Network

D-Star call sign terminology

- The terminology is from the viewpoint of the communication link!
  - "MyCall" is really **YOUR** call sign; that is, you, the guy or gal holding the radio or microphone.
  - "YourCall" (also called "UrCall") is really the call sign of the **OTHER** person, that is, the person you want to talk to (you only set this when you use the D-Star gateway system).
  - "Rpt1Call" (also called "R1Call") is the call sign of the local repeater.
  - "Rpt2Call" (also called "R2Call") is the call sign of the local gateway computer.

Using the local D-Star repeater

- Most D-Star repeater installations have more than one repeater. Each repeater is on a different amateur radio band. By convention:
  - The “C” module is on the “2m” band (144-148 MHz).
  - The “B” module is on the “70cm” band (440-450 MHz).
  - The “A” module is on the “23cm” band (1.2 GHz).

Talking around the world (FM)

- With some analog repeaters, there are systems (eg, “EchoLink” & “IRLP” that allow you to use the Internet to connect two or more repeaters together:
  - A local computer connected to the repeater digitizes the voice and sends it to a remote computer, which converts the audio back to analog and sends it to the remote repeater for transmission over the air.

Talking around the world (D-Star)

- With most D-Star repeater installations, there is a local computer that also connects the repeater to the Internet.
  - This repeater is called the "gateway".
  - However, it is the user's radio, not the gateway, that converts the audio to a digital signal before transmission, and decodes it upon reception.
  - The gateway does a lot more than just connect two remote repeater systems.

The D-Star network

- There are four ways to communicate with other users on other D-Star repeaters, using the D-Star network:
  1. "Repeater routing" – this is part of the original D-Star design.
  2. "Call sign routing" – this is part of the original D-Star design.
  3. Using "repeater linking" – this capability was added by "D-Plus", a gateway software add-on.
  4. Using "reflector linking" – this capability was added by "D-Plus", a gateway software add-on.
- #s 1 & 2 are slightly complex, and if both you & the other user don't "get it right", you will not be able to talk.
- #s 3 & 4 are much simpler to setup & use, and often the repeater is already set in that mode.

D-Star network basic setup (1)

- To use **any** of these D-Star network modes, you must specify the "Rpt2Call" field:
  - The "Rpt2Call" field designates the gateway computer, which is considered the "G" D-Star module.
  - In the USA, the "Rpt2Call" field also contains the local repeater call sign (never the remote repeater or gateway).
  - You **must** set the gateway call sign & module into the "Rpt2Call" field. The module ("G") **must** be set in the 8th character position of the "Rpt2Call" field.

D-Star network basic setup (2)

- "MyCall" is set to your call sign.
- "UrCall" is initially set to "CQCQCQ" or "/" (the latter is recommended on newer Icom D-Star radios).
- "Rpt1Call" is set to the local repeater call sign, with the module ("A", "B", or "C") in the 8th character position of the "Rpt1Call" field.
- Even for local repeater calls, it is best to always set "Rpt2Call" to the local gateway call sign, with the module ("G") in the 8th character position of the "Rpt2Call" field.

D-Star “network routing” overview

- Advantages of call sign routing:
  1. You can call another user without knowing which repeater that user is currently on.
- Limitations of repeater or call sign routing :
  1. You can’t hear what is happening on the remote repeater.
  2. You usually need to initially announce that you are remote, so that the remote user(s) know to set up their radios for repeater or call sign routing.
  3. If the remote user doesn’t setup his/her radio correctly, you will be unable to have a successful two-way conversation.

D-Star “network linking” overview

- Advantages of repeater or reflector linking:
  1. You can hear what is happening on the remote repeater(s).
  2. The remote user does not need to configure his/her radio in order to respond.
  3. A repeater can be left in this configuration for new users.
- Limitations of repeater or reflector linking :
  1. You can’t call another user without knowing which repeater that user is currently on.

D-Star call sign routing: call

- For the user wanting to contact another user using call sign routing, it's easy:
  - You set the "YourCall" field to the other user's call sign.
- The gateway computer looks in its local copy of the D-Star database to find the last repeater that the other user was on, and routes the call there.

D-Star call sign routing: reply

- If other users at the remote repeater hear your call and wish to reply, they must program their radios to send their transmissions back to the caller.
- To do this, they must set "YourCall" to either:
  1. the caller's callsign; or
  2. the call sign of the repeater that the caller is on.
- This can be done by either:
  1. Manually setting the "YourCall" field; or
  2. immediately (before anyone else transmits) pressing the "RX->CS" button (the label varies among radio models).

D-Star repeater routing: call

- For the user wanting to contact another user using repeater routing, it's easy:
  - You set the "YourCall" field to the other repeater's call sign:
  - The first character is a slash ("/"),
  - followed by the other repeater's call sign,
  - followed by spaces to pad the field to seven (7) characters,
  - followed by the other repeater's module ("A", "B", or "C") in the 8th character position.
- The gateway computer routes the call to the indicated remote repeater.

D-Star repeater routing: reply

- If other users at the remote repeater hear your call and wish to reply, they must program their radios to send their transmissions back to the caller.
- To do this, they must set "YourCall" to either:
  1. the caller's callsign; or
  2. the call sign of the repeater that the caller is on.
- This can be done by either:
  1. Manually setting the "YourCall" field; or
  2. immediately (before anyone else transmits) pressing the "RX->CS" button (the label varies among radio models).

