

Pocket RXTX –Multimode Transceiver Control for Android



Version 0.5

Dan Toma - YO3GGX - yo3ggx@gmail.com

I kindly ask you not to give a negative feedback in Play Store before contacting me to clarify your issues with the application. I promise to answer you ASAP.

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Introduction

This is an Android only application used to remotely control several HAM radio sources:

- Ham Radio Deluxe (through the HP IP Server, CAT only, sound can be done through Skype or other IP phone);
- A FT8x7 transceiver connected through an USB CAT cable or through Bluetooth (CAT only, no sound);
- A SDR multiband server located in KN34bk (multi concurrent users SDR receiver for 80/40/30 and 20m bands).

Features

Current version of the application has the following generic features (for all sources):

- Works on any Android device, including smartphones, tablets and Google TV, with a minimum resolution of 320x240 and Android version 2.1 or higher. For USB support Android v3.1 or higher is required, or to have USB host support installed for Android 2.3.x;
- Works in both portrait and landscape modes;
- tuning through the rotary knob or by directly entering the frequency from a numeric keypad (in MHz);
- Up/Down buttons to tune with a preset step which depends on the selected band;
- 16 presets (including frequency, mode, info. For each of the 16 memories all parameters are saved (freq, alias, description, band, mode, etc);
- ON/OFF button. When off, the application is disconnected from the server/transceiver;
- select band from the pool of available ones;
- select operation mode (AM/ LSB/USB/CW/ etc.);
- display: SWR in both graphical and text mode;
- possibility to change application font size to match any device or taste. Font size is then stored in the config file and displayed on the startup screen at next run;
- a FN key to extend the number of memories to 16 and add future functionality to some buttons;
- 16 Memories to store frequency, mode and text info;
- work in both portrait and landscape modes;
- UTC clock included in the interface.

Specific functions for HRD mode:

- Set and save the hostname (or IP address) and port for the HRD IP server;
- Supports for the moment the following transceivers: FT-450, FT-817, TS-2000, IC-7200 (last two not tested);
- Control the following functions of the transceiver: Mode, Band, VFO toggle (A/B), Power, PTT, ATU (ON/OFF), Tune, PTT
- Get feedback from HRD at startup for Power, Freq, Mode ATU, VFO.
- During operation you get feedback frequency and mode if changed from HRD console or from transceiver.

Specific functions in USB or Bluetooth CAT mode (FT8x7):

- Bidirectional control (from smartphone or from the transceiver) with feedback for: frequency, mode, output power, SWR, S, ALC, PWR, Mode, Band, VFO, PTT).

Specific functions in SDR Receiver mode:

- Control Mode (AM/USB/LSB/CW), bandwidth (Normal/Narrow/Wide), Band;

- Connect to the same receivers available through WebSDR at : <http://websdr.yo3ggx.ro>
- Display waterfall or spectrum per band;
- Waterfall/spectrum zoom up to 8x;
- Mute button.

Limitations

Current version of the application has the following limitations:

- In SDR mode can connect only to my SDR receivers;
- A limited number of transceivers are supported ;
- A limited number of tests were performed by me. Application for sure still has bugs, or can crash for apparent no reason. With your help issues will be solved one by one and new features will be added.

WARNING!!!

Use this application on your own risk. As in HRD mode your PC can be made accessible from Internet (for CAT and audio), is your job to protect against attacks, possible by using some kind of VPN (ex. PPTP). Current IP Server implementation in HRD does not offer any kind of authentication, so everybody can access your Transceiver for CAT if he knows the right port. Some extra security features will be added in the future. If you are not comfortable with this and you are not using any kind of VPN, then use this only over your LAN.

More, even this application does not send any “dangerous” data to the transceiver, but as the protocol used by FT-8x7 for CAT does not use any error correction mechanism, it is possible (in some extreme situations) to give you unexpected results, like a software crash on the transceiver (requiring to power cycle it) or in a worst case scenario even a complete wipe of all EEPROM data, including configuration, software calibration/alignment and memories.

Please use any program you like (ex. FT817 commander) to save at least all “soft calibration” settings, plus any other information stored in your radio before using this application.

I cannot be held responsible for any damage caused to your Android device, your transceiver or your PC... You are warned! ☺

Audio Configuration

To use HRD mode with audio you can install Skype on both Android and PC and connect the PC to the transceiver Mic and Speaker. There are several examples available on the Internet. A future version of the application will directly include sound functionality.

