



CSRA D-STAR University 2015

at the University of South Carolina - Aiken

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CSRA D-STAR University 2015

Noon Session

- D-STAR History
- Current D-STAR Capabilities
- DR mode
- Updating Your Radio
- D-STAR Registration
- D-STAR Explained
- D-STAR Under the Hood
- Internet Labs
- D-STAR Data

D-STAR History

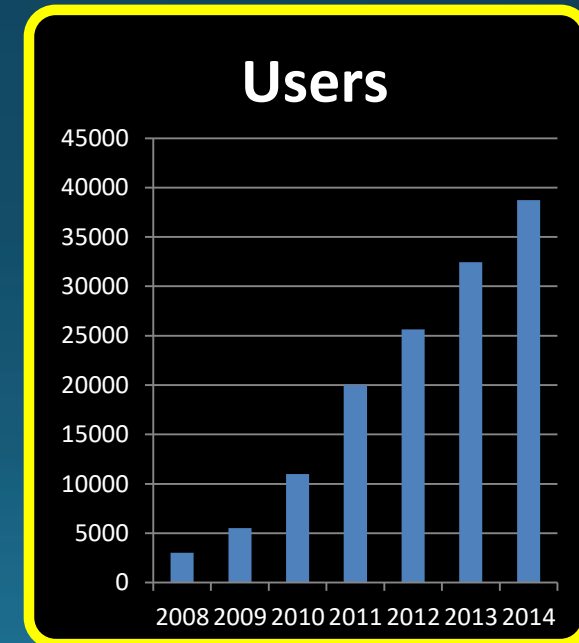
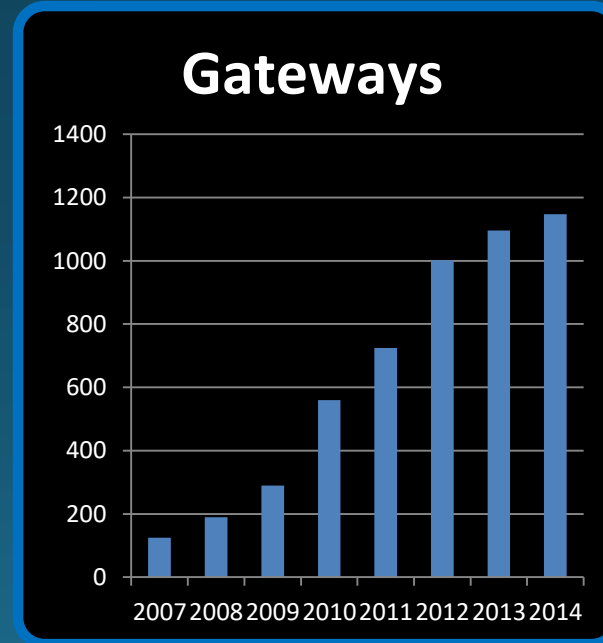
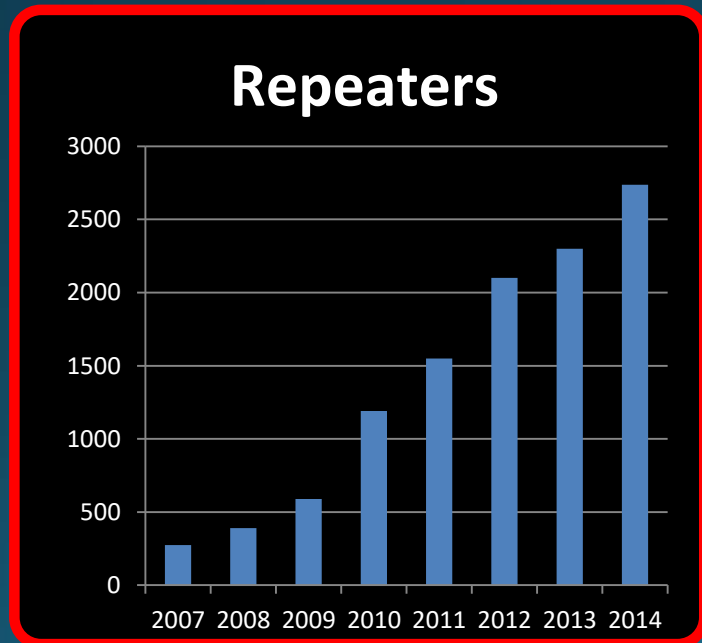
D-STAR History

	Event	Date	
Generation 0	Corporate HQ Introduction	2001	
	JARL published protocol	2001	
	Tokyo Ham Fair	2002	
	Dayton	5/2002	
	TAPR DCC	6/2002	
	D-STAR Introduced in Dayton	5/2003	
	ID- RP1D/VS – 1.2GHz Repeater (K5TIT)	2003	
	D-STAR Concept Article in QEX	2003	
	1st Generation	ID-1	8/2003
		IC2200H	3/2004
ID-800H		3/2005	
D-STAR 101 Class		8/2005	
48 Users		2006	
D-STAR Monitor		2006	
DSTARUsers.org		2006	
DPRS		2006	
RP2000, RP4000		5/2006	
IC-91AD		5/2006	
RP2C, RP2D, RP2V – Upgraded Repeater		7/2006	
ID-2820		3/2007	
Dayton Buy 10 ID-1 Get a RP2 Free		5/2007	
534 Users / 36 Repeaters		5/2007	
Huntsville Gateway Class		8/2007	
DVDongle		12/2007	
ID-92		3/2008	

	Event	Date	
2nd Generation	Icom releases "G2" software	3/2008	
	All users had to re-register		
	Multi- cast support		
	DPlus 2.0 released	3/2008	
	Chirp	2008	
	D-RATS	2008	
	DCHAT	2008	
	DSTARInfo.com	4/2008	
	First contact to Japan from Dayton	5/2008	
	201 Repeaters	8/2008	
3rd Generation	DVAP	2/2010	
	ID-80 / ID-880H	4/2010	
	ID-9100	3/2011	
	ID-31	4/2012	
	ID-51	4/2013	
	ID-7100	7/2013	
	Gen 3B	ID-5100	4/2014
		RS-MS1A Android App	3/2014
		ID-51+ Anniversary Edition	10/2014

D-STAR Continues to Grow

- As of January 1, 2015 – 1,147 DPlus Gateways, over 2,738 Voice Repeaters, 225 Data Modules and 38,724 registered users on US Trust Server.
- Over 1,200 repeaters in US



Current D-STAR Capabilities

Current D-STAR G2 Capabilities

- Voice
- Data (<1200bps DV)
- Data (<3600bps DV+) **NEW!**
- Data (<128kbps DD)
- Call Sign Routing

Gateway Software Capabilities

DPLUS

- Linking to repeaters and reflectors
- Connection of DV Dongles and DV Access Points
- Echo Test
- Linking status

ircDDB

- Linking to DCS and XREF reflectors

MONLINK

- Scheduled linking, unlinking
- Default links
- Announcements

Using DR Mode

Using DR Mode

- Digital Repeater Mode
- Radios have a database of Repeaters and Destinations
- Easy to Use
 - Pick Source Repeater
 - Updateable List
 - Nearest Repeater
 - Pick Destination / Function
- Automatic Programming of Radio

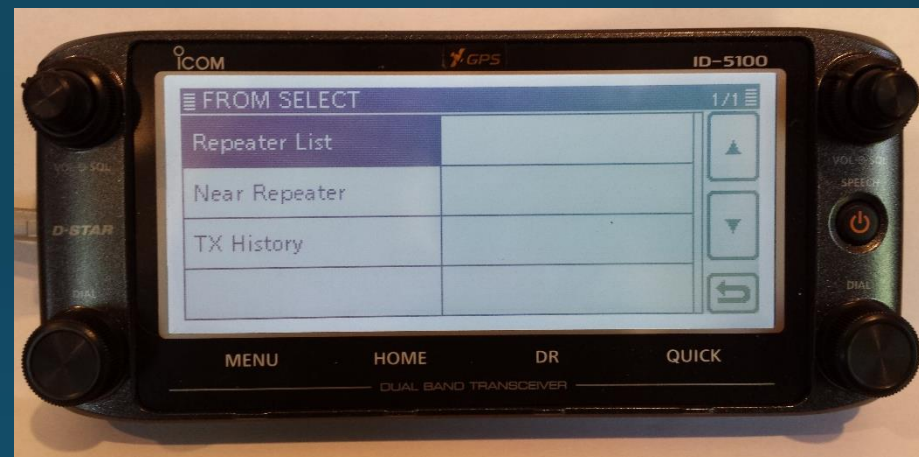
Memory Management – Generation 3 (DR Mode)