Call sign vs. repeater routing

- So, what's the difference?
- Note that the radio setup to reply, appears to be the same for both call sign routing and for repeater routing!
- Both call sign routing and repeater routing accomplish the exact same thing!
- What is different, depends upon your intent:
  - If the person you are talking to, moves (eg, mobile) to another repeater, call sign routing will automatically route your transmissions to the new repeater.
  - Repeater routing is fixed until you change "YourCall".

D-Star routing common features

- Features: common to both call sign and repeater routing:
  - All radios listening to either repeater can hear both sides of the conversation. **HOWEVER**:
  - If any other listener transmits on either repeater, only other listeners on that repeater will hear the transmission, **UNLESS** they **ALSO** program their radios for call sign or repeater routing.
  - This means if someone attempts to join the conversation, the local user should mention that call sign routing is in use.

D-Star call routing summary

- Normally, call sign routing is easier for the replying station to set (via the "Rx->CS" button), so it is normally used for remote calling.
- Repeater routing might be best if you want to talk to just anyone on the remote repeater.
- Of course, in any routing communications, some users can be using call sign routing and some can be using repeater routing.

D-Star linking

- Linking to D-Star repeaters and reflectors is made possible by the D-Star gateway software add-on by Robin Cutshaw / AA4RC.
- Linking to D-Star repeaters and reflectors was not envisioned in Icom's design of the D-Star network:
  - You can only link two D-Star repeaters together.
  - A reflector is very similar to a D-Star gateway, but without any repeater modules. You can link many D-Star repeaters to one reflector.

D-Star network commands

- These commands only work if:
  1. You have set the "Rpt2Call" field to specify your local gateway (otherwise the gateway will never see them).
  2. Your local gateway **must** be running:
     - "D-Plus", the gateway software add-on (written by Robin Cutshaw / AA4RC) to Icom's gateway software; or
     - "D-Extra" software on systems running non-Icom gateway software.
- These commands are set into the "YourCall" field of the radio. You key your radio to send the command to the gateway.

“Can you hear me now?”

- (with apologies to Verizon’s advertizing slogan).
- Ever want a **truly objective** signal report? Use the “echo” command:
  - Program a “YourCall” value of seven (7) spaces, followed by an “E” in the 8th (module) position.
  - Key your radio & speak a short test message of your choice (I recommend using the words “echo test” in it).
  - When you unkey your radio, the gateway will play back (“echo”) your transmission.
  - Remember to change your “YourCall” value back!

D-Star repeater linking

- To link to another repeater (running “D-Plus” or “D-Extra”), you set the “YourCall” field to the other repeater’s call sign:
  - Enter the other repeater’s call sign,
  - followed by spaces to pad the field to six (6) characters,
  - followed by the other repeater’s module (“A”, “B”, or “C”) in the 7th character position,
  - followed by the “link” command (“L”) in the 8th character position.
- Key the radio briefly ONCE to set the link; you will hear a voice message announcing the result.
  - Remember to change your “YourCall” value back!

D-Star reflector linking

- To link to a D-Star reflector (running “D-Plus” or “D-Extra”), you set the “YourCall” field to the reflector’s “call sign”:
  - Enter the other reflector’s “call sign”,
  - followed by spaces to pad the field to six (6) characters,
  - followed by the other reflector’s “module” (“A”, “B”, or “C”) in the 7th character position,
  - followed by the “link” command (“L”) in the 8th character position.
- Key the radio briefly ONCE to set the link; you will hear a voice message announcing the result.
  - Remember to change your “YourCall” value back!

After the link …

- Once the link to a D-Star repeater or reflector has been established:
  - All repeaters linked together act as one repeater, with one caveat:
  - All users must insure that the "Rpt2Call" field is set to their local repeater's gateway, or their transmissions will not be heard on the other repeater(s).
  - Users should set the "YourCall" field to "CQCQCQ" or "/" (the latter is required on D-star radios using the "DR" ("D-Star Repeater") mode.

D-Star unlinking

- Program a "YourCall" value of seven (7) spaces, followed by an "E" in the 8th (module) position.
- Key your radio & speak a short test message of your choice (I recommend using the words "echo test" in it).
- When you unkey your radio, the gateway will play back ("echo") your transmission.
- Remember to change your "YourCall" value back!

D-Star tip: The new “DR” mode

- Icom’s new “D-Star Repeater” mode separates the “YourCall” memories from the “Rpt1Call”/Rpt2Call” memories.
- In “DR” mode, you can select the “YourCall” value, and then scroll through the “Rpt1Call”/Rpt2Call” memories without changing the “YourCall” value.
- Tip: Enter the “DR” mode **first**, before selecting a “YourCall” value.
- Tip: Save & use “/” as a “YourCall” value in place of “CQCQCQ”. When “YourCall” contains “CQCQCQ”, the “DR” mode will blank out the “Rpt2Call” field, and your transmissions will not be routed to the gateway (or a linked repeater or reflector).

D-Star network information

- This could be a whole session, so I will just list a few:
  - www.DstarDB.com (my site: tracks D-Star usage)
  - www.dstarinfo.com (D-Star programming calculator)
  - www.dstarusers.org (D-Star repeater list)
  - www.jfindu.net (and other APRS stuff)
  - www.aprs-is.net/DPRSCalc.aspx (D-PRS calculator)