D-STAR Gateway Use

Summary

This lesson introduces practical uses of the D-STAR gateway. The student will learn more about how the gateway functions in a D-STAR repeater and how cross-band operation works. Methods of using the gateway to route calls within the D-STAR network using an IC-91AD D-STAR radio are also presented.

The D-STAR Gateway

The D-STAR gateway is not a "thing", but rather a "connection." The gateway is software that runs on a PC connected to the controller of a D-STAR repeater as shown in **Figure 7-1**. (You'll learn more about setting up the gateway in the final lesson.) The PC has to be supplied with a broadband Internet connection, through which it can exchange data with any other gateway or D-STAR server worldwide.

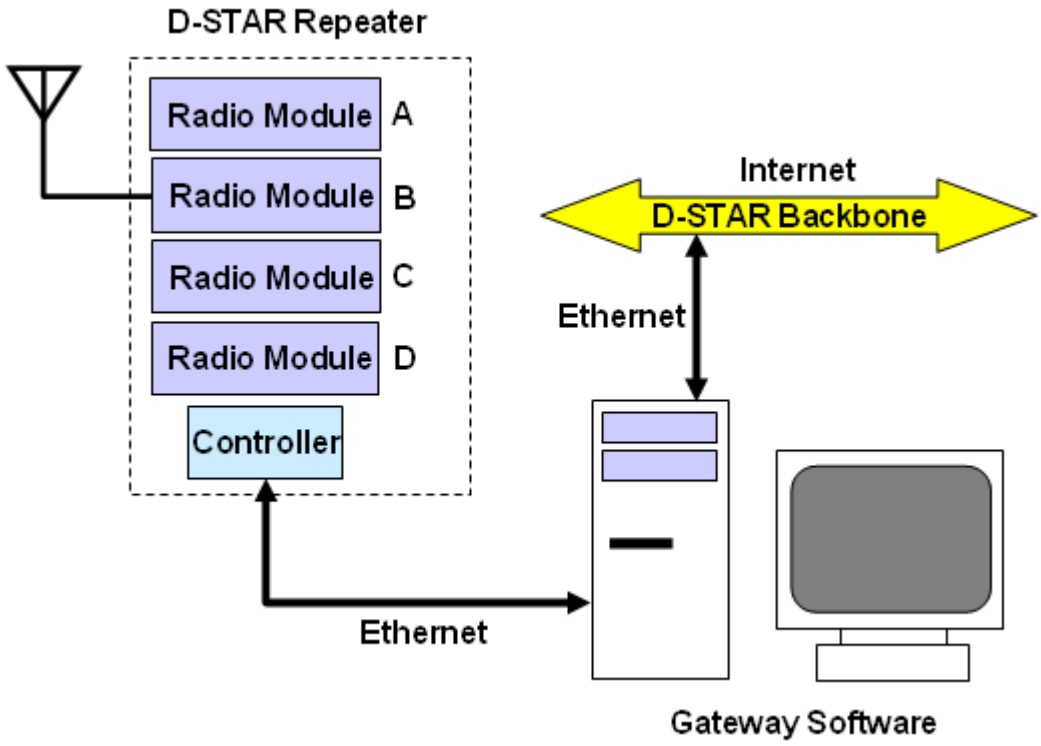

Figure 7-1

Automatic and Manual Functions

Some functions of the gateway are automatic. For example, you learned about the call sign registry in Lesson #4. The registry is accessed automatically to locate the current repeater on which a specific call sign is registered. Another automatic function is the regular update of the database of the Internet Protocol (IP) addresses for other D-STAR gateways. That update occurs several times every day.

To the repeater user, though, most D-STAR functions that use the gateway require some kind of manual direction to be activated or initiated. For example, to call a friend using a different D-STAR repeater, you must direct your local D-STAR repeater to use its gateway to locate them. When making a CQ call outside the local D-STAR zone, you must direct your local repeater to the appropriate repeater system through the gateway.