- Available on ID-31, ID-51, ID-51+, IC-7100, ID-5100
- Radios have regular memories usually used for FM
- Geocoded Repeater List / DR memories used for D-STAR
- ID-5100, ID-51+ Repeater List may be used for FM or D-STAR
- DR Mode introduces TO/FROM screen for easy use



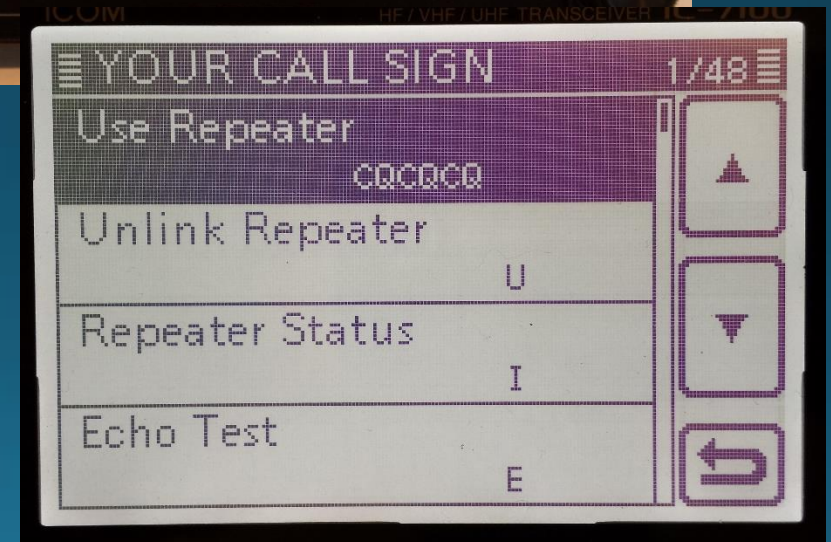
Using DR Mode

- Select FROM to pick a repeater
- Utilizes internal GPS to know where you are
- Repeater List has geocoded repeaters
- Selecting Nearest Repeater finds closest repeaters
- Select desired repeater



Using DR Mode

- Select TO on screen
- Select “Your Call Sign”
 (“Reflector” on ID-5100 / ID-51+)
- Select “Use Repeater” (“Link to Reflector” on ID-5100 / ID-51+) to talk (like CQCQCQ)



DR Mode

- Link to a repeater or reflector while in TO field by rotating knob (*ID-5100 select Gateway CQ for repeater list or Repeater List>Link to Reflector for list of reflectors*)
- Return to Use Repeater/Reflector for CQCQCQ for talking



D-STAR ICOM Android App

- Free app for Android phones, tablets – RS-MS1A
 - Works with ID-51A,(+) with OPC-2350LU cable
 - ID-5100 using cable or Bluetooth
- Use to display DR and radio settings
- Send/receive photos between compatible radios
- Text messaging in familiar look
- Expanded Repeater List



Updating Your Radio

Updating Your Radio

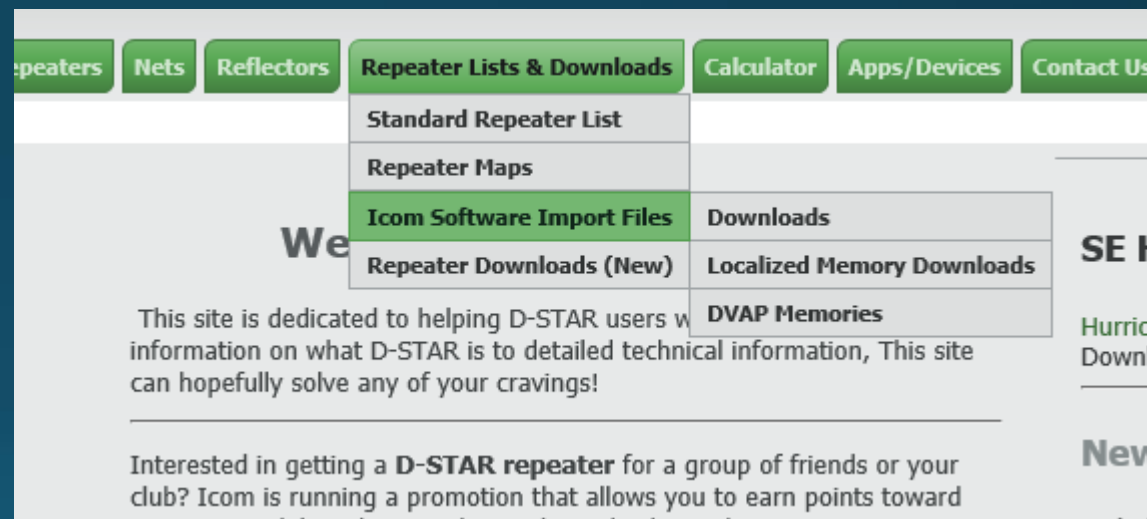
- Updated using Icom Software
- Updated information from DSTARInfo.com
 - Can import into Icom software and program radio
 - Can write to SD card and import into radio
- Updated using RT Systems software

www.rtsystemsinc.com



Exporting Updates

- Icom Software Import Files (Gen 1 & 2)
 - Downloads
 - Memory List
 - Repeater List
 - Your Call List
 - Localized Memory Downloads
 - DVAP Memories
- Repeater Downloads (New)



Repeater Downloads (New)



D-STAR INFO
INFORMATION, FAQs, AND MORE

ICOM 50th Anniversary Edition ID-51A 50th Anniversary Edition
Which color will you choose?

Home | FAQ | Conferences | Closest Repeaters | Nets | Reflectors | **Repeater Lists & Downloads** | Calculator | Apps/Devices | Contact Us

D-STAR Expanding...

Newest D-STAR Repeaters

Callsign	City	Country, State
AK2H	Leesville	United States, South Carolina
ZU9KDL	Port Elizabeth	South Africa
W1NPP	Auburn	United States, Maine
W0MDT	Ramsey	United States, Minnesota
VY2DSR	Kensington	Canada, Prince Edward Island
VE3STP	Mt.St.	Canada, New

We're Here for You!

This site is dedicated to helping D-STAR users world wide. From basic information on what D-STAR is to detailed technical information, This site can hopefully solve any of your cravings!

Interested in getting a **D-STAR repeater** for a group of friends or your club? Icom is running a promotion that allows you to earn points toward repeater modules when you buy radios. Check out the promotion at [D-STAR Points](#).