Starting the application

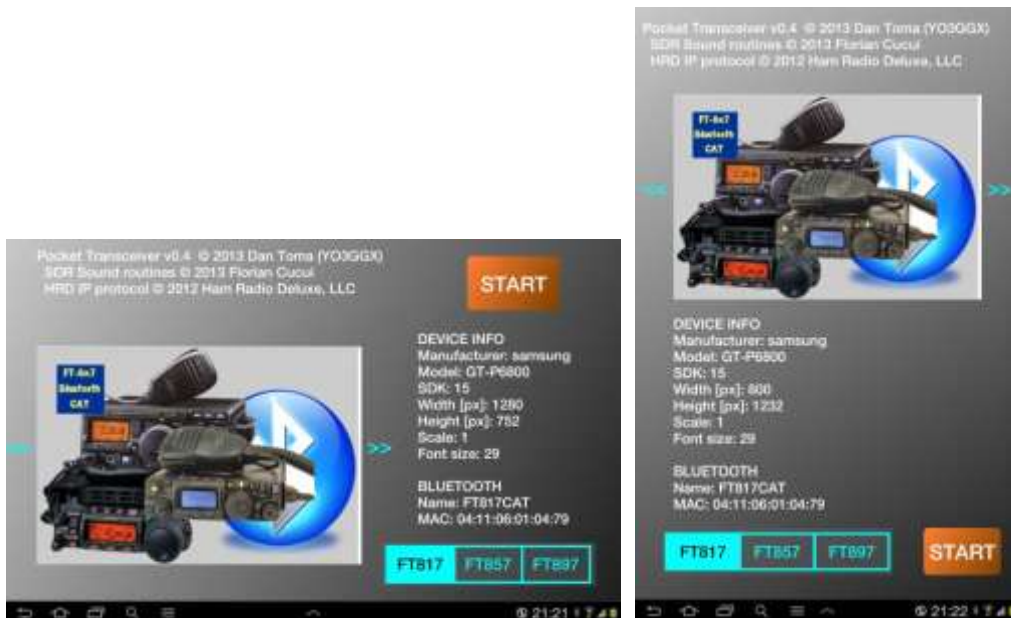
You can install the application directly from Google Play Store (search for “Pocket RXTX” or Pocket Transceiver) or using the link from the top of this document.

After you install the application, you will have a new icon like the following:



Press on the icon to launch the application.

You will get the following startup page (for Landscape and Portrait modes):



If you have problems using the application, please send me the text displayed in the “INFO” box for the following parameters:

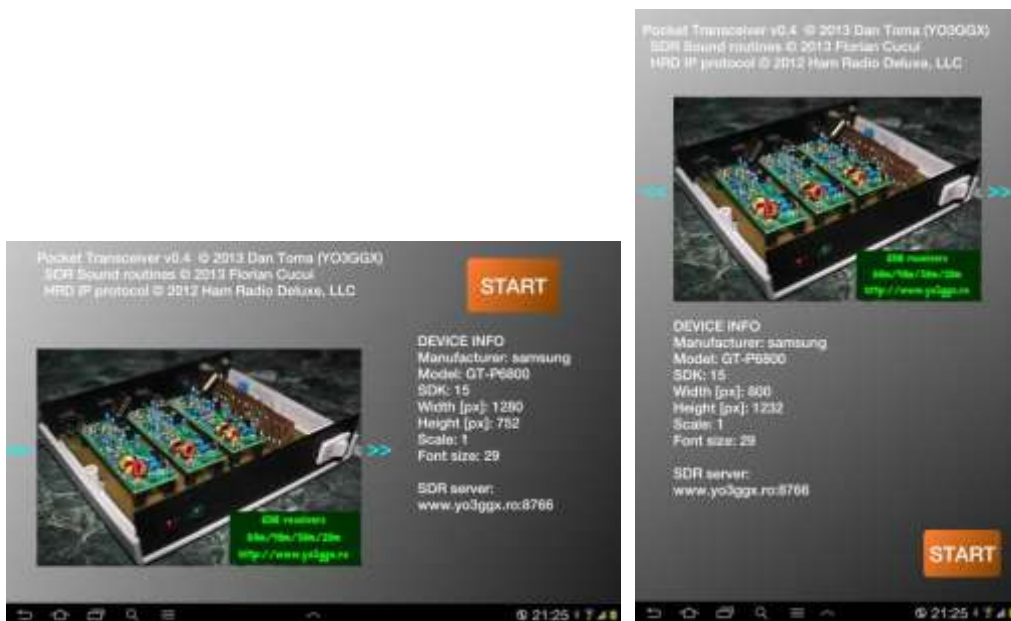
Manufacturer
Model
SDK
Width [px]
Height [px]
Scale
Font size