The Directed Gateway

There are no "link control" signals required to connect and disconnect the repeaters. In a sense, all D-STAR repeaters are connected all the time and it is up to the users to decide when and where their signals should be heard! Unlike analog repeaters where linked systems share every signal they can hear, the D-STAR gateway only sends digitized signals to other repeaters when directed to do so by the information in a received D-STAR packet.

This also means that you can't "listen in" on a remote D-STAR repeater by switching on a link. The only time you will hear a signal from a remote D-STAR system is when the station that generates the signal directs the gateway to send it to your repeater or repeater zone.

Gateway Call Sign Conventions

The Receiver Repeater Call Sign field contains the necessary information to route signals through the D-STAR network by using a gateway. D-STAR packets not being relayed to other repeaters aren't handled by the gateway and so aren't heard elsewhere.

Adding a "G" to a repeater call in the Receiver Repeater Call Sign field tells the D-STAR repeater to send the transmission via the gateway. The "G" must be in the 8th available space in the call sign, so if the repeater has a 4-character call sign, three spaces must be added before the "G." **Figure 7-2** shows the necessary call sign set up to make a call on a remote repeater by using a gateway.

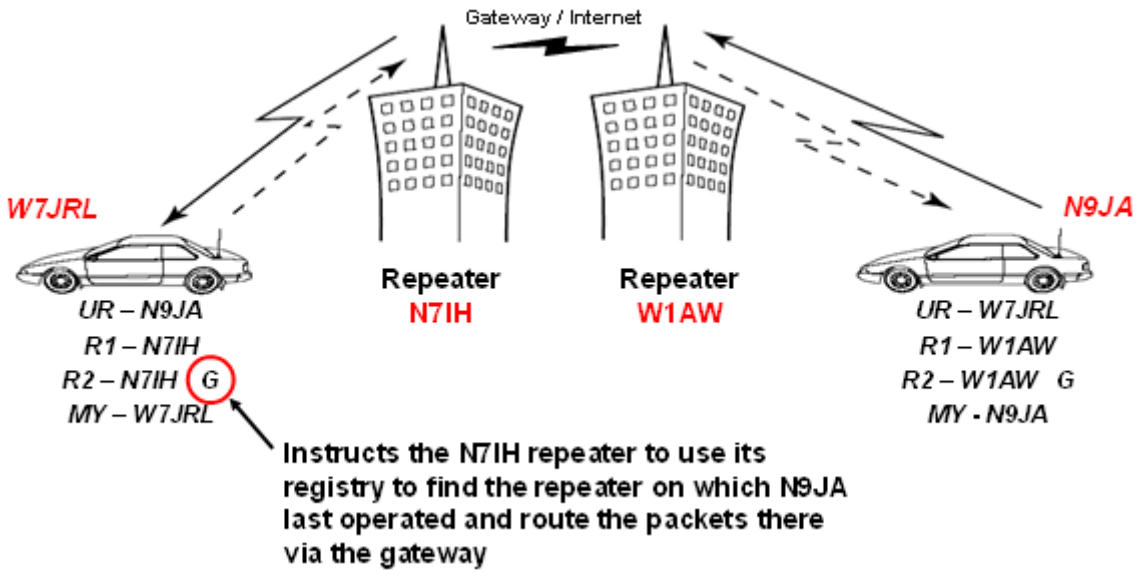

Figure 7-2

In the figure, W7JRL is calling N9JA. W7JRL (My Call Sign, or MY) is sending D-STAR packets to the N7IH repeater. That requires W7JRL to have programmed Sender Repeater Call Sign (R1) with N7IH. Similarly, N9JA's R1 call sign is set to W1AW. N7IH and W1AW can be anywhere there is an Internet connection.

For W7JRL to call N9JA without knowing what repeater N9JA is using, W7JRL uses the automatic registry lookup of the N7IH gateway. This is accomplished by adding the "G" at the end of the R1 call sign. That tells the N7IH gateway software to look in its copy of the call sign registry (updated several times each day) for the repeater through which N9JA last made a transmission. When W7JRL calls N9JA, the N7IH repeater then knows to where to route the digitized audio signals. If N9JA is listening to the W1AW repeater, the call from W7JRL will be heard.

