

D-STAR Network Operation

Summary

The student will learn how the D-STAR system uses call signs to route communications around the D-STAR network. The concept of a D-STAR zone is introduced along with the D-STAR gateway that connects zones together. The student will also be introduced to programming call signs in a D-STAR radio for simple communications tasks.

Call Signs

D-STAR packets contain call signs identifying the origin and destination of each transmission, as well as repeater stations through which the transmission is routed. Call signs are stored in the memories of each D-STAR transmitter, just as alphanumeric labels can be stored in many modern VHF/UHF transmitters.

As you learned in the previous lesson, each D-STAR packet can carry up to four different call signs. The following list begins with the name of the field in the D-STAR packet (see **Figure 4-1**) for each of the four call signs:

- Own Call Sign - the call sign of the user making the transmission, referred to as "my call sign"
- Counterpart Call Sign - the call sign of the station the user wishes to or is in contact with, referred to as "your call sign"
- Sender Repeater Call Sign - the repeater and specific module (A-D) through which the user intends to communicate, referred to as "repeater 1"
- Receiver Repeater Call Sign - the repeater and specific module (A-D) through which the station identified by Counterpart Call Sign will communicate, referred to as "repeater 2"

D-STAR Call-Signs

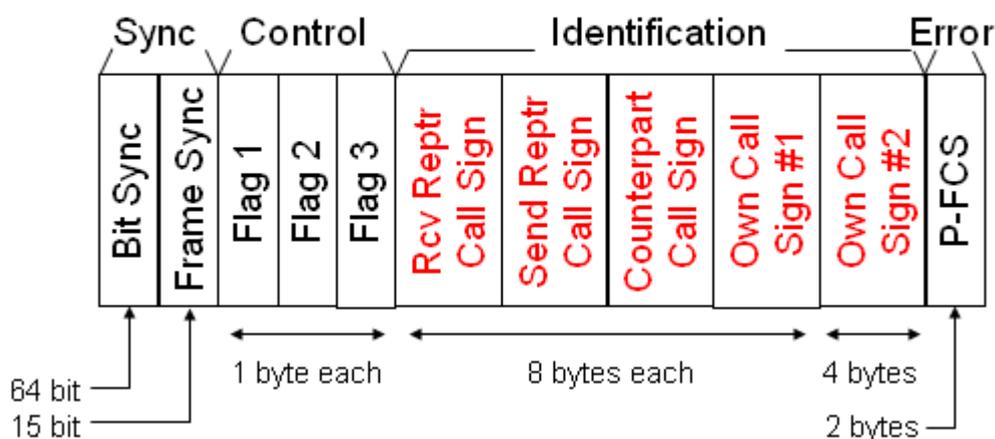


Figure 4-1

The call signs provide the identity of the packet's origin, destination, and repeaters used. The D-STAR network needs this information to make sure that the packets from one station to another take the right path as illustrated in **Figure 4-2** below. The repeaters can be located anywhere there is Internet access, so the users can be across town or on different

continents.

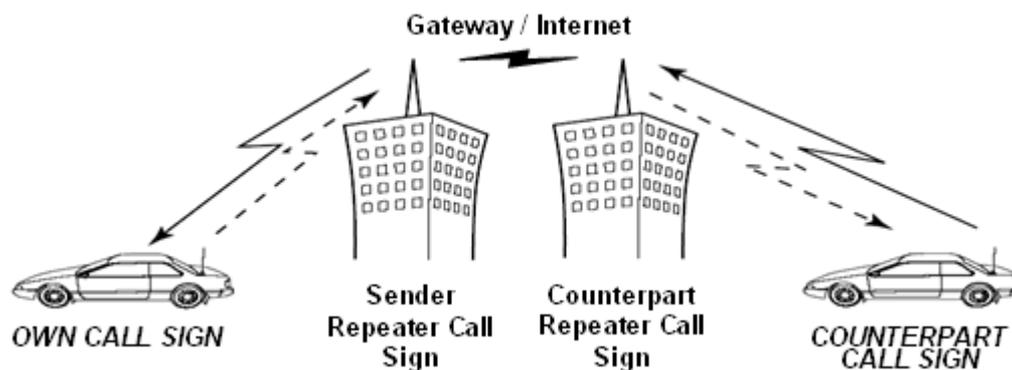


Figure 4-2

Each D-STAR repeater can have up to four **modules** that handle voice or data, each identified by a letter; A, B, C or D. Each module acts as a separate repeater sharing a common controller with the other modules. By adding the module identifier letter in a repeater call sign, the information is routed only to that module.

It is important to remember that even though a transmission may be directed to a specific station, all D-STAR transmissions not over an Internet link are public and can be monitored by anyone, just as on analog repeaters. There are no "private conversations" on the D-STAR network.

D-STAR recognizes government-assigned call signs of users or repeaters up to 8 characters long, which is sufficient for a 6-character call, plus a slash and one numeric portable indicator digit. Extra information can be added as a suffix to the originating station's call sign in the Own Call Sign #2 field.

Note that any routing suffix letters must be in the 8th available space in the call sign. For example, if the repeater has a 4-character call sign, three spaces must be added before the routing suffix letter.

If the character string "CQCQCQ" is present in the Counterpart Call Sign field, it indicates that the calling station wishes to talk to any station. This is the same as saying "N9JA monitoring" or "W7JRL for a contact" on an analog repeater.

