STARnet Overview

May 20, 2011

STARnet Digital is a new application for use with D-STAR (Digital Smart Technology for Amateur Radio) that builds upon Smart Technology for Amateur Radio, creating dynamic networks of D-STAR radio stations through the worldwide network of D-STAR gateways and repeaters.

The fundamental building block of a STARnet Digital network is the **Group**. Each Group is accessed by a **Group Callsign**. User radios **subscribe** to a Group by putting the Group Callsign in the destination Your (UR) address of the D-STAR radio header and keying their transmitter. Once subscribed, any transmissions directed to the Group will be automatically relayed to the repeater where the subscribing station was last heard. The subscribing station can move from repeater to repeater and upon a transmission from the subscribing station to the repeater, the Group will automatically redirect Group transmissions to the subscribing station's new repeater.

D-STAR was designed to use addressable communications where the originating station selected the destination station by placing the callsign of the remote station in the destination Your (UR) field of the D-STAR radio. The D-STAR gateway network is responsible for keeping track of individual stations and routing communications based on the destination callsign. This is a one-to-one relationship and creates complications if more than two stations wish to communicate over a variety of gateways and repeaters.

Early D-STAR gateway software was and continues to be closed source with no Application Program Interface (API). To facilitate wide area communications, including a large network of stations, industrious developers created "bolt on" linking technology that "sniffs" network traffic and relays it "out of band" between gateways delivering it to other repeaters for retransmission. We applaud this work and believe that it will continue to provide needed functionality for certain types of network activity.

STARnet Digital takes the native, callsign routed, approach to creating a network of subscribing stations. The STARnet Digital server looks like a D-STAR repeater to a gateway. The STARnet Digital "repeater" advertises itself to the network, and individual Groups report through that repeater as if they were just another user station with a Group Callsign. Existing D-STAR gateways do not have to add any special software or hardware for its users to subscribe to STARnet Digital Groups, the subscribing stations simply set the destination Your (UR) address in their radio to the Group Callsign of the Group they wish to communicate with; no linking, no unlinking, no exclusivity of Groups which the repeater can relay.

All users that want to talk to the Group will simply put this callsign in the destination Your (UR) address field of their radio. For example, if station KJ4QAL wanted to participate on a Group with the Group Callsign EX4MPLE, the settings on their radio would be:

MY: KJ4QAL

Your (UR): EX4MPLE (See Table below for a example of an actual ICOM 91AD programmed with STARnet Group memory entries)

RPT1: <Local Repeater Callsign> (Whatever nearby repeater they want to use on the D-STAR network)

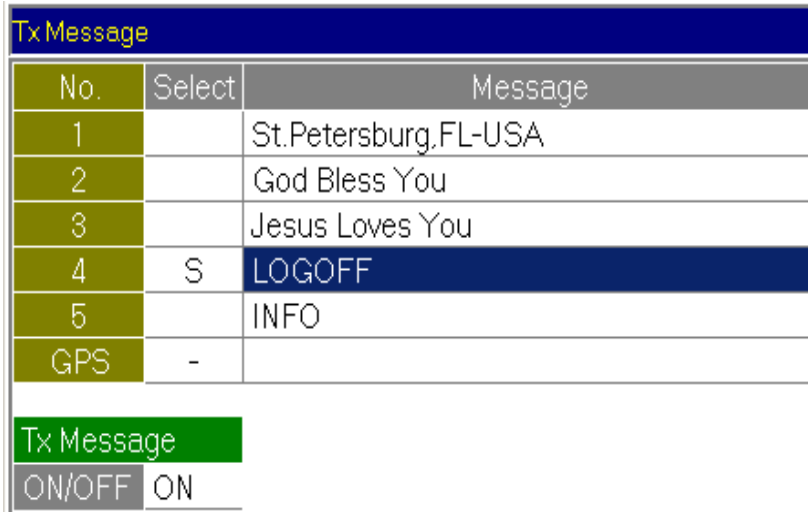
RPT2: <Local Repeater Gateway Callsign>

The local gateway must be setup to report into ircDDB, whether the gateway is an Icom G2, G4ULF, etc., or using the native ircDDBgateway. **The local gateway needs no additional software installed.** You can see if your local gateway is on the ircDDB network by visiting http://www.ircddb.net/– Select your country and look for the callsign of your local gateway.

When the user transmits for the first time, they will be automatically registered with the Group and any transmissions directed to the Group will be relayed back to the user. If the user moves to another repeater on a gateway that supports ircDDB, and transmits, the Group will follow them and send traffic for the Group to the new repeater. (It will stop sending to the previous repeater if the user was the last subscribing station on that repeater

If the station switches repeaters, the Your (UR) callsign will automatically switch to CQCQCQ on their radio, and the user will have to re-enter the Your (UR) callsign (or use callsign capture, usually the CS/RX button on their radio) to transmit into the group, but receive is automatic. Common Group Callsings are great candidates for the Your (UR) memories on the D-STAR radio.