From the startup page you can select the connection mode and some other parameters. The picture above represents the Bluetooth CAT mode, where you can select from the 3 options: FT817, FT857 and FT897. In the current version of the app the only difference is that Power control is supported only in FT817 mode.

To select Ham Radio Deluxe mode slide the picture to the left or to the right till you get the following picture (represented in both portrait and landscape mode).



To select SDR Receiver mode slide to obtain the following picture:



After you select the right connection press on START button to enter the main application screen.

Using the SDR receiver

When you start the main screen the receiver is “powered off”, so the display will look like in the following pictures for both Landscape and portrait mode.



Current connection mode is represented by a small icon in the bottom left corner of the info box. You can have the following icons:

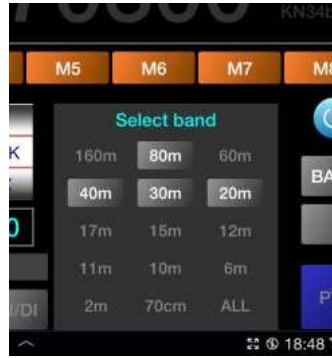
					USB CAT mode
					Bluetooth CAT mode
					HamRadio Deluxe mode
					SDR Receiver mode

The other 3 fields are for the moment reserved for future developments
To start reception long press on the blue power button. The screen will change like in the following pictures.



The screen contains the following components (for Landscape mode):

- “SDR” mode displayed in the top left corner;
- SDR station name (YO3GGX);
- SDR receivers location (KN34bk);
- S level. Numerical value for S is displayed on top of the S bar;
- A black box used to display RDS (when will be available), channel info or any other data saved for each memory;
- 8 memory buttons used to store all the settings (Freq, mode, info, etc.) - extended to 16 memories through a FN button;
- A wheel used to select operation mode (LSB/USB/CW/AM). Any change will be send to the server in realtime;
- A wheel used to change the bandwidth (Normal/Narrow/Wide);
- + and – buttons to increase/decrease frequency with 1KHz. By keeping one of these button pressed, you will enter a “Repeat” mode for faster change;
- A rotary knob which can be used for tuning, like the one available on a real transceiver. When slow rotating, the step is 10Hz, when fast rotating is higher;
- An ON/OFF button used to turn ON or OFF the connection to the WebSDR server. When OFF, the display will be completely dimmed and buttons locked;
- A Function (FN) button to switch between the two groups of memories (M1-M8 and M8-M16) and to further select the second function for some of the buttons, in a future version;
- A gray slider on top of the frequency display used to access the Waterfall or Spectrum mode;
- A BAND button used to change the band. You can select any of the available HAM bands as in the following image:



- A big blue PTT button. This will be used for PTT in a future version. IN the current version it is only used to set the frequency from the numeric keypad (see further);
- You can directly enter the frequency you want. For this purpose long press on the frequency display to activate the numeric keypad. The rotary knob will be replaced by the keypad and the PTT button will change to “SET”, as in the following images (both landscape and portrait modes):



After you enter the desired frequency click on the big “SET” button in the lower right part of the screen.

Tuning using the Waterfall or Spectrum

To access the waterfall drag the gray slider down, over the frequency display. The frequency display will be covered by the waterfall. Current frequency will be displayed now on the Info box, together with the band. Use the “SP/WA” button to toggle between Waterfall and spectrum.



Current tuning frequency will be represented by a vertical yellow marker and the bandwidth with a semitransparent green strip.

Current frequency scale is displayed on top of the waterfall/spectrum,

You can directly touch the waterfall/spectrum or drag the yellow marker to tune to a specific frequency. A fine tuning can then be done using the knob.

