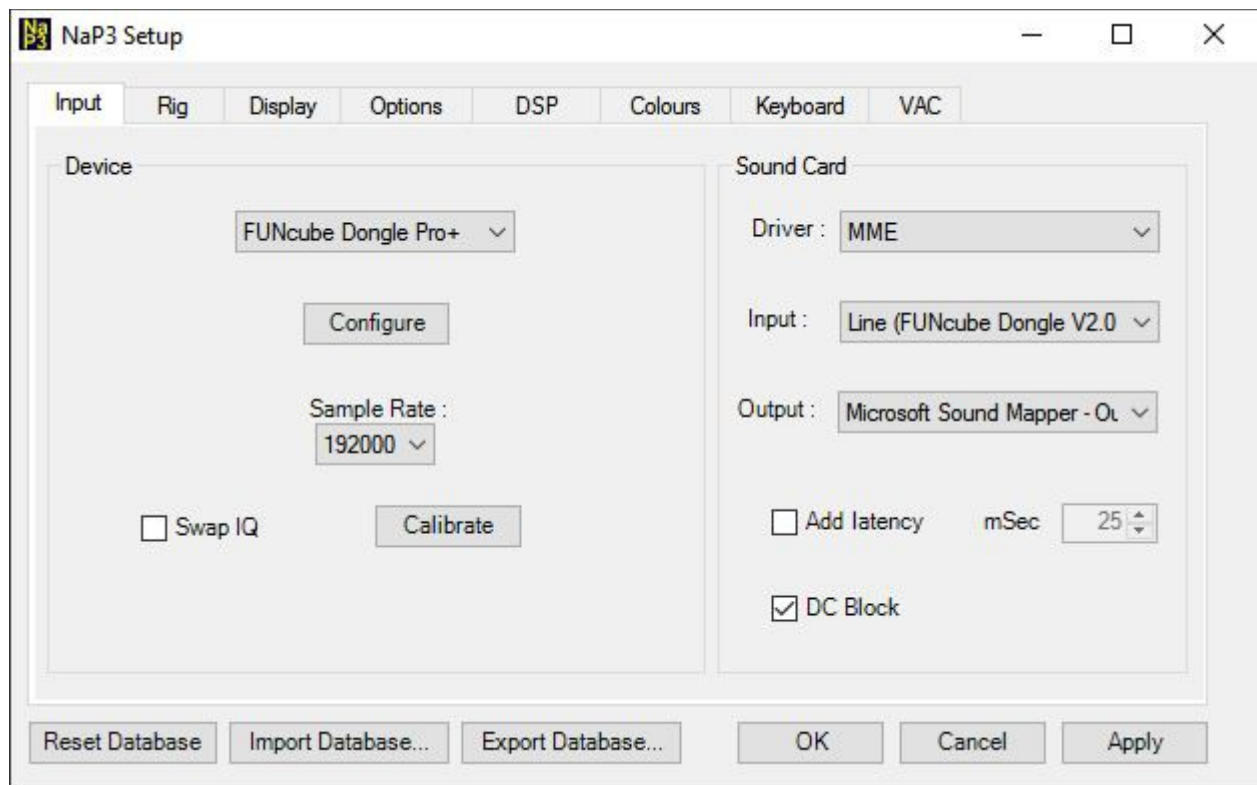
In the Port Activity section of the screen are flashing indicators showing activity on the configured Com ports. The first one represents the transceiver port and will be flashing regularly. The flashing of the other indicators is dependent upon the program attached to that Com port. NaP3 causes an irregular flashing, while Commander causes a regular flashing with the flash rate depending on the polling rate set up in the applications. Ports that are active will be flashing green, while inactive ports will appear solid red.

NaP3 configuration

Now start NaP3 and select Setup from the menu bar. You'll see this page under the Rig tab and you should fill it in as shown.