The user can unsubscribe from the Group by either adding another memory with "T" for Terminate in the Your (UR) last position e.g. "STN727_T" **or** setting the Your (UR) to the Group Callsign, and put "LOGOFF" in the TX Message/Comment on their radio and quick keying your radio once. We recommend putting this command in one of the TX message memory slots on the radio for easy access and conservation of memory locations.



A user can subscribe to more than one Group at a time, but must set the destination Your (UR) call to each group individually with which the user wishes to send traffic.

Note that DVDongles, DVAPs, and DVAR Hotspots **will not be able to use STARnet Digital** since they do not currently support native D-STAR callsign routing, which is the transport technology for STARnet Digital. These devices use DPLUS linking rather than native D-STAR callsign routing. The STARnet Digital team would like to see software developed where these devices authenticate using strong authentication to a proxy server that would allow callsign routing to and from these “stations”. (Those individuals who currently run HotSpots, are advised that both G4ULF and ircDDBGateway software can operate on simplex radios and provide full callsign routing functionality.)

STARnet Digital was conceived and functionally designed by John Hays, K7VE, with code design, engineering, and implementation by Jonathan Naylor, G4KLX. It builds on the work of many others, including the JARL which developed the D-STAR protocol, and the ircDDB network team, for which we are grateful.

Listed below is a compilation of further information to help you and others to better understand this technology and how to use and leverage it. Note that the "**STARnet Digital Group Server**" is a first of its kind in the South Eastern United States and is being hosted by the Cyrus Radio Network Club of St.Petersburg, Florida and will hence forth be known as the **Greater Tampa Bay Area "STARnet Group"** or more applicably just storing a memory location into ones DSTAR Radio such as in the following Icom IC-91AD Memory Programming example for the W4ICY DSTAR Repeater (Note that the Your "UR" Call setting for the **CH "0"** Memory location is designated "**STN727_B**" necessary to call sign route subscribe to the this particular STARnet Group and additionally the **CH "1**" memory location is designated "**STN727_T**" necessary to Terminate the call sign subscription with this STARnet Group) :

		Frequency						TONE/TSQL						Digital		Call Sign			Bank	
CH	Select	Freq	DUP	Offset Freq	TS	Mode	Name	Skip	Tone	Repeater Tone	TSQL Freq	DTCS	DTCS Polarity	DSQL	Code	Your (UR)	RPT1	RPT2	Group	Ch
0		442.75000	+DUP	5.00000	5K	DV	GTBSG-B									STN727 B	W4ICY B	W4ICY G	S	0
1		442.75000	+DUP	5.00000	5K	DV	TERMIN	S								STN727 T	W4ICY B	W4ICY G	S	1
2		442.50000	+DUP	5.00000	5K	DV	GTBSG-B									STN727 B	W4THE B	W4ICY G	S	2
3		442.50000	+DUP	5.00000	5K	DV	TERMIN	S								STN727 T	W4THE B	W4ICY G	S	3
4		444.81250	+DUP	5.00000	5K	DV	GTBSG-B									STN727 B	W4RNT B	W4ICY G	S	4
5		444.81250	+DUP	5.00000	5K	DV	TERMIN	S								STN727 T	W4RNT B	W4ICY G	S	5
6	S	442.75000	+DUP	5.00000	5K	DV	NW7DR-A									STN002 A	W4ICY B	W4ICY G	S	6
7		442.75000	+DUP	5.00000	5K	DV	TERMIN	S								STN002 T	W4ICY B	W4ICY G	S	7

Note that the local repeater you are utilizing for D-STAR Gateway access must have already installed and have running on their repeater server the D-STAR Gateway add-on software package that the allows callsign routing subscribe to function between US-TRUST and non-TRUST users. This Java software uses "irc" (Internet Relay Chat) protocol to share data. Also note that the US-TRUST has given the "OK" for implementation and use of ircDDB on Gateways within the USTRUST network.

The name of the application is "**STARnet Digital**" (not StarNet, StarNet Digital, or other variations)

Tools, webpages, etc. should follow this branding. When shortened it is **STARnet**.

Servers are **STARnet Digital Group Servers** or when shortened they are called a **STARnet Server**

A network of **STARnet Subscribers** are called a **STARnet Group**

A station **subscribes** to a **group**, they do not "link"

If a STARnet Group is connected to a DEXTRA (or other) reflector, it is called a **STARnet Group Bridge** (or bridging)

We should talk in these terms to avoid confusion with “linking” systems like DPLUS or DEXTRA. It will help the user community start to differentiate between the technologies. We do not want STARnet Digital to be seen as a linking technology, it is a callsign routed system where each transmission is individually routed with individual clients able to subscribe to multiple groups and individual repeaters able to multiplex multiple groups for different users.

To see a listing of other Worldwide STARnet Groups:

http://db0fhn.efi.fh-nuernberg.de/doku.php?id=projects:dstar:starnet

To go to the official STARnet Digital Yahoo Group:

http://groups.yahoo.com/group/STARnetDigital/

To go to the official ircDDB Website :

http://www.ircddb.net/

For a Youtube ircDDB Gateway Demonstration:

http://www.youtube.com/watch?v=k1yCCUvFVzA&feature=player_embedded

Enjoy !

Kyle Jones
KJ4QAL
Trustee
Cyrus Radio Network Club