You can zoom into the waterfall using the ZOOM button from the lower part of the screen. Clicking on it you will change the zoom level in a circular way, as follows: 1x -> 2x -> 4x -> 8x -> 1x. On 30m band you can zoom up to 4x maximum. The frequency scale will change accordingly. Zoom feature can be very useful if you tune for example in a CW zone, where the bandwidth is very small, like in the following picture. Long pressing ZOOM button will automatically switch to 1x.



The BUF button can be used to eventually improve the audio quality in terms of dropouts. Each click will increase the value with one unit. Please play with it and send me the best value for you.

Setting the bandwidth

You have 3 presets for the bandwidth in SDR receiver mode, depending on the current modulation mode, as follows:

AM:

Narrow: +/- 2.5 KHz
Normal: +/- 4 KHz
Wide: +/- 6KHz

SSB:

Narrow: 0.7 - 2 KHz
Normal: 0.3 - 2.7 KHz
Wide: 0.2 - 3 KHz

CW:

Narrow: 0.72 - 0.78 KHz
Normal: 0.6 - 0.9 KHz
Wide: 0.55 - 0.95 KHz

Using the Memories

Saving to a Memory location

You have at your disposal 16 memories (from M1 to M8 and M8 to M16 when FN key is active) where you can store all the info related to a specific channel/frequency.

To save a specific memory configure the transceiver for all the parameters and then long click on one of the memories button (ex. M2). The screen will change; a big entry field will be available together with the standard keyboard.



Enter the ALIAS (max. 6 chars) you want to appear on the button for that specific frequency and a description (length not limited), separated by ',' symbol...



... and then press ENTER on the virtual keyboard. Data is saved to memory button 2;



Recalling a Memory location

To recall a memory location you just have to click on the corresponding button. All the settings saved for that location will be loaded from the configuration file (freq, band, step, mode, more will follow).

Clearing a Memory location

To clear a memory location you have to long click on the corresponding button and when asked to enter name and alias just delete everything and press ENTER on the virtual keyboard. The memory button will be renamed to the original Mx.

Using HRD mode

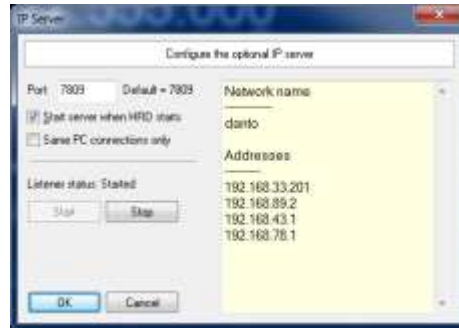
This application was developed and tested using Ham Radio Deluxe version 5.24.0.38 b3474.

Configure communication parameters

1. PC side

On the PC where HRD is installed, you need to configure the IP Server.

For this purpose, in the HRD main window select from the menu bar: Tools > IP Server.



Enter the desired TCP port and then check “Start server when HRD starts” (optional) and uncheck “Same PC connection only” (mandatory) and then click “Start”. You can now click “OK” if the service was started (“Start” button grayed out and “Stop” button active).

2. Android side

From the application menu select “SETUP”. You will be prompted to add Hostname and TCP port of HRD IP Server.



Operating in this mode is intuitive; use the same procedures as in the previous chapter.



This mode was tested using FT-450 and FT-817, but it is designed to support IC-7200 and TS-2000 too.

In this mode the frequency and mode is continuously read from the HRD console, so if you change them from the transceiver the change will be reflected in Pocket RXTX too.

Using Direct CAT mode

CAT over Bluetooth

If the Bluetooth interface is not activated then you are prompted to do it.



The main screen looks like in the following picture.



You can control Mode, Output power, Band, VFO (A/B) and PTT.

You get permanent feedback from the radio for: frequency, mode and PTT.

You get feedback from the radio for Output power when changing modes. During Rx, the S level is displayed in a graphical and numerical way.

During Tx, for FT817 only you get feedback for: SWR,PWR , ALC and MOD.

CAT over USB

USB mode is automatically selected if a supported USB CAT (see below) interface is connected to your smartphone/tablet before starting the application.

You will be automatically prompted to run the application.



Press OK and Pocket RXTX will be automatically started with USB support.

When in direct CAT mode, press on SETUP menu to set the serial Baudrate according with your transceiver settings.



Use the wheel to select the Baudrate and then press “SET” button. You can now press on blue Power button to connect to the transceiver over USB cable. Use the same operation mode as for the Bluetooth CAT.