SE Hurricane Net

Hurricane Net Forms (Right Click to Download form)

New Downloads

Includes FM repeaters for US
D-STAR Repeater Downloads Updated

Choose Search Values

D-STAR Repeater Downloads Version 1.0 - 29 April 2014

Enter Location

We found the following location: Aiken, SC
United States/SC
Latitude 33.5616416931152 Longitude -81.7221374511719
Maidenhead Grid EM93dn

Select Radio	Select Radio
Radio Specifications	IC-7100A
Standard Memories	IC-7100E
Repeater List Length	IC-80AD
Your Call Sign List Length	IC-E80D
Name Display Length	ID-31A
	ID-31E
	ID-5100A
	ID-5100E
	ID-51A
	ID-51A Plus
	ID-51E
	ID-51E Plus
	ID-880H
	ID-E880
	RS-MS1A

Choose Percent FM

D-STAR Repeater Downloads Version 1.0 - 29 April 2014

Enter Location

We found the following location: Aiken, SC

United States/SC

Latitude 33.5616416931152

Longitude -81.7221374511719

Maidenhead Grid

EM93dn

Select Radio

Radio Specifications

Standard Memories 500

Repeater List Length 750

Your Call Sign List Length 200

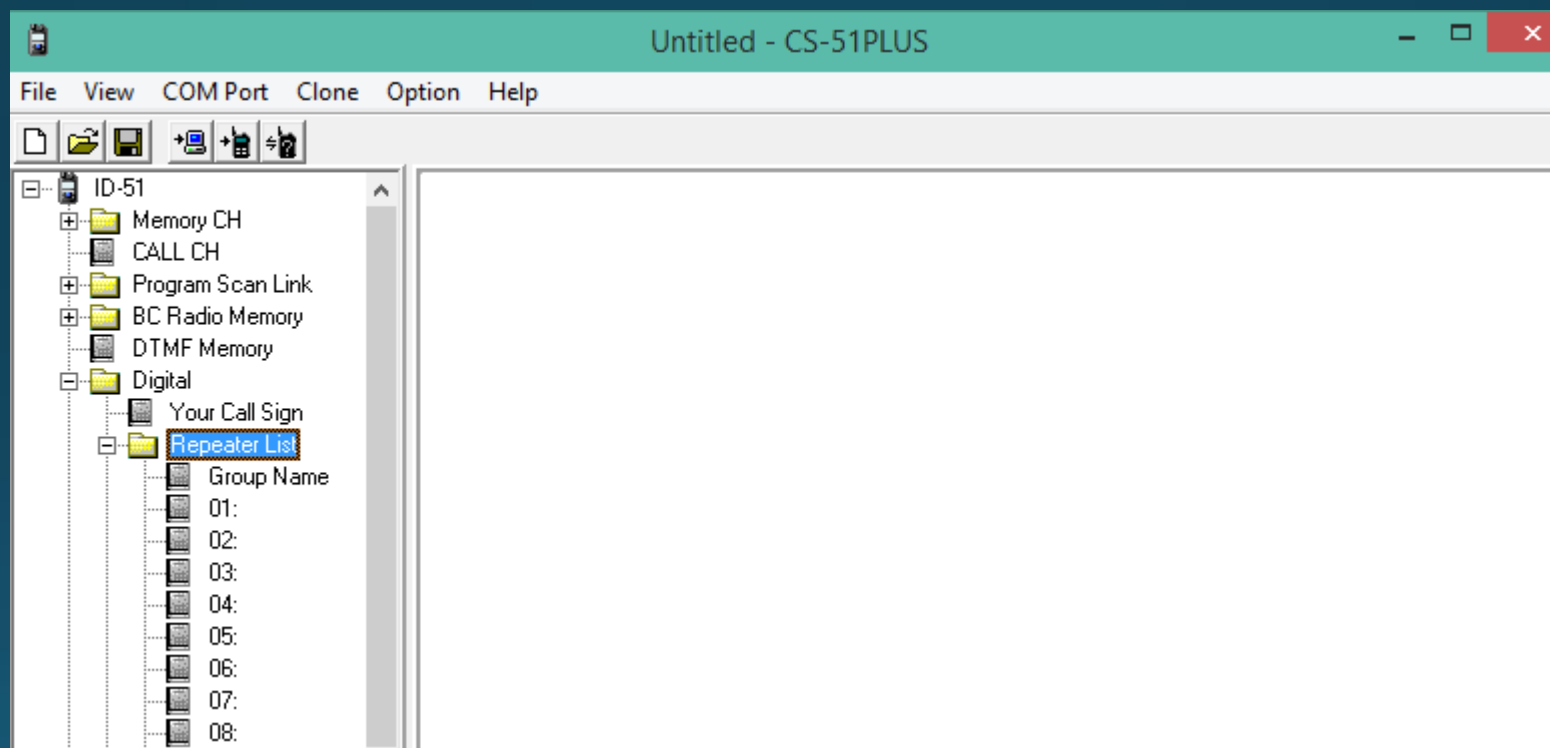
Name Display Length 16

Percent FM

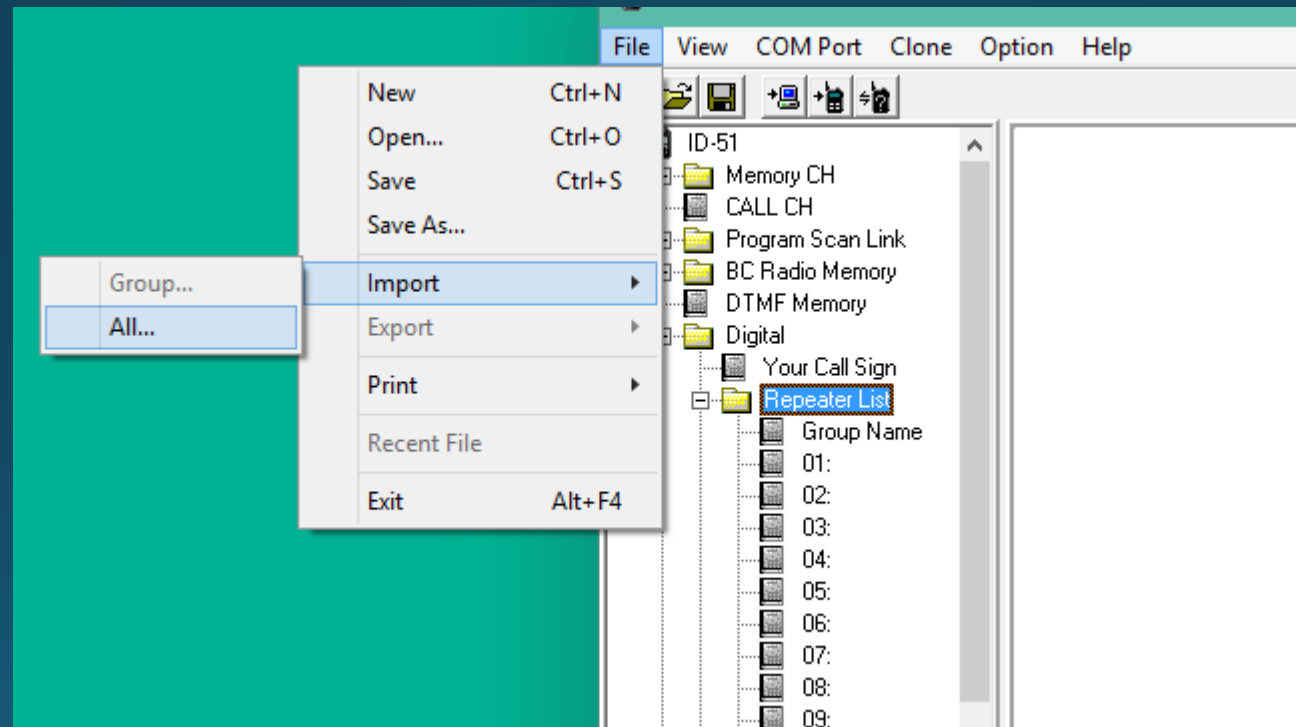
Format of File

22	USA South	High Point	North Car	W4GSO1 C	W4GSO1 G	146.16	DUP-	0.6	DV	OFF	82.5Hz	Yes	Approxim	36	-79.8	-5:00
22	USA South	Mt. Airy	North Car	KJ4HFV B	KJ4HFV G	444.5625	DUP+	5	DV	OFF	82.5Hz	Yes	Approxim	36.26	-80.39	-5:00
22	USA South	Raleigh	North Car	KR4RAL B	KR4RAL G	442.2125	DUP+	5	DV	OFF	82.5Hz	Yes	Approxim	35.68	-78.53	-5:00
22	USA South	Shelby	North Car	W4NYR C	W4NYR G	145.08	DUP+	1.4	DV	OFF	82.5Hz	Yes	Approxim	35.27	-81.33	-5:00
22	USA South	Shelby	North Car	W4NYR B	W4NYR G	444.1875	DUP+	5	DV	OFF	82.5Hz	Yes	Approxim	35.27	-81.33	-5:00
