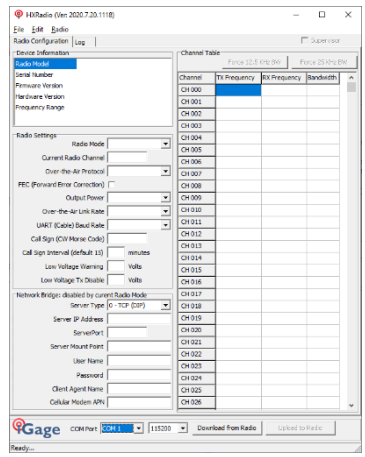
User Manual

HXRadio Programming Tool



For the Harxon DU8616 radio:

This manual is for use with Harxon DU8616 35-Watt digital radio supplied by iGage Mapping Corporation. Radios purchased from other sources cannot be programmed without an iG key code which is only available for iGage supplied devices.

Matches device firmware D025.01.00 and factory programming tool: HX-DU8616D-V001.02.12

30 July 2020

HarxonRadioProgrammingTool_UserManual_Build1119.docx

Copyright, Control and Safety

Radio Safety Warning

High powered radios present a real threat to safety. When using UHF radios, you must not operate the radio in transmit mode when near the antenna.

You should not operate the radio when closer than 4 feet to the antenna.

Do not program the radio without an antenna attached.

Using the HXRadio Programming Tool

Installation

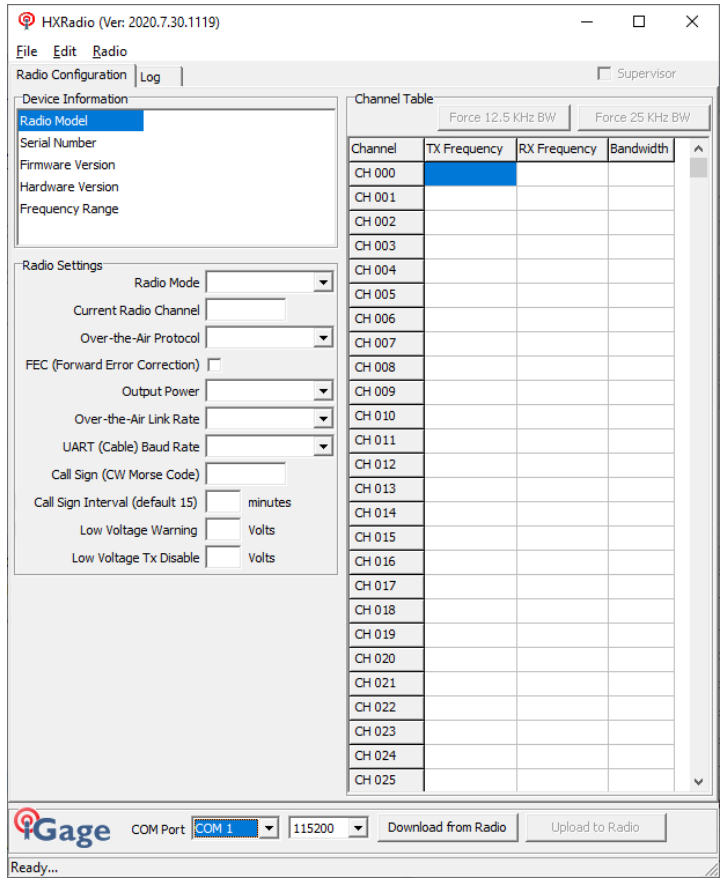
HXRadio is a single file executable. It is compatible with Windows XP, Windows 7, Windows 8 and Windows 10.

You can place the executable anywhere on a Windows PC and start the tool by clicking on it.

Placing the tool on your desktop makes it easy to find and easy to start.

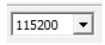
Operation

When the tool is run, it will initially look like this:



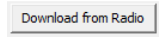
Begin by attaching the radio to a serial port and powering the radio on. After the radio boots, make sure the selected 'COM Port' matches the COM port the radio is connected to:

Set the Baud Rate to match the interface rate selected on the front panel of the radio:

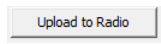


The default rate is 115,200 as shown above.

