

Setting up the Kenwood NXR-710/810 Repeater with the Raspberry Pi & NXCore

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Listed below are step by step instructions for setting up your Kenwood NXR-710/810 repeater with the Raspberry Pi running NXCore. This document focuses on programming the NXR-710/810 repeaters for use with NXCore; however, it should be noted that the NXR-700/800 repeaters will work as well but the scope of this document covers only the NXR-710/810 series.

Before getting started you will need the following:

- Kenwood NXR-710 (VHF) or NXR-810K (450-520MHz) or NXR-810K2 (400-470MHz)
- Kenwood Programming Cable and the latest KPG-129D/DN software and Firmware
- Kenwood KTI-3M Conventional IP Network Interface Unit
- 3 Port Ethernet Switch for connecting the Raspberry Pi, KTI-3M, and Internet Connection
- Knowledge of what your static IP address will be from your ISP/Router/etc.

1. The first step should be to connect you power supply and KTI-3M to your NXR-x10 repeater.
2. Once the KTI-3M is connected to the repeater update the repeater firmware to the latest issue using FPro. First ensure firmware updating is enabled in the repeater programming; "OPTIONAL FEATURES" then "COMMON PAGE 1" and make sure the "FIRMWARE PROGRAMMING" box is checked. You can now connect your programming cable, power on your NXR-x10 repeater while holding the "PF1" key- the display should read "P.G.", from there set the desired Baud rate (default is 115200) to match that of FPro and update the firmware.
3. After updating the firmware we can now build the DAT file. Open KPG-129D/DN and add your RX/TX Frequencies and make the channel type NXDN- **PLEASE USE RAN 1 for RAN DEC/ENC!**

Channel Information [Channel - 1]

Ch	RX Frequency	TX Frequency	Ch Type	TX Mode	QT/DQT Dec	QT/DQT Enc	RAN Dec	RAN Enc	Ch Name
1	445.137500	440.137500	NXDN	NXDN	---	---	1	1	rP
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									

You must use RAN 1 for Decode/Encode

Channel Edit Close Help

- The next step in programming is adding Intersite Call, by going to “EDIT” then clicking on “CONVENTIONAL IP NETWORK”. Once you are in the Conventional IP Network settings under the “GENERAL” tab click the checkbox for “INTERSITE CALL”, you can leave the default settings as they are shown.

The screenshot shows the 'Conventional IP Network' configuration window with the 'General' tab selected. The window has three sub-tabs: 'General', 'Network', and 'IP Console'. The 'General' tab contains four main sections: 'Intersite Call', 'Cross-busy', 'Site Roaming', and 'Voting'. In the 'Intersite Call' section, the 'Intersite Call' checkbox is checked, and the default settings for IP Casting (Unicast), Maximum Jitter Buffer Size (400 ms), Minimum Jitter Buffer Size (80 ms), and Network-wide RAN (Caller Site) are shown. The 'Cross-busy' section has the 'Cross-busy' checkbox unchecked and 'Busy Channel Lockout' set to 'No'. The 'Site Roaming' section has the 'Beacon' checkbox unchecked, and the default settings for Host Repeater (Deselected (Continuous)), Duration (1200 ms), Transmit Interval Time (60 s), and Common Multicast IP Address are shown. The 'Voting' section has the default settings for RSSI Threshold (-100 dBm) and RSSI Hysteresis (5 dB). At the bottom right, there are 'Close' and 'Help' buttons.

Section	Parameter	Value
Intersite Call	<input checked="" type="checkbox"/> Intersite Call	
	IP Casting	Unicast
	Maximum Jitter Buffer Size [ms]	400
	Minimum Jitter Buffer Size [ms]	80
Cross-busy	<input type="checkbox"/> Cross-busy	
	Busy Channel Lockout	No
Site Roaming	<input type="checkbox"/> Beacon	
	Host Repeater	Deselected (Continuous)
	Duration [ms]	1200
	Transmit Interval Time [s]	60
	Common Multicast IP Address	
Voting	RSSI Threshold [dBm]	-100
	RSSI Hysteresis [dB]	5

5. After setting up Intersite Call we need to add our IP addresses for the NXR-xxx repeater and the Raspberry Pi. We **MUST** have the Kenwood NXR-xxx IP address one less than that of the Raspberry Pi. Site 1 is the Kenwood NXR-xxx repeater. Site 2 is the Raspberry Pi. The Raspberry Pi IP address is a static IP address assigned by your ISP/Router/etc. The “DEFAULT GATEWAY” should be changed so that it matches both Site 1 and 2 IP addresses but with the exception of changing the end of the address to “254” – as shown below.