22	USA South	Tryon	North Car	KK4LVF B	KK4LVF G	442.875	DUP+	5	DV	OFF	82.5Hz	Yes	Approxim	35.28	-82.23	-5:00
22	USA South	Wingate	North Car	W4FAN B	W4FAN G	444.8625	DUP+	5	DV	OFF	82.5Hz	Yes	Approxim	34.98	-80.46	-5:00
22	USA South	Aiken	South Car	KR4AIK B	KR4AIK G	443.4125	DUP+	5	DV	OFF	82.5Hz	Yes	Approxim	33.57	-81.72	-5:00
22	USA South	Aiken	South Car	KR4AIK C	KR4AIK G	145.16	DUP-	0.6	DV	OFF	82.5Hz	Yes	Approxim	33.57	-81.72	-5:00
22	USA South	Awendaw	South Car	KR4CHS C	KR4CHS G	145.12	DUP-	0.6	DV	OFF	82.5Hz	Yes	Approxim	32.93	-79.69	-5:00
22	USA South	Beaufort	South Car	KJ4LNJ C	KJ4LNJ G	145.48	DUP-	0.6	DV	OFF	82.5Hz	Yes	Approxim	32.43	-80.4	-5:00
22	USA South	Caesars H	South Car	KR4GSP C	KR4GSP G	145.42	DUP-	0.6	DV	OFF	82.5Hz	Yes	Approxim	35.11	-82.62	-5:00
22	USA South	Charleston	South Car	W4HRS C	W4HRS G	145.16	DUP-	0.6	DV	OFF	82.5Hz	Yes	Approxim	32.79	-79.95	-5:00
22	USA South	Charleston	South Car	W4HRS B	W4HRS G	444.1125	DUP+	5	DV	OFF	82.5Hz	Yes	Approxim	32.79	-79.95	-5:00
22	USA South	Charleston	South Car	WR4SC C	WR4SC G	145.12	DUP-	0.6	DV	OFF	82.5Hz	Yes	Approxim	33.04	-79.61	-5:00

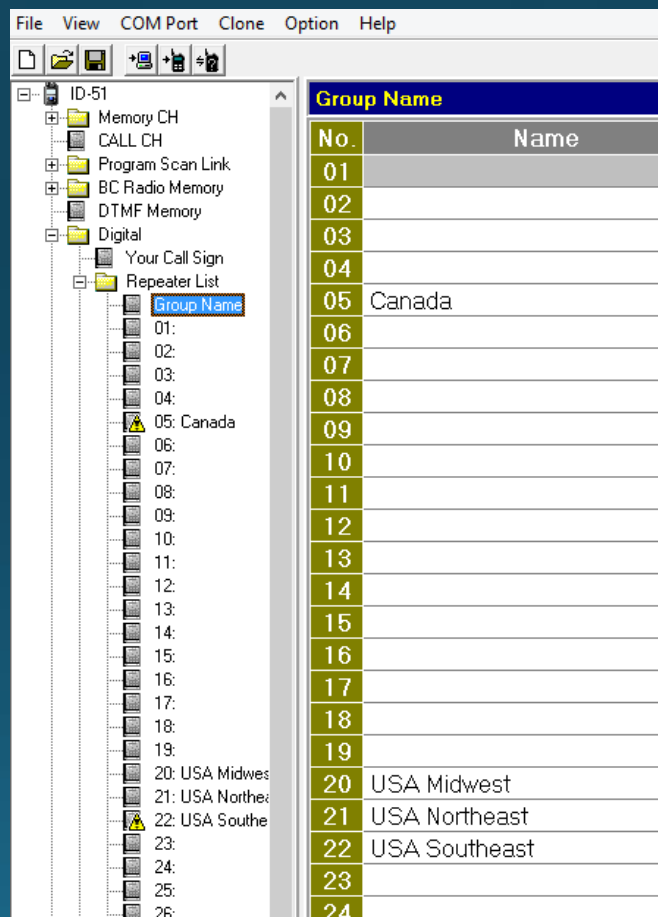
Importing into CS-51PLUS



Import All into Repeater List



Group Names Appear



Local Repeaters Appear

File View COM Port Clone Option Help

ID-51

- Memory CH
- CALL CH
- Program Scan Link
- BC Radio Memory
- DTMF Memory
- Digital
 - Your Call Sign
 - Repeater List
 - Group Name
 - 01:
 - 02:
 - 03:
 - 04:
 - 05: Canada
 - 06:
 - 07:
 - 08:
 - 09:
 - 10:
 - 11:
 - 12:
 - 13:
 - 14:
 - 15:
 - 16:
 - 17:
 - 18:
 - 19:
 - 20: USA Midwes
 - 21: USA Northe
 - 22: USA Southe
 - 23:
 - 24:
 - 25:
 - 26:

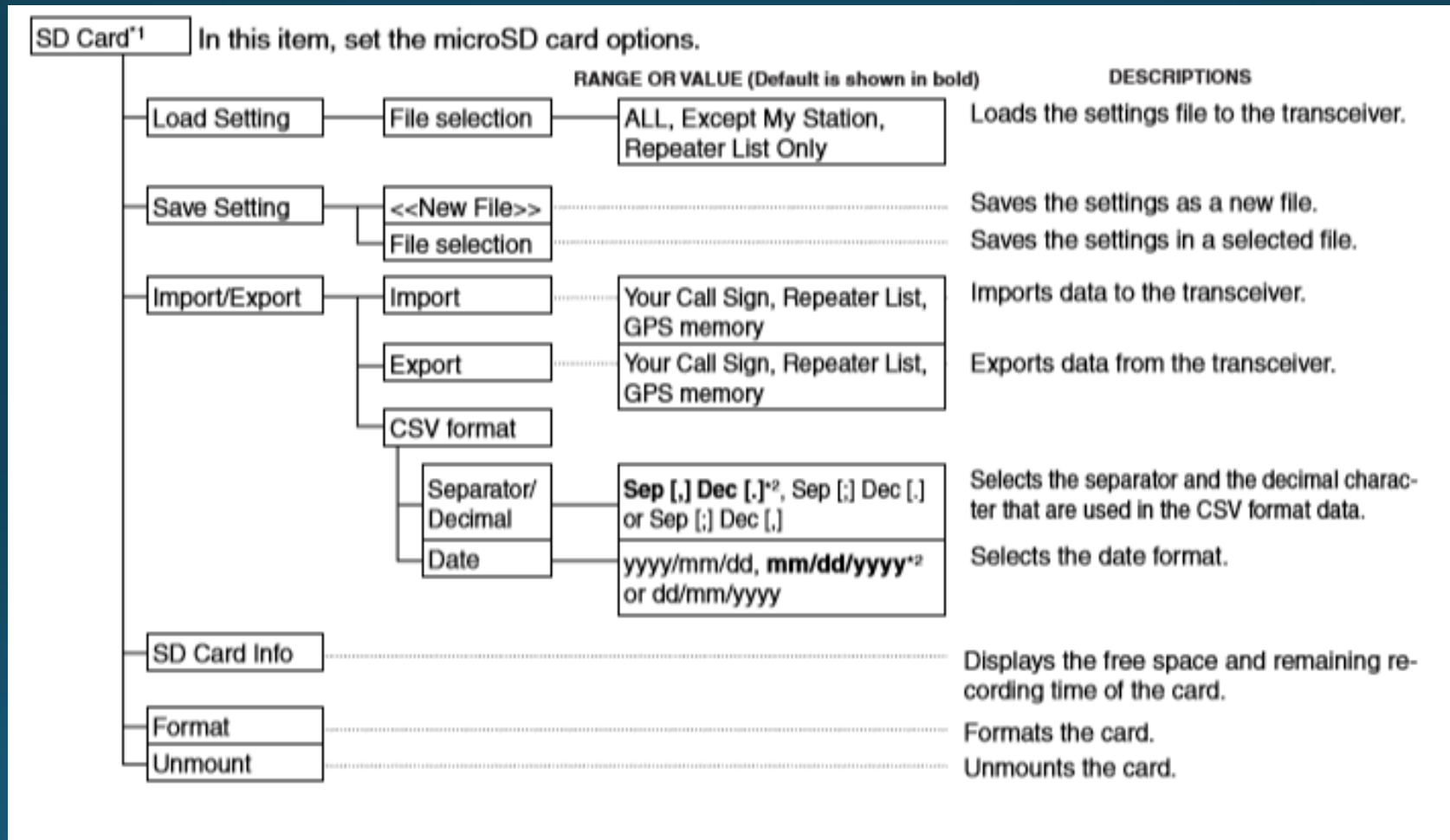
22: USA Southeast (Remain 0 memories)