Click the 'Download from Radio' button to recall the radio current settings from the connected device:



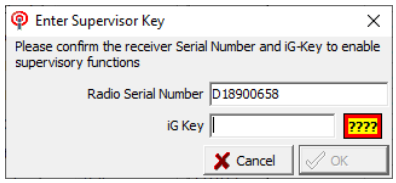
Once you download the current radio settings, you can modify the settings as required for your application. When modifications are complete, click the 'Upload to Radio' button to send the new configuration to the radio:



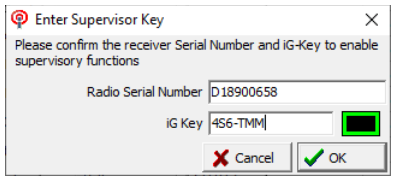
Supervisory Mode

The radio frequency channel assignments and the Bandwidth can not be modified without checking the 'Supervisor' checkbox:

When checked you will be prompted to enter the 5 or 6 character 'iG Key' for your specific radio:



When the proper key is properly entered, the 'OK' button will be enabled and the status box will change to green:

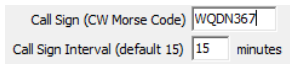


Every radio has a unique supervisor key.

The key is contained on a card that is distributed by iGage with the radio. If you lose the keycard you will need to call the iGage factory to obtain the code.

By entering the Supervisor key-code you agree that:

1. The radio will be programmed only with transmit frequencies that you are legally entitled to use.
2. The channel bandwidths are set appropriately (typically 12.5 KHz).
3. You have a 'FCC ID' and the FCC ID will be entered into the radio and broadcast



4. The 'FCC ID' is labeled on the radio exterior.
5. A valid copy of the 'FCC License' is kept at the radio location.

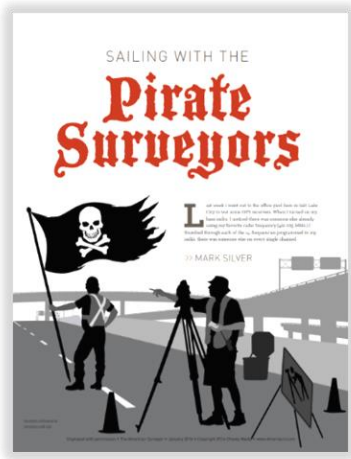
Note that operating the radio outside of these regulations will result in a $100,000 per day fine if you are caught! The FCC is VERY SERIOUS about non-licensed use.

The 'iG Key' should only be shared with responsible parties.

FCC Licensing Information

The Harxon DU8616 UHF radio requires FCC licensure for transmit operation in the United States. It is illegal to operate the DU8616 device in Transmit mode (as a UHF Base or repeater) without a valid FCC license at any output power, in any area, under any non-emergency condition.

The following article describes the pitfalls of broadcasting without a license:



http://www.amerisurv.com/PDF/TheAmericanSurveyor_Silver-PirateSurveyors_Jan2014.pdf

If you did not have an FCC license when your radio was shipped, a default frequency table may have been installed on your receiver. Without an FCC license you may only receive transmissions on these frequencies.

You may not legally use the radio in a transmit application without:

- Obtaining a valid FCC License.
- Verifying the frequency tables match your license.
- Adding your FCC ID to the internal radios so that they can properly broadcast your license in Morse Code every 15 minutes.
- Putting a label on the device with your FCC ID.
- Keeping a copy of your FCC License with the transmitting devices when they are in use as a transmitter.

In January 2020, the '**P**reventing **I**llegal **R**adio **A**buse **T**hrough **E**nforcement Act, or "PIRATE" Act (S.1228)' was signed raising the penalty for non-compliance to $100,000 per day with a $2,000,000 maximum!

If you choose to operate this equipment without obtaining an FCC license, you do so at your own risk and by opening the Supervisor Key Card envelope you implicitly agree to indemnify iGage Mapping Corporation against any FCC action.

Obtaining a New FCC License

If you don't have an existing FCC license to transmit UHF corrections you will likely use a 'Radio Licensing Company' to obtain frequency coordination and submit an application to the FCC.

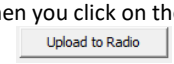
The entire FCC application process typically costs around $600 of which includes $125 Frequency Coordination and $260 for the FCC filling fee. You may be asked these questions when applying for a license:

Question	Answer
Frequency Requested	"Standard RTK GPS Pool", Monitor: NO
Band	451-469, no splits
System	Conventional
Type	Base and Mobile Simplex FB. MO
Wattage	35 Watts Mobile; 35 Watts Base
Bandwidth	12.5 kHz
Interconnection	None
Emission Type	Digital Data
Location	The States where you might work or 'USA'
Antenna Mounted On	Survey Tripod, not to exceed 20 feet
Emission Designator	9K75F1D

It can take as long as 3-months to obtain an FCC ID after the initial filing.

Compliance Checks

When you click on the 'Upload to Radio' button:



The programming tool will automatically check to make sure that the channel frequencies and channel bandwidths are not specifically forbidden for use in the USA.