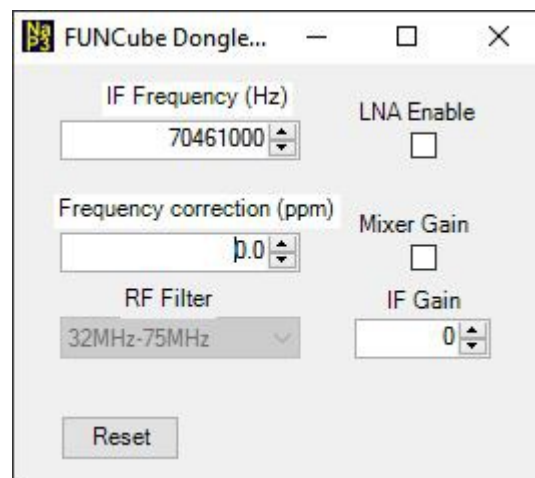


You may have to adjust the IF Frequency Offsets or the Frequency Offset for your system, but the values shown should be very close to what's needed. Next, go to the Input tab of NaP3 Setup and set the parameters for the Funcube Dongle Pro+ as shown in the following:



With the Funcube, you'll need to check the Swap IQ box shown above depending on the band you're on. It should be unchecked on 160 through 17 meters, and checked for 15, 12 and 10 meters.

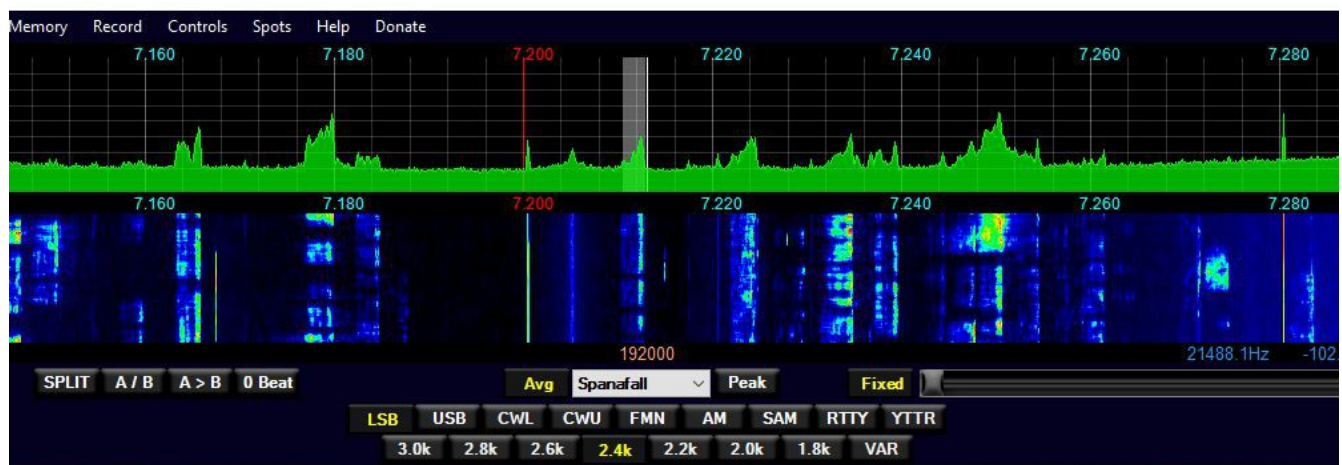
Next, we have to configure the Funcube dongle in NaP3 and you do that by pressing the Configure button seen on the page above. NaP3 then displays the Funcube configuration screen as shown here:



When I first began using the Funcube dongle, there was a center spike that the DC Block of NaP3 completely removed. After the Funcube had been powered up for several days, the center spike took on a fuzzy and wider appearance and DC block no longer completely eliminated it. You may or may not have that problem, but here's how I minimized the effect of it. First, I specified the IF frequency for the Funcube as 70.461 MHz as shown above, instead of the 70.455 MHz actual IF frequency of the Mark V. That, along with the IF offset values used in the NaP3 setup results in moving the center spike about 6 KHz to the left on the NaP3 display where it won't interfere with signals you want to see most of the time. You should leave the LNA and Mixer boxes unchecked and leave IF gain set to zero. If you check either box or set IF gain higher, you will run into IMD problems on the NaP3 display when the band is full of strong signals. That problem will appear as phantom signals on the display.

Note that **only the Funcube Dongle Pro+ is supported by NaP3**. Other dongles such as the RTL-SDR use a different architecture and do not have a built-in sound card as the Funcube does.