No.	Type	Name	Sub Name
0	DV Repeater	Alexander City	Alabama
1	DV Repeater	Anniston	Alabama
2	DV Repeater	Anniston	Alabama
3	DV Repeater	Birmingham	Alabama
4	DV Repeater	Birmingham	Alabama
5	DV Repeater	Birmingham	Alabama
6	DV Repeater	Birmingham	Alabama
7	DV Repeater	Birmingham	Alabama
8	DV Repeater	Clanton	Alabama
9	DV Repeater	Clanton	Alabama
10	DV Repeater	Enterprise	Alabama
11	DV Repeater	Enterprise	Alabama
12	DV Repeater	Ft Payne	Alabama
13	DV Repeater	Ft Payne	Alabama
14	DV Repeater	Gadsden	Alabama
15	DV Repeater	Gadsden	Alabama
16	DV Repeater	Greenville	Alabama
17	DV Repeater	Greenville	Alabama
18	DV Repeater	Guntersville	Alabama
19	DV Repeater	Huntsville	Alabama
20	DV Repeater	Huntsville	Alabama
21	DV Repeater	Huntsville	Alabama

Save .csv File to μ SD Card

- D:\ID-51\Csv\RptList
- Keep file name short
- Remove Non-AlphaNumeric Characters in file name
- Import CSV into Radio
- Menu – SD Card – Import/Export – Import – Repeater List – FileName
- Reboot Radio

Import Directly to Radio



Registration

Registration

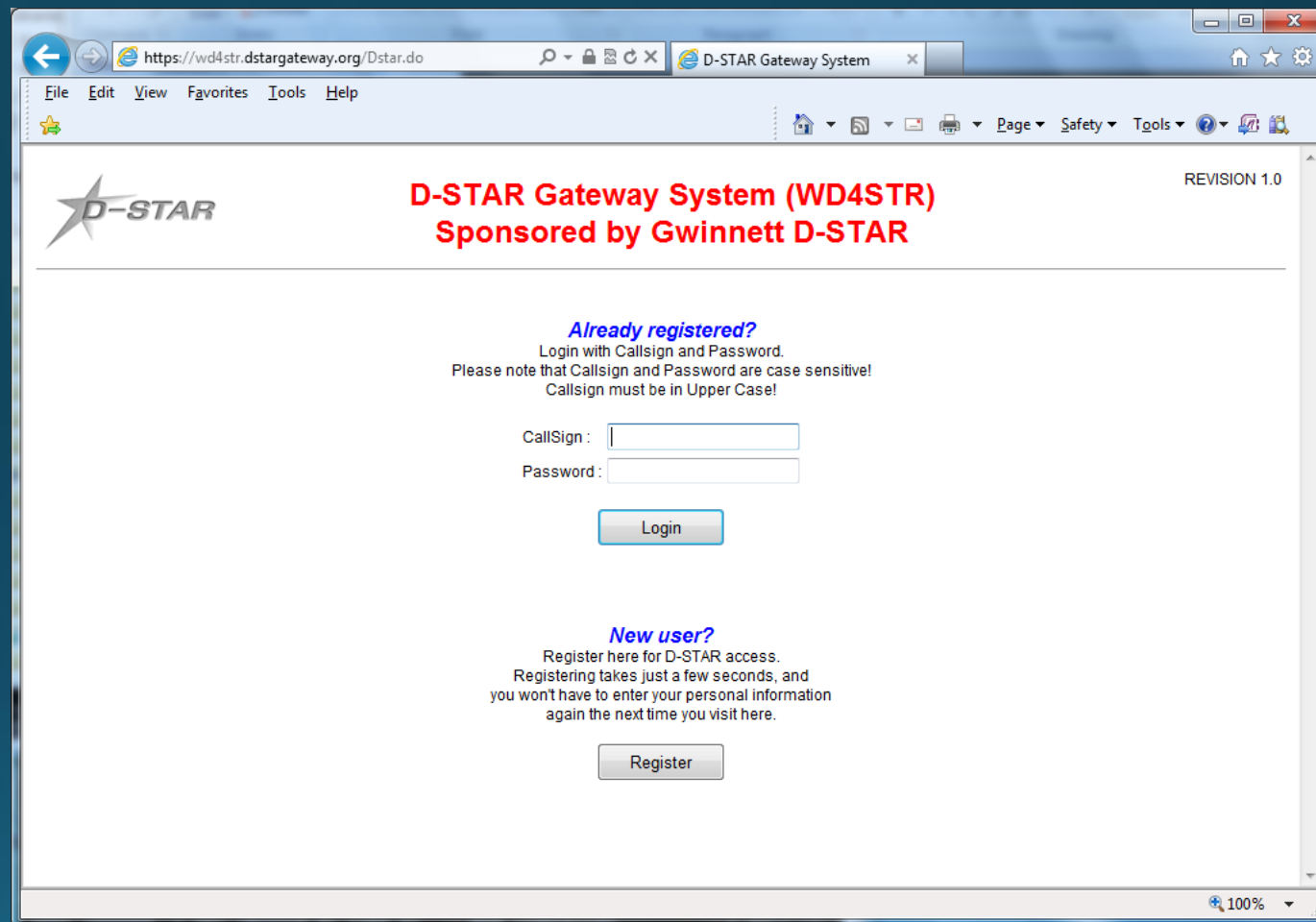
- NOT REQUIRED TO TALK ON D-STAR!
- Only required when
 - Linking Repeater
 - Accessing D-STAR from Internet
 - Using DVDongle, DV Access Point with DPLUS

The Registration Process

- Why register?
- Registering your call sign allows access to more functions (call sign routing, linking)
- Register on your local or the closest system
- Register on one and only one system (local registration syncs with all systems throughout world)
- Registration is a three-step process (*all three steps must be completed*)
- <http://www.dstargateway.org> for steps

Starting Registration

- Step 1 – Browse to desired system and register as new user
(<https://callsign.dstargateway.org/Dstar.do>)




https://wd4str.dstargateway.org/Dstar.do

D-STAR Gateway System

File Edit View Favorites Tools Help

Home Print Page Safety Tools

 **D-STAR Gateway System (WD4STR)** REVISION 1.0
Sponsored by Gwinnett D-STAR

Already registered?
Login with Callsign and Password.
Please note that Callsign and Password are case sensitive!
Callsign must be in Upper Case!

CallSign :

Password :

Login

New user?
Register here for D-STAR access.
Registering takes just a few seconds, and
you won't have to enter your personal information
again the next time you visit here.