Because the same radio is used for a variety of applications, by private and government agencies it is not possible to make extensive range checks other than:

399.8875 MHz >= f >= 410.0125 MHz	§ 15.205 Restricted bands of operation
432.9875 MHz >= f >= 434.0125 MHz	§ 15.240 Operation in the band 433.5-434.5 MHz

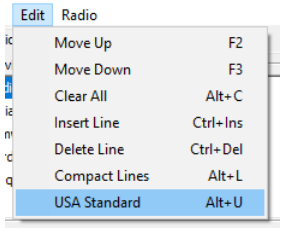
Any errant frequency or channel bandwidth will trigger this warning:

If you click on 'Yes' you will be allowed to proceed. Please note that doing so is probably an invitation for FCC enforcement action.

Entering Frequencies

USA Standard Frequencies

80% of all Survey Users in the USA are licensed for the same / similar frequencies. The menu option 'Edit: USA Standard' (available only when in Supervisor mode):



will enter this frequency table:

Channel	TX Frequency	RX Frequency	Bandwidth
CH 000	461.025,000	461.025,000	12.5 KHz
CH 001	461.050,000	461.050,000	12.5 KHz
CH 002	461.100,000	461.100,000	12.5 KHz
CH 003	462.125,000	462.125,000	12.5 KHz
CH 004	462.375,000	462.375,000	12.5 KHz
CH 005	462.400,000	462.400,000	12.5 KHz
CH 006	464.500,000	464.500,000	12.5 KHz
CH 007	464.550,000	464.550,000	12.5 KHz
CH 008	464.600,000	464.600,000	12.5 KHz
CH 009	464.625,000	464.625,000	12.5 KHz
CH 010	464.650,000	464.650,000	12.5 KHz
CH 011	464.700,000	464.700,000	12.5 KHz
CH 012	464.725,000	464.725,000	12.5 KHz
CH 013	464.750,000	464.750,000	12.5 KHz

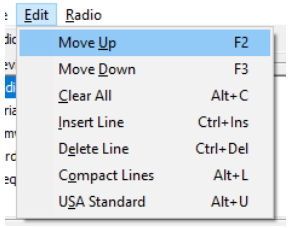
Typically, only one or two lines will need to be modified. You can use the 'Edit' menu functions to add and delete lines as necessary. After making changes, use the 'File: Save' function to save your unique frequency / channel set.

Auto RX Frequency Entry

When entering a TX frequency, the RX frequency is always modified to match the TX frequency. If you want to have a different RX frequency, enter the TX frequency first, then edit the RX frequency.

Table Editing Functions

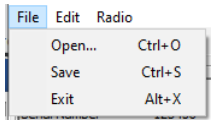
Several table editing functions are available when the Supervisor mode is enabled:



Move Up	Moves the currently selected line up one line, swapping the data from the previous line
Move Down	Moves the currently selected line down one line, swapping the data with the next line
Clear All	Empties the entire frequency table
Insert Line	Adds a blank line at the cursor location, moves all subsequent lines down one line
Delete Line	Removes the line at the cursor, moves all subsequent lines up one line
Compact Lines	If one or more blank lines exists in the table, they are deleted

Saving and Recalling Frequency Assignments

The 'File: Open' and 'File: Save' options:

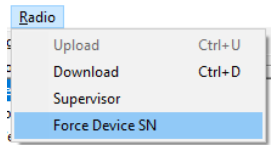


Allow you to save and recall frequency table assignments to text files.

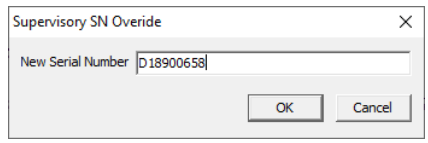
Remote Radio Programming

It is possible to spoof a radio serial number for remote programming, if you know the 'iG Key' for the spoofed radio.

Choose the menu option 'Radio: Force Device SN':

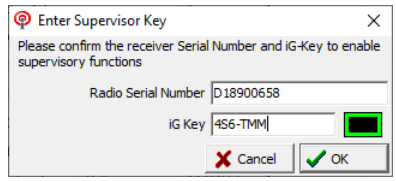


Enter the Serial Number of the device you want to program:



Then click 'OK'.

You will be prompted to enter the 'iG Key' for the spoofed device:



If the 'iG Key' is correct, the OK button will be enabled and you can click it to continue.

The Supervisor mode will be enabled and you will be able to configure a Frequency table for the selected device.