

The D-STAR Repeater

Summary

This lesson gives an overview of how a D-STAR repeater is constructed and the series of operations necessary to configure a repeater controller, modules, and gateway for operation. The lesson is not a step-by-step instruction manual for setting up a D-STAR repeater. The details of configuration will be found in the operating manuals for the various pieces of equipment and software. Configuration of the ID-RP2L microwave link is not covered.

The D-STAR Repeater

Like most repeaters, the actual equipment consists of several specialized pieces of hardware. **Figure 8-1** shows a repeater that has four modules (the actual RF transceivers), a **controller**, an RF link, and a gateway PC with Internet link. This is a complete D-STAR repeater. (Antennas and other accessory equipment are not shown.)

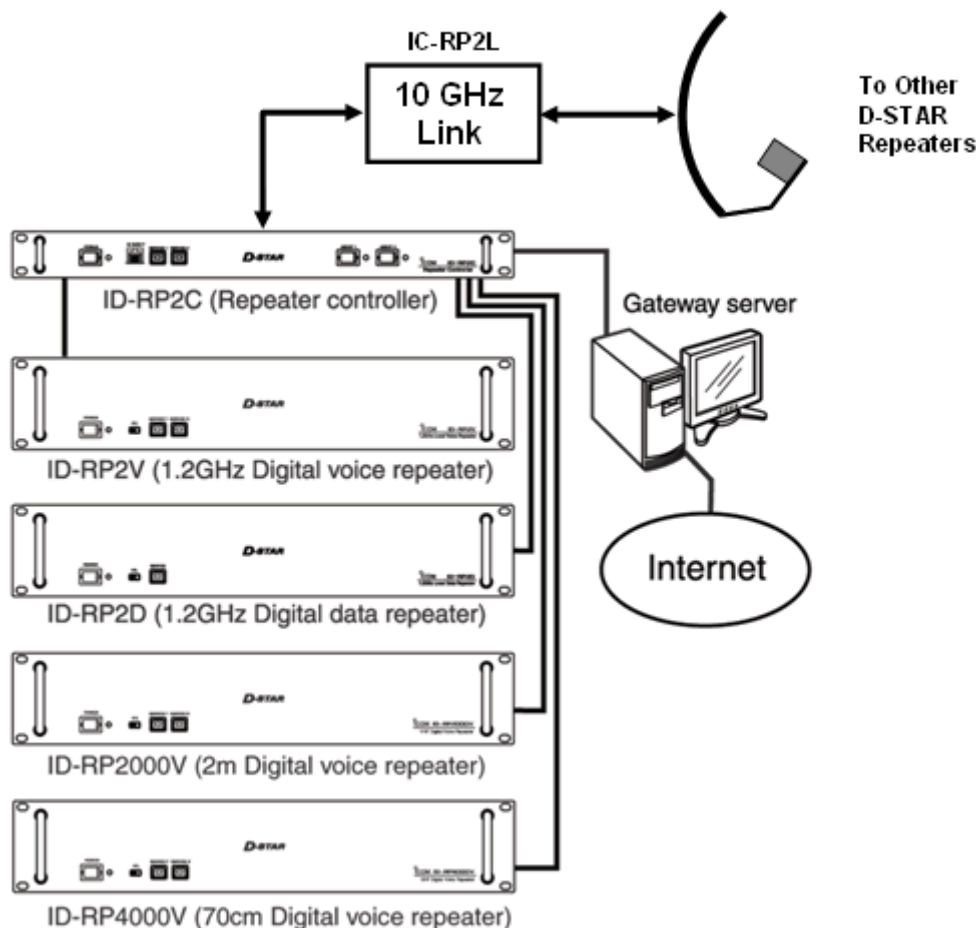


Figure 8-1

At a minimum, a D-STAR repeater must have a controller and at least one module. The functionality of this isolated repeater would be quite limited because it would not have access to the D-STAR network for the call sign registry or any kind of zone communications with other D-STAR repeaters.

By adding the ID-RP2L RF link, the repeater can be linked to other D-STAR repeaters. As you learned in earlier lessons, if one of the linked repeaters has a gateway, a D-STAR zone

is formed. So this simple repeater--controller, module, and link--can provide all of the D-STAR network services.

Repeater Call Sign

You will need a unique call sign for the repeater, such a club call sign. The same call sign can not be used in two different "roles" in the D-STAR network. (eg, the repeater call sign can not also be your individual call sign.) The call sign may not be used anywhere else in the D-STAR network. It is OK to reuse the call sign outside the D-STAR network, such as on HF or for an analog repeater.

D-STAR Repeater Components

ID-RP2C Controller

One ID-RP2C repeater controller is required for each D-STAR repeater. Modules can not function without a controller. The controller is a microprocessor-baser computer system that supervises the modules, routes digital voice and data signals amongst them, and provides the interface to the gateway or RF link that connects the repeater to others in the D-STAR network.

Repeater Modules

D-STAR repeater modules perform the same functions as do transmitters and receivers in an analog repeater system. Modules do not include the duplexers necessary for the receiver and transmitter to share the antenna. A separate antenna connection is required for each module. The modules process only D-STAR digital signals. An analog signal on a D-STAR module's input frequency is not demodulated or retransmitted.