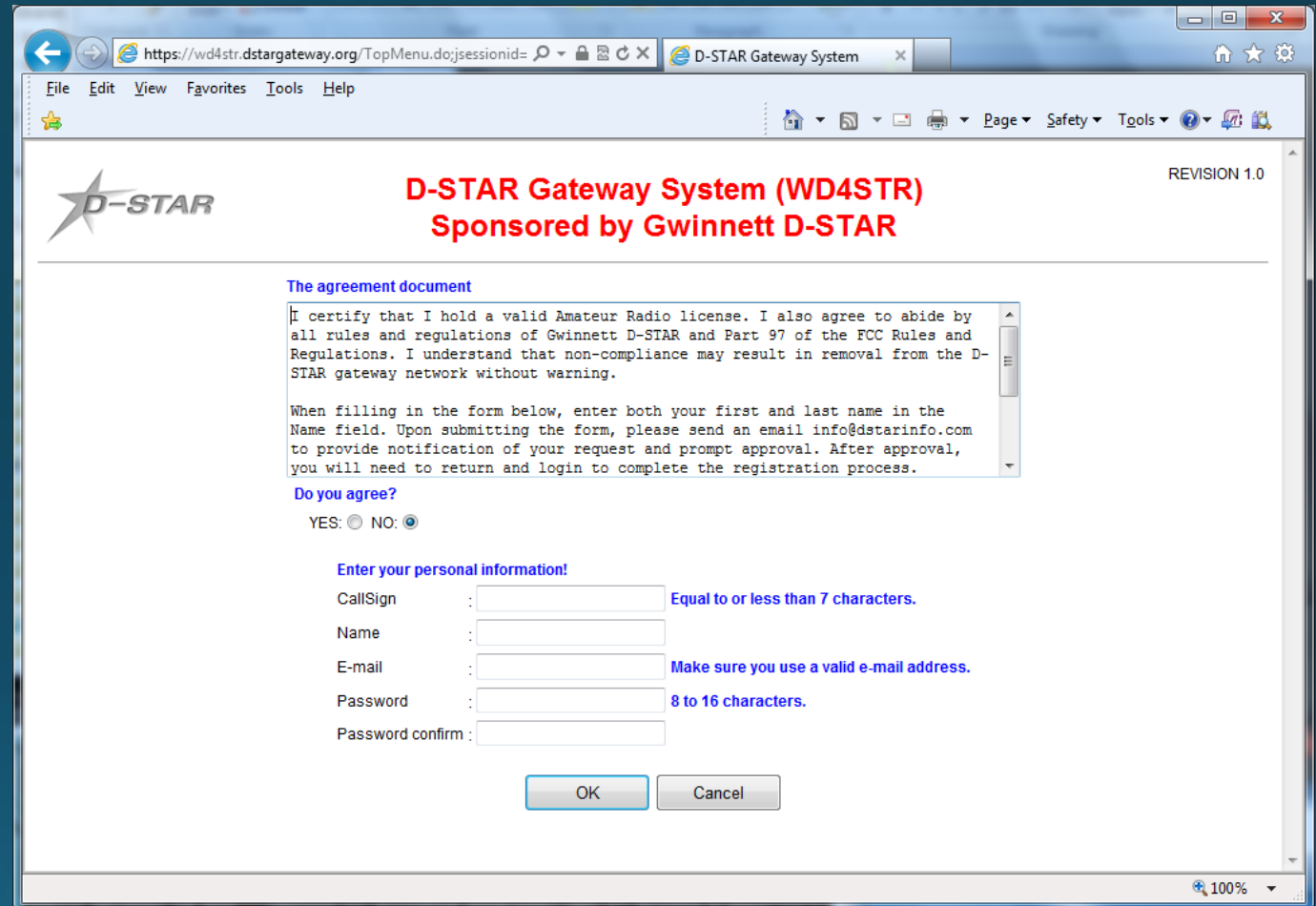
Register

100%

Fill Out Your Info

Fill out the info (call sign, name, email address and desired password)

- Step 2 – System administrator must approve your initial registration. *You may need to send email to admin.*



The screenshot shows a web browser window with the URL <https://wd4str.dstargateway.org/TopMenu.do?sessionid=>. The page title is "D-STAR Gateway System (WD4STR) Sponsored by Gwinnett D-STAR" and it is labeled "REVISION 1.0". The D-STAR logo is visible in the top left. The main content area contains an agreement document with the following text:

The agreement document

I certify that I hold a valid Amateur Radio license. I also agree to abide by all rules and regulations of Gwinnett D-STAR and Part 97 of the FCC Rules and Regulations. I understand that non-compliance may result in removal from the D-STAR gateway network without warning.

When filling in the form below, enter both your first and last name in the Name field. Upon submitting the form, please send an email info@dstarinfo.com to provide notification of your request and prompt approval. After approval, you will need to return and login to complete the registration process.

Do you agree?
YES: NO:

Enter your personal information!

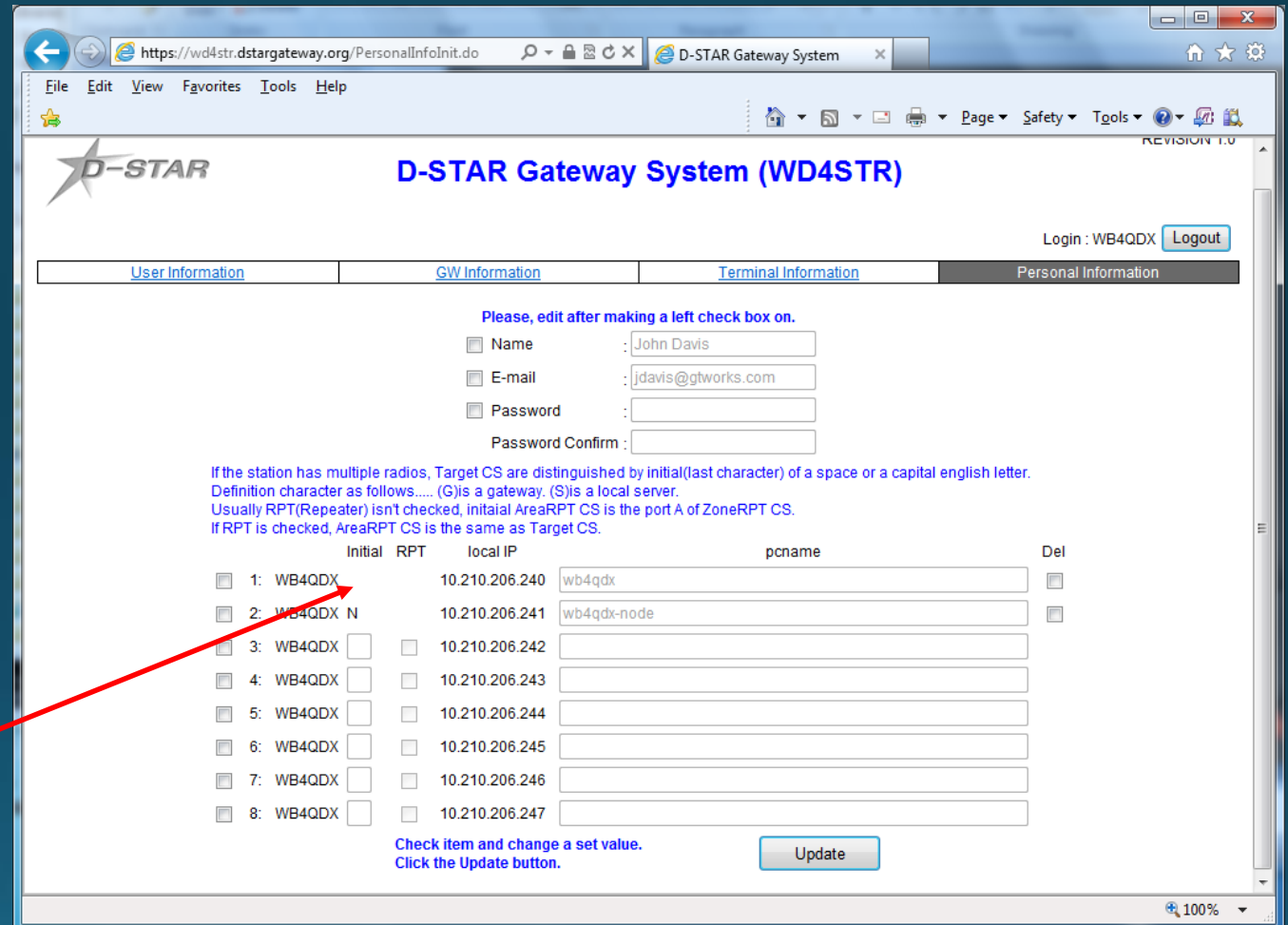
CallSign : Equal to or less than 7 characters.
Name :
E-mail : Make sure you use a valid e-mail address.
Password : 8 to 16 characters.
Password confirm :

Buttons: OK, Cancel

Add a Terminal

- Step 3 – Add at least one terminal with a space in first row under Initial, then type a pc-name (lower case, e.g. wb4qdx-dstar)

Note: You only need one terminal, a "space" for use. Adding more terminals can add confusion



D-STAR Gateway System (WD4STR)

Login: WB4QDX [Logout](#)

[User Information](#) | [GW Information](#) | [Terminal Information](#) | [Personal Information](#)

Please, edit after making a left check box on.