PLEASE NOTE THAT THE IP ADDRESSES SHOWN ARE USED AS AN EXAMPLE AND ARE MY IP ADDRESSES- YOUR SITE 1, SITE 2, AND DEFAULT GATEWAY IP ADDRESSES WILL BE DIFFERENT.

Own IP Address

Site Number	1
NXIP Site ID	
IP Address	192 . 168 . 1 . 114
Subnet Mask	255 . 255 . 255 . 0
Default Gateway	192 . 168 . 1 . 254

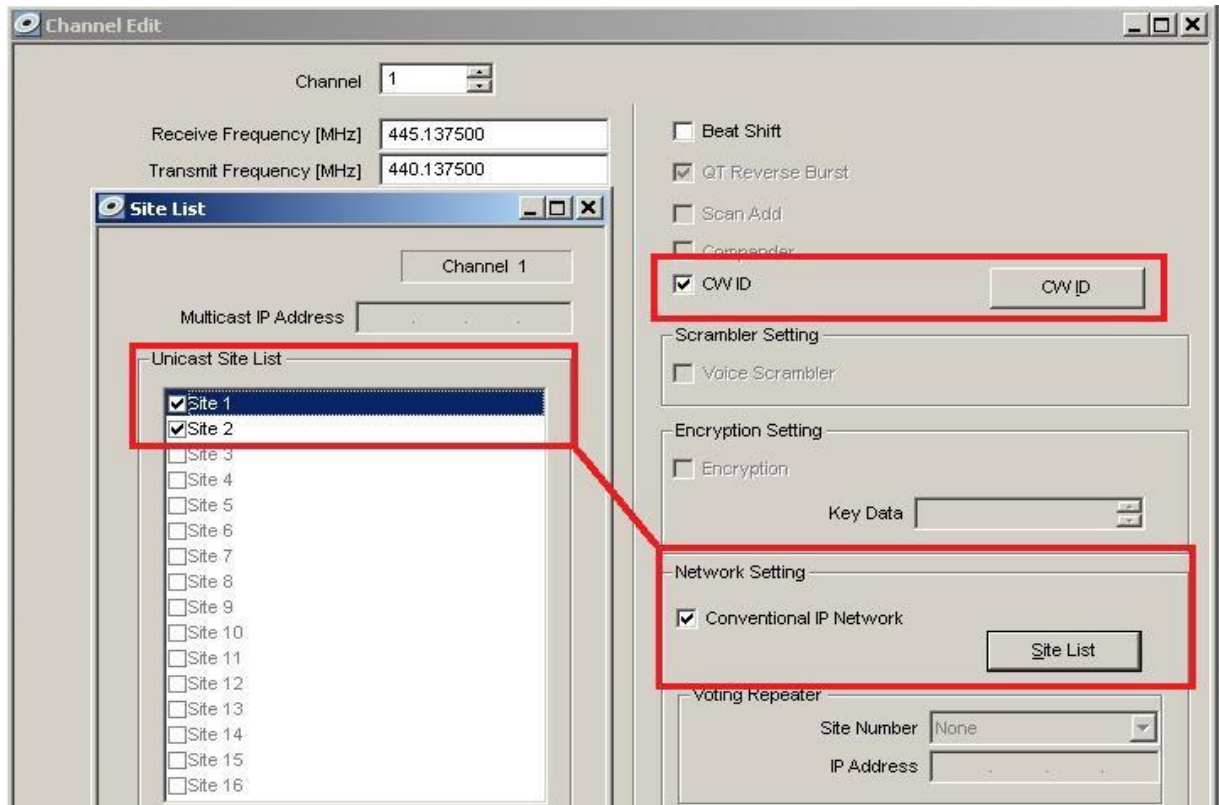
Own IP Address Edit

Unicast IP Address List

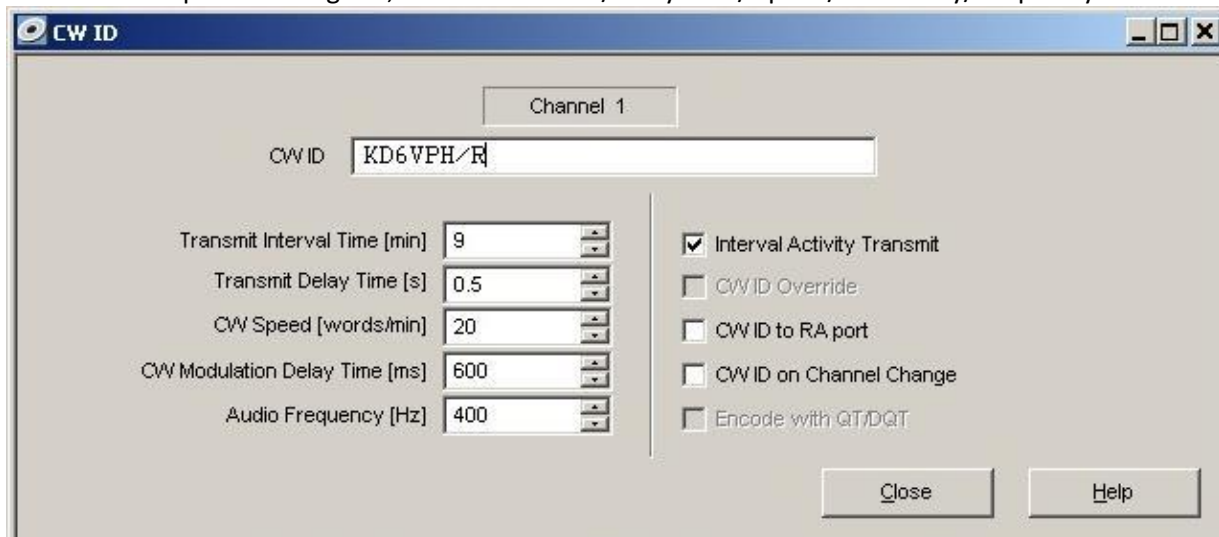
Site No.	IP Address
1	192.168.1.114
2	192.168.1.115
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	

Site No. 1 is the NXR-xxx Repeater
Site No. 2 is the Raspberry Pi
Note: Repeater IP address is 1 less than that of the Raspberry Pi

6. The next step is to setup the repeat channel we have programmed (SITE 1) to communicate with the Raspberry Pi (SITE 2). We now go back to the “CHANNEL INFORMATION” screen and click on “CHANNEL EDIT”. Once we are in the Channel Edit screen under “NETWORK SETTINGS” we will need to check the checkbox “CONVENTIONAL IP NETWORK” and then click on “SITE LIST”, from there we will add our 2 sites; Site 1 (the Kenwood NXR-xxx) and Site 2 (the Raspberry Pi). We can also select the checkbox “CW ID” as shown below.



7. Once we click the checkbox on CW ID we can click on the “CW ID” box and set the Kenwood NXR-xxx repeater callsign ID, CW interval time/delay time/ speed/mod delay/frequency.



8. We are finished with programming the required settings for using the Kenwood NXR-xxx with the Raspberry Pi and NXCore. You can now tailor the rest of the options in the repeater programming to your liking and write them to repeater. After writing your saved DAT file to the repeater the unit will reboot. If your Internet connection, Raspberry Pi, and KTI-3M are connected to your 3 Port Ethernet Switch you should have the ability to communicate with others.

Pictured below is the KD6VPH NXDN repeater consisting of a Kenwood NXR-810K2 (400-470MHz) with a Raspberry Pi 3B, 3 Port Ethernet Switch, Kenwood KTI-3M, Duracomm Power Supply, and Celwave 633-6A-2N Notch Duplexer. The entire setup is self contained; the USB, HDMI, and Internet/LAN connections are all located at the rear panel of the repeater.