When W7JRL's call is heard, N9JA's radio should automatically save W7JRL's call along with W7JRL's repeater call sign - the Sender's Repeater Call Sign. This allows N9JA to reply immediately, without having to enter any call signs. The resulting set of call signs for W7JRL and N9JA to have a contact is shown in the figure.

What if W7JRL just wants to make a general call for a contact on the W1AW repeater? In that case, "CQCQCQ" is sent in the Your Call Sign (UR) field and the call is heard by everyone listening to the output of the W1AW repeater.

Cross-band Operation

D-STAR repeaters can support up to four radio modules as shown in **Figure 7-1**. The modules can be on any combination of bands. Currently, Icom supplies modules for 144 and 440 MHz and 1.2 GHz. More than one module can be on the same band, assuming that adequate filtering is available to prevent **desense**. Each module is assigned a unique letter identifier; A, B, C, or D.

Usually, your signal and those of the stations you contact will be on the same band. In this case, no module identification letter needs to be added to the Sender Repeater Call Sign field. The controller will cause your repeated signal to be transmitted on the same band on which it was received. This is the **default** mode of operation.

You may also choose to specify the output module explicitly and if the module chosen operates on a different band, you are then operating **cross-band**! This works similarly to an analog repeater system; the signal from one station is received and demodulated on one band and then routed to a transmitter whose output is on a different band. The other station's signal takes the opposite path.

In D-STAR systems, the modules (up to four) are selected by adding the module identification letter after the repeater call sign. The controller uses the letter to route the information between modules.

The D-STAR gateway allows cross-band operation across the D-STAR network just as if the modules were all in the same equipment cabinet. **Figure 7-3** illustrates how two stations, W7JRL and N9JA, can have a contact even if they are operating on different repeaters on different bands. As with single-band gateway operation, the D-STAR radios should acquire the necessary call sign information from the received packets to make replying automatic.

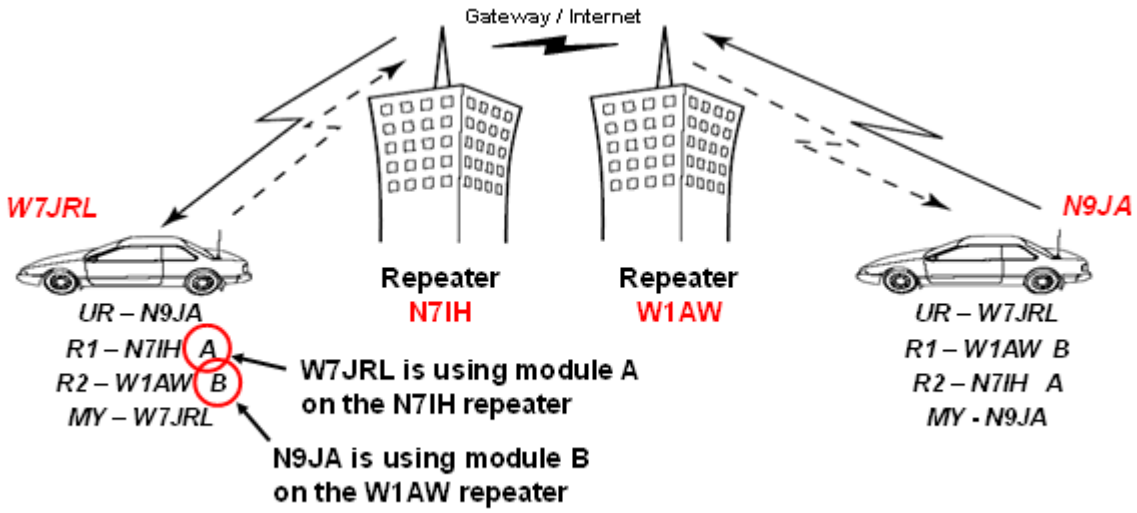

Figure 7-3

Just as with analog repeater systems, however, if you choose to specify the module the station you are calling must be listening on that band. Otherwise, they will not hear your call. Unlike analog systems, you can allow the D-STAR gateway to determine the proper module by using the call sign registry as discussed in earlier lessons.

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