Name : John Davis
 E-mail : jdavis@gtworks.com
 Password :
 Password Confirm :

If the station has multiple radios, Target CS are distinguished by initial(last character) of a space or a capital english letter. Definition character as follows.... (G)is a gateway, (S)is a local server. Usually RPT(Repeater) isn't checked, initial AreaRPT CS is the port A of ZoneRPT CS. If RPT is checked, AreaRPT CS is the same as Target CS.

	Initial	RPT	local IP	pcname	Del
<input checked="" type="checkbox"/>	1: WB4QDX		10.210.206.240	wb4qdx	<input type="checkbox"/>
<input checked="" type="checkbox"/>	2: WB4QDX N		10.210.206.241	wb4qdx-node	<input type="checkbox"/>
<input type="checkbox"/>	3: WB4QDX	<input type="checkbox"/>	10.210.206.242		
<input type="checkbox"/>	4: WB4QDX	<input type="checkbox"/>	10.210.206.243		
<input type="checkbox"/>	5: WB4QDX	<input type="checkbox"/>	10.210.206.244		
<input type="checkbox"/>	6: WB4QDX	<input type="checkbox"/>	10.210.206.245		
<input type="checkbox"/>	7: WB4QDX	<input type="checkbox"/>	10.210.206.246		
<input type="checkbox"/>	8: WB4QDX	<input type="checkbox"/>	10.210.206.247		

[Check item and change a set value.](#)
[Click the Update button.](#)

[Update](#)

D-STAR Explained

What is D-STAR?

- D-STAR is an open standard for digital voice and data on Amateur Radio
- One of several digital modes in Amateur Radio
- Developed by Japan Amateur Radio League (JARL)
- Uses AMBE vocoder chip from DVSI
- Icom is first manufacturer with base, mobile, handhelds and repeater equipment
- Connect Systems planning D-STAR handheld for 2015
- Other vendors offering other products

How does D-STAR work?

- Voice is converted to digital modulation and transmitted at 4800 bps
 - 2400 bits for voice
 - 1200 bits for Forward Error Correction on voice
 - 1200 bits for data (error correction usually in applications)
 - Faster data speed (~3600 bps) with ID-51+ or ID-5100 with (firmware upgrade)
- True narrowband digital signal
 - Voice and data occupy one 6.25 KHz signal (versus 12.5 KHz FM channels for voice, System Fusion, P25 and MotoTRBO)
- Can operate simplex, repeater or linked to other repeater(s)

What can D-STAR Do?

- Transmit or receive voice and 1200/3600 baud data simultaneously on 2m, 440 and 1.2 GHz (no TNC required)
- 128 Kb data transmission on 1.2 GHz with Internet connectivity (Ethernet bridge to Internet with IP address)
- D-PRS (digital APRS) automatic position reporting simultaneous with voice with GPS
- Flexible repeater linking with Gateway and Internet connection
- Reflectors act as conference bridge for linking multiple repeaters (60+ DPLUS, 30+ DCS and 10+ XREF Reflectors now in operation worldwide)
- DV Dongle, DV Access Point (DVAP) and DV Node Adapters allow voice and data access to D-STAR via Internet connection (similar to EchoLink)

D-STAR Reflectors

- Reflectors are conference bridges for connecting multiple repeaters and devices
 - Connecting a repeater to a reflector links all repeaters and devices
 - Transmitting into one linked repeater is heard on all repeaters
 - Creates wide area linked networks or gathering places for QSOs
 - Complete listing of reflectors at www.DSTARinfo.com/reflectors.aspx
- Reflectors have multiple modules (Listed on DSTARInfo)
 - ABCD for specified use
 - E for Echo Test through the Reflector
- *D-STAR Etiquette: Keep in mind many repeaters may be connected during long QSOs*

D-STAR Nets

- Complete listing of nets at www.dstarinfo.com/nets.aspx

The screenshot shows the D-STAR Info website interface. At the top, there is a navigation menu with links for Home, FAQ, Conferences, Closest Repeaters, Nets, Reflectors, Repeater Lists & Downloads, Calculator, Apps/Devices, and Contact Us. Below the navigation is a section for "Current Time" showing the official U.S. time as 01:42:51 p.m. Eastern, with options for 12-hr or 24-hr time zones and a network delay of 0.1 s. The main content area is titled "D-STAR Nets" and includes a note: "Information provided for personal use only. Commercial use is prohibited. Compilation Copyright DSTARInfo. Repeater owners or administrator may update their information by going to www.DSTARInfo.com/update." Below this is a table listing various D-STAR nets.

Name	Description	Day	Local Time	TimeZone	UTC	Location
PHDRA	Philadelphia Digital Radio Assn.	Mon	20:00:00	Eastern Standard Time	01:00:00	REF020A
RASPI	Raspberry Pi Net - Restarts 1 Sept	Mon	19:00:00	Pacific Standard Time	03:00:00	REF035C
WPA	Western Pennsylvania D-STAR Net	Mon	21:00:00	Eastern Standard Time	02:00:00	REF063C
QUEBEC1	Réseau D-STAR du Québec	Tue	20:00:00	Eastern Standard Time	01:00:00	VE2V9SC
NEADS	New England Amateur D-STAR Net	Tue	20:00:00	Eastern Standard Time	01:00:00	REF010C
ROCKET	Huntsville D-STAR Net	Tue	19:30:00	Central Standard Time	01:30:00	KI4PPFC
TRI1C	Tri-State Amateur D-STAR Net	Tue	20:30:00	Eastern Standard Time	01:30:00	REF001C
WCFDS	West Central Florida D-STAR Club	Tue	21:00:00	Eastern Standard Time	02:00:00	KJ4ACN B
TEXAS	Texas D-STAR Net	Tue	20:00:00	Central Standard Time	02:00:00	REF004B
NCDS1	North Carolina D-STAR Net	Tue	21:00:00	Eastern Standard Time	02:00:00	REF054C
ALADS	Alabama D-STAR Net	Tue	20:30:00	Central Standard Time	02:30:00	REF058B
CODS	Colorado D-STAR Net	Tue	20:00:00	Mountain Standard Time	03:00:00	REF035B

D-STAR Equipment

- D-STAR radios (mobiles, handhelds, repeaters) commercially produced by ICOM
- D-STAR UHF handheld by Connect Systems proposed in 2015
- DV Dongle is non-radio device allowing access to repeaters and reflectors via Internet (similar to EchoLink)
- DV Access Point (DVAP) creates low power hotspot via Internet
- Node Adapters converts FM transceiver to D-STAR hotspot via Internet

Icom Radios

- Offers line of mobiles, handhelds and repeaters
- Most radios are dual band (2m, 70cm)
 - ID-31A is 70cm only
 - ID-1 is 23cm only, allows high speed data
- All radios operate standard FM and D-STAR digital modes
- All Icom radios have built-in serial port for data transmission
- All offer GPS as built-in, a part of speaker/mic or connection via serial or USB port

Icom Mobiles - Gen 1 and 2

- IC-2200 and ID-800 were initial mobiles
 - D-STAR board can be added to IC-2200
- IC-2820 is full featured mobile
 - Dual-band, dual receive
 - Built-in GPS with external antenna
- ID-880 updated ID-800 with improved user functions
 - Dual-band, single receive mobile



Icom Mobiles – Gen 3

- ID-9100
 - HF to 1200 MHz
 - Satellite Mode
 - RTTY
 - RS-BA1P Remote Control Software
- ID-7100
 - HF to 450 MHz
 - Touchscreen Display
 - Nearest D-STAR Repeaters
- ID-5100 mobile
 - Dual-Band, dual receive
 - GPS built into head unit
 - Touchscreen display
 - Optional Bluetooth interface
 - DR Mode with 1200 included memories
 - Nearest D-STAR and FM Repeaters