NOTE: To use this mode you need Android 3.1 or higher (or 2.3.3 with embedded USB host support). If not available then you can connect only over Bluetooth. In the current version of the application only the following USB/Serial chips are supported:

FTDI FT232R UART	VID: 0x0403	PID: 0x6001
CP210x UART Bridge	VID: 0x10C4	PID: 0xEA60

Changing application font size

For some Android devices is possible that application fonts to be too big or too small (based on the system settings), or you just want to adapt it to your own preferences. You can change the size of the font by simply sliding the finger over the right area of the frequency display, where MHz and band info is displayed. Sliding up the font size will increase with one unit. Sliding down will decrease with one unit. When you are satisfied with the result, just exit the application in order for this information to be saved in the configuration file. When you further run the application, the new font size will be used.

Practical demonstration

A short video demo of the preview 0.3 version is available on YouTube.

<http://www.youtube.com/watch?v=b3LWF4xa6nE>

The new Waterfall and Spectrum features in version 0.4 can be seen in the following YouTube video.

<http://www.youtube.com/watch?v=qsJUc98oHS8>

Please subscribe to my channel (Dan Toma) to be automatically informed when a new video will be available.

Bibliography

FT817 User manual

The KA7OEI FT-817 pages - http://www.ka7oei.com/ft817_meow.html

HRD IP-Server Command List <http://forums.hrdsoftwarellc.com/showthread.php?9248-HRD-IP-Server-Command-List>

Application history

Version 0.3 (Feb 3rd, 2013).

First release of the application in the current form.

Version 0.4 (Feb 10th, 2013).

What's new/changed:

- waterfall and spectrum added in SDR mode;
- connection/power status LED replaced with a circular light around power button;
- to toggle ON/OFF you have now to long press on Power button ;
- mute button added;
- waterfall/spectrum zoom (x1, x2, x4, x8);
- you can now select the language for the online user manual or HELP menu;
- exit menu added;
- default font size is auto scaled based on device type/config;
- other small cosmetic changes (ex. info frame background changed to Black, rounded buttons, gray background for help, etc.).

Bugs solved:

Version 0.4.1-3 (Feb 17th, 2013).

What's new/changed:

- feedback for PTT and S-Meter added in HRD mode
- support extended to more functions/transceivers (see the table)

Bugs solved:

- cannot change mode because of feedback from transceiver
- in HRD mode the power is not read correctly at startup
- if Off and then On does not connect anymore to HRD (need to restart app)
- do not keep mode and bandwidth settings when rotating in SDR mode
- sound dropouts in SDR mode

Version 0.5 (Feb 26th, 2013).

What's new/changed:

- USB CAT support in FT8x7 mode (Only FTDI and CP2102 based USB-Serial adapters are supported for the moment);
- ask to activate Bluetooth if disabled at application startup;
- added support for : FT-840, IC-718, IC-746pro in HRD mode;
- symbol added on the main screen to display current mode (HRD, SDR, Bluetooth, USB);
- better handling memory load/save/edit;
- optimize feedback (Freq, mode, PTT, S) in HRD mode;
- better handling MODE/PWR/BW wheels updates;
- real power read for FT817 at startup or band change (not only 5W/0.5W);
- Max Power no more on the display as it is represented by the wheel;

- Max power saved for each memory location;
- other small bug fixes;
- small cosmetic changes;

Bugs solved:

- no graphical representation for S level;
- the power is not set correctly for some transceivers (ex. IC-7200);
- memory edit field overwritten by the frequency digits in portrait mode;
- when starting in SDR mode the BW wheel does not correctly represent current BW
- last freq/mode/BW not saved in SDR mode if exit;

The list of currently supported transceivers and features in HRD mode can be found here:

<http://www.yo3ggx.ro/pocketrxtx/suport.jpg>

For any queries regarding bugs or features requests please join and use the application dedicated forum here:

<http://www.yo3ggx.ro/forum/viewforum.php?f=15>

To see more videos about my projects and to be informed about any news please subscribe to my YouTube channel here:

<http://www.youtube.com/channel/UC3eDug-p4mcwWYE3-pZmObQ/videos?view=0>

If you want to contribute to further developments please donate using the ling available on my web page here:

<http://www.yo3ggx.ro/>

Please send me your feedback. Further development of the application fully depends on YOU.