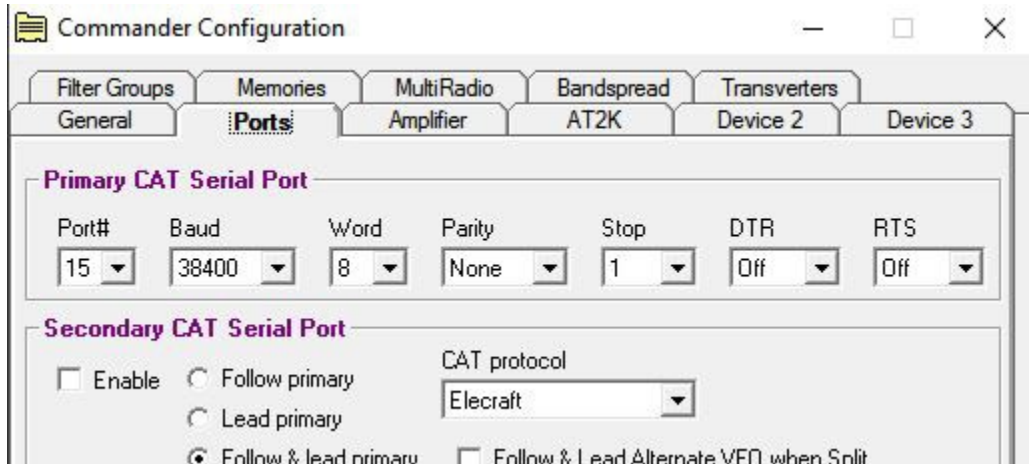
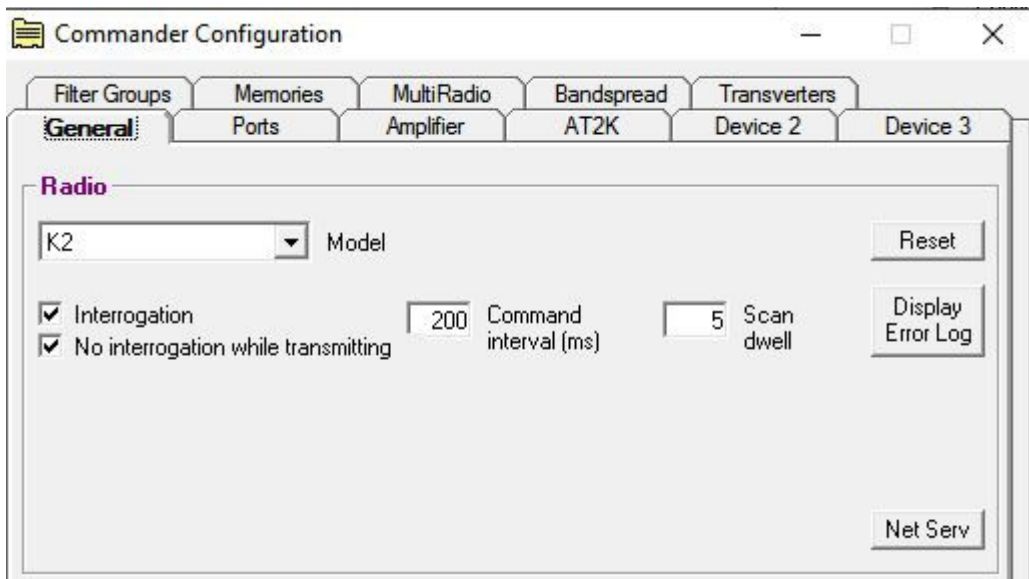
Here's how NaP3 looks on my system.



NaP3 is completely configurable when it comes to what you see on the screen. You may choose to fill the screen, or just use a minimal display as I do.

DXLab Commander configuration

The Commander configuration is pretty simple as all you have to do is tell Commander he'll be talking to a K2 and on which port. Here's how I have Commander set up:



Operation notes

At this point, both NaP3 and your logging program should be communicating with the Mark V. If you tune the Mark V, you should see the frequency displays in NaP3 and the logging program changing with the Mark V. From DXLab SpotCollector, you can mouse on a spot and the Mark V and NaP3 will be tuned to the appropriate frequency and mode. If the spot was for a split frequency operation, VFO-B on the Mark V will be properly set and you'll see the indicators for both VFOs on NaP3.

From the NaP3 screen, with the Mark V in split mode, you'll be able to right-click with the mouse and then set either VFO-A or B to the desired frequency and the Mark V and your logging program will follow.

If you've hidden the Mark V program window using the Hide button, you can restore the window by double-clicking on the program's icon on the Windows task bar.

If you select the Debug item on the program menu bar, the debug window will display buttons that can be used to trace critical program information for each Com port to the file you've specified. The buttons turn red when pressed indicating the trace is active. The traces should never be turned on during normal operation as they have a heavy impact on performance and the information produced has no meaning except to the program author. You may be asked to turn on one of the traces if you experience a problem.

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