Prefixes and Suffixes

Prefixes and suffixes added to the call sign do not have the same meaning or format as in an analog transmission. These prefixes and suffixes are routing information for the D-STAR repeater controllers to tell them how to handle the packet. D-STAR suffix characters are separated from the call by spaces.

Point-to-Point Simplex

The simplest D-STAR contact is a simplex, user-to-user contact without any repeaters involved. To make a simplex contact, the calling station programs their call sign in the Own Call Sign field and "CQCQCQ" or the desired station's call sign in the Counterpoint Call Sign field. Operation is then conducted just as it is on analog FM.

Repeater Operation

Using a local D-STAR repeater is very much like simplex communications except that the repeater's call sign must be programmed into the Sender Repeater Call Sign field. For a repeater to relay a D-STAR signal, it must recognize its own call sign in the packets from the transmitting station. The transmitting station must also include the letter identifying the repeater module being used in the repeater call sign.

D-STAR Zones

Just as analog repeaters can be linked together to extend the range of communications, D-STAR repeater modules can be linked into **zones**. A D-STAR Zone consists of all of the repeater modules that share a common **gateway**, the Internet connection for a D-STAR repeater. **Figure 4-3** shows how this works.

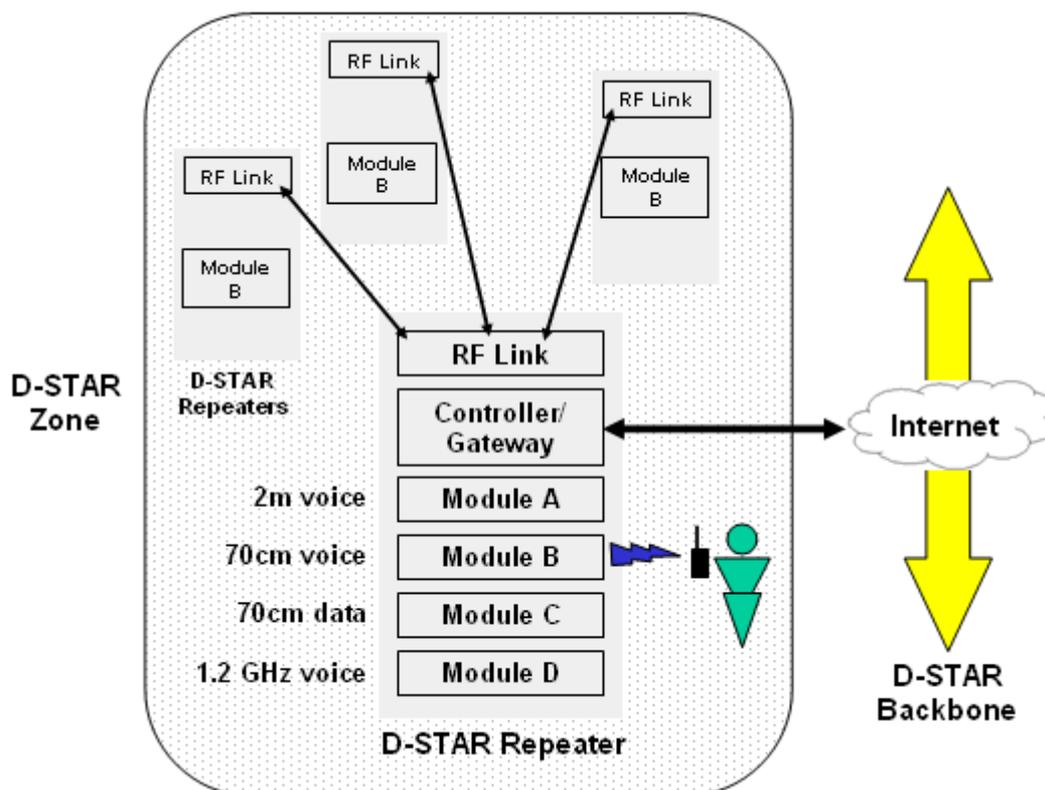


Figure 4-3

Within the group of repeaters, modules identified with the same letter, such as 'B', form a D-STAR Zone. The zone may be a single repeater with a single module assigned the letter B or there may be several repeaters with B modules. The important thing to remember is that all of the repeaters must share a single, common gateway.

D-STAR Gateway

A D-STAR gateway is a broadband Internet connection from a D-STAR repeater controller to other D-STAR repeaters around the world. Using a gateway is how users in different zones can communicate. The user is required to know the call sign of the zone's repeater that provides the gateway.

Adding a "G" to a repeater call tells the D-STAR repeaters to send the transmission via the gateway. Note that 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."

Call Routing

What if the user does not know the call sign of the repeater on which the desired station is operating? The D-STAR network provides that information automatically through the D-STAR [registry](#).

The registry is a database of user call signs registered on the D-STAR network by repeater system operators. Each D-STAR gateway has a copy of that database, which is maintained by several D-STAR [trusted servers](#) located around the world. Each D-STAR repeater gateway database is updated a number of times each day.

For a user to make use of the D-STAR network, his or her call sign must be added to the registry by a D-STAR repeater operator, just as you are assigned a password for a computer system. (Note that you can make simplex contacts without registering.) Once added to the list, each time the user transmits via a D-STAR repeater, the user's location is updated in the master registry where it will be provided to all D-STAR gateways.

To contact a registered station, the calling station enters that call sign into the UR call sign field and instructs the repeater to use the gateway by adding "G" after the R1 or R2 call sign as described above. The D-STAR controller will then look up the station's call in its database and route the call to the repeater on which the call last registered.

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