The currently available D-STAR repeater modules are:

RP2D	1.2GHz, 128k Digital Data (DD)
RP2V	1.2GHz Digital Voice (DV)
RP4000V	440MHz Digital Voice (DV)
RP2000V	144MHz Digital Voice (DV)

Each module is connected to the controller at a separate **port**. There are four module ports on the controller and each can be connected to a DD or DV module. The recommended configuration for a full repeater system is:

Port 1	RP2D
Port 2	RP4000V
Port 3	RP2000V
Port 4	RP2V

Note that the interfaces between the controller and other Icom modules or equipment is proprietary to Icom equipment.

Configuring a D-STAR Repeater

To program the repeater controller and frequencies you will need:

- Windows®-based PC with at least 1 Ethernet and 1 USB port (1.1 or 2.0)
- USB A to B cable
- Ethernet cable (not a crossover cable)

Configuring a D-STAR Repeater Controller

Connect the Ethernet cable to the 10-BASE-T jack (an RJ-45 modular connector) on the controller's front panel. Configure the PC's Internet TCP/IP protocol to manually enter an IP address for the connection. (This is done via the Windows Network Connections window.)

Start the IC-RP2C configuration software and enter the controller's IP address in the "Network Setup" screen. The default IP addresses for the controller as shipped from Icom are either 172.16.0.1 or 172.16.0.10. Click "OK". The ID-RP2C configuration software window will appear.

Click the "Read" button. In the subsequent "Network Password" window enter the password, which is "PASSWORD". You will now see the ID-RP2C configuration software window as shown in **Figure 8-2**.

RP2C Configuration Software

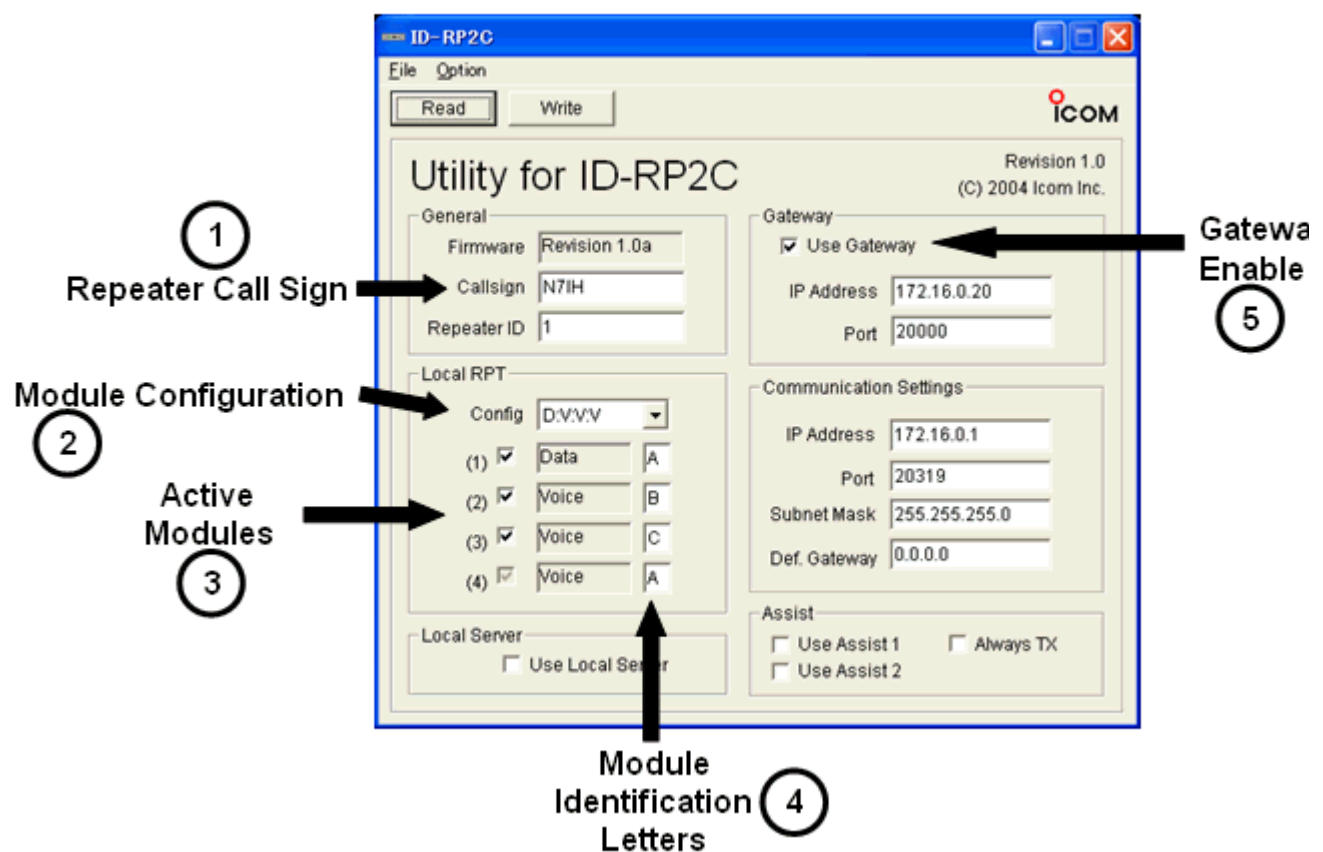


Figure 8-2

Step One - Enter the repeater's call sign. Remember that this must be a unique call sign within the entire D-STAR network. This is the repeater's D-STAR network identity to all D-STAR users.

Step Two - Select a "module configuration" from the drop down menu. The example shown is for a single DD module and three DV modules. Select the configuration that matches your repeater.

Step Three - Enable the active modules by clicking in the check box. If your repeater has fewer than four modules, the lower checkboxes and labels will be blank or greyed-out. The modules must be physically connected to Port 1 to 4 on the controller in exactly the same order as shown on this screen.

Step Four - Assign each active module a different identification letter. These are the letters by which users will identify the modules on which they want to operate. If an ID-RP2V or ID-RP2D module are included in the system, they must both be assigned the letter "A". This is due to the controller's internal software requirements.

Step Five - If the repeater will use a gateway, click "Enable Gateway" to tell the controller that the gateway interface will be active.

This completes controller configuration.

Configuring a D-STAR Repeater Module

The D-STAR repeater module's control and programming is done using a USB interface on the module. There are two USB ports on each repeater module; one for the transmit (TX) frequency and the other for the receive (RX) frequency. Plug the USB A-B cable into the module and computer.

The Windows "Add New Hardware" wizard will be launched by your PC and the appropriate USB drivers will be installed. Launch the repeater modules software which will then interrogate the module and display the frequency programming window shown in **Figure 8-3**. Enter the desired frequency for the module and click OK. That's easier than ordering a set of crystals, isn't it?

Repeater Module Frequency Selection

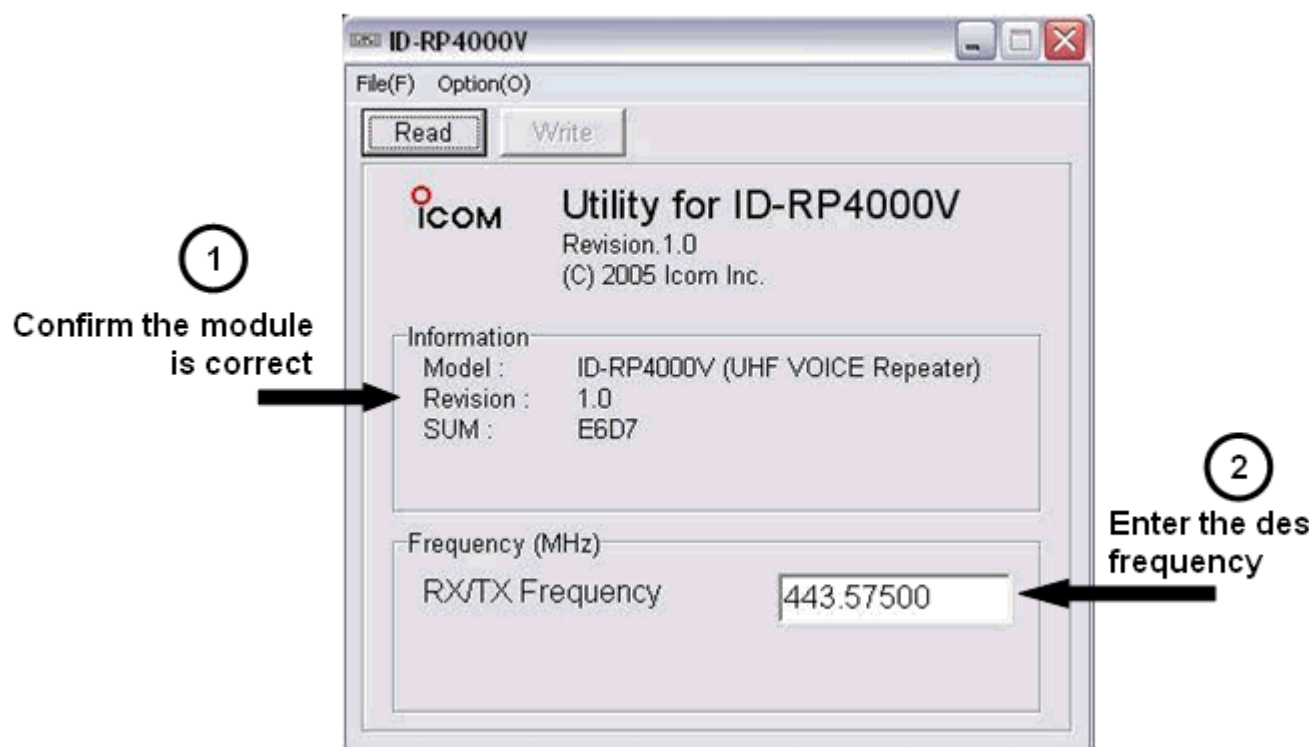


Figure 8-3

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Click the "Review" button to review the topics covered in this lesson. When you are ready, click "Next" to continue...