Icom Handhelds – Gen 1 and 2

- IC-91AD was initial D-STAR handheld
 - Dual-band, dual receive
- ID-92AD dual-band, dual receive
 - Slightly larger frame with more heat sink
 - Waterproof
 - GPS spkr/mic optional accessory
- ID-80 introduced as lower cost handheld
 - Dual-band, single receive
 - GPS spkr/mic accessory available
 - First Implementation of DR mode



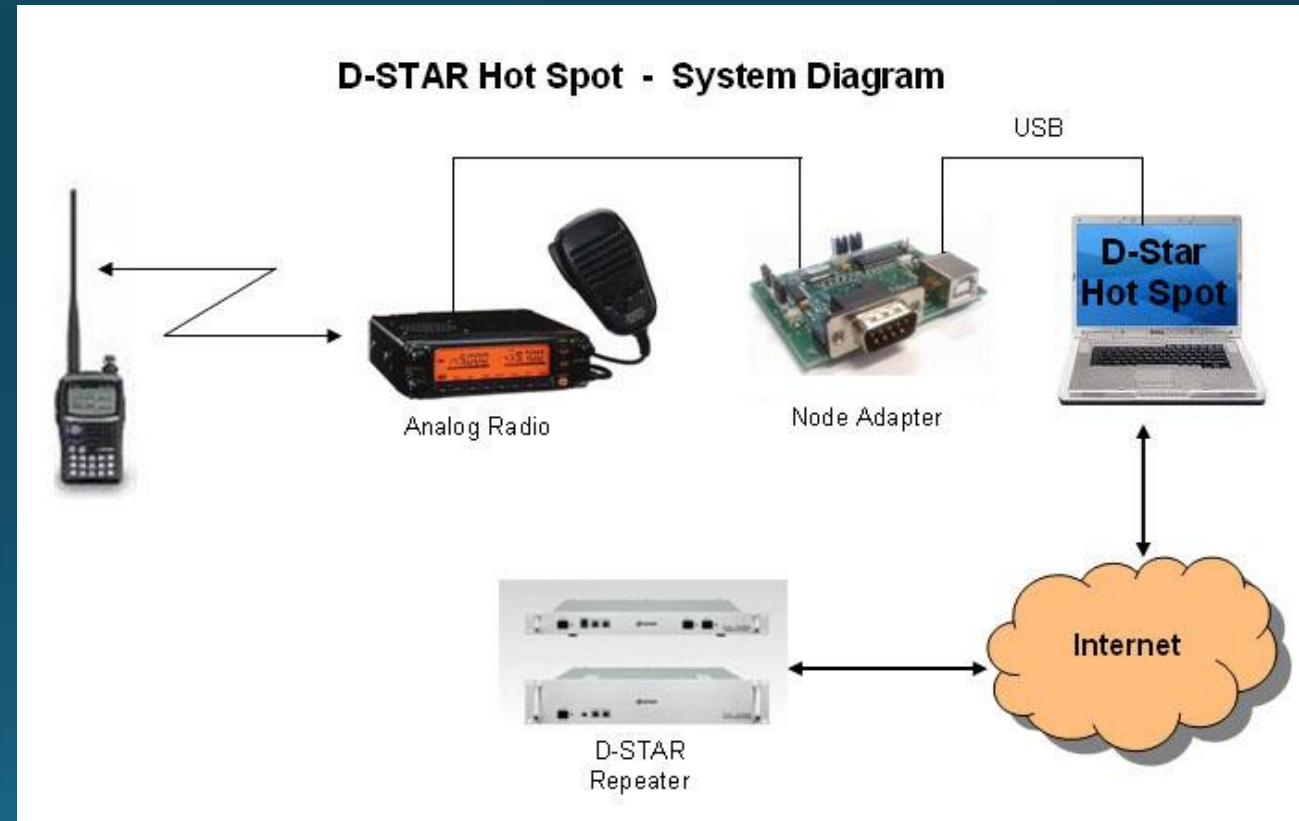
ID-1 for 1.2 GHz Voice and Data

- Operates FM, Digital Voice (DV), low speed data and high speed data (DV)
- High speed data connection is Ethernet compatible
- Acts as Ethernet bridge



DV Node Adapters/GMSK Modems

- Provides D-STAR interface to FM radio
- Can be used to create hotspot or repeater
- Can create D-STAR compatible radio with Dongle and FM transceiver





D-STAR Under the Hood



Getting on the Air

FM Repeater

Mode - FM

Frequency

Offset

CTCSS / TSQ

Tone frequency

D-STAR Gen 1 & 2

Mode - DV

Frequency

Offset

UR

RPT1

RPT2

D-STAR GEN 3

Select Repeater

Add Your Call Sign to Radio

- For a radio, program your call sign (caps, no spaces) in MYCALL or MY field
 - Found in Menu under MY STATION in newer radios
- For a DVAP, DV Dongle or Hotspot, program call in call sign field exactly as entered in your registration

- Get on and talk!

The Big Three

- **MY** or **MYCALL** is your own call sign and is set once in radio
1. **UR** or **URCALL**: Where do I want to go?
 2. **RPT1**: The repeater and module I am transmitting to (ex. KJ4GGV C)
 3. **RPT2**: Where I want my transmission to go (normally to “G”, the Gateway)
 - *NOTE: It's a good practice to put the call sign and “G” in RPT2 even if talking local so other linked repeaters, DV Dongles and DV Access Points can hear your transmissions*

RPT1, RPT2 Format

- Normal format (xxnxxx m)
 - Call sign is left justified
 - Module is always in 8th position
 - C=VHF
 - B=UHF
 - A=1.2 GHz
- Examples (*"■" represents a space*)
 - WD4STR■C
 - W4DOC■■C
 - W4GR■■■C

DPLUS adds functions

- *DPLUS is a program developed by Robin Cutshaw, AA4RC, which adds linking functions and the use of DV Dongles, DV Access Points and Hotspots to D-STAR. DPLUS is active on most gateway-equipped repeaters.*
- Characters used with DPLUS
 - G – Gateway
 - E - Echo Test
 - I – Identification
 - L – Link Repeater
 - U – Unlink Repeater

Basic QSO

- Sample for KJ4GGV VHF/2m Repeater
145.2800 MHz +5.0 MHz Offset
 - MY WB4QDX
 - UR CQCQCQ
 - RPT1 KJ4GGV ■ C
 - RPT2 KJ4GGV ■ G

"■" represents a space

Used for talking on local repeater. If repeater is linked, you are also heard on any of the linked repeaters

Linking to a Repeater

- Sample for KJ4GGV VHF/2m Repeater
145.2800 MHz +5.0 MHz Offset

- MY WB4QDX
- UR WX4GPBAL (or W4DOC ■ CL, W4GR ■ ■ CL)
- RPT1 KJ4GGV ■ C
- RPT2 KJ4GGV ■ G

■ " represents a space

Key once, gateway responds with voice prompt "Remote System Linked". Change to CQCQCQ in UR for QSO.

Linking to a Reflector

- Sample for KJ4GGV VHF/2m Repeater
145.2800 MHz +5.0 MHz Offset

- MY WB4QDX
- UR REF002AL
- RPT1 KJ4GGV ■ C
- RPT2 KJ4GGV ■ G

"■" represents a space

Key once, gateway responds with voice prompt "Remote System Linked". Change to CQCQCQ in UR for QSO.

Unlinking

- Sample for KJ4GGV VHF/2m Repeater
145.2800 MHz +5.0 MHz Offset

- MY WB4QDX
- UR ■■■■■■U
- RPT1 KJ4GGV■C
- RPT2 KJ4GGV■G

"■" represents a space

Key once, gateway responds with unlinked voice prompt. Change to CQCQCQ in UR for QSO.

Memory Management

- Radios have different capabilities and number of memories
- First generation radios have standard memory locations for FM or DV
 - **Method 1** – Store commands in memory for favorite reflectors or repeaters
 - **Method 2** – Use UR memories for favorite reflectors or repeaters (uses fewer memory locations)
- Gen 3 radios with DR mode simplify programming
 - **Gen 3** – Use DR mode with repeater list and GPS for nearest repeater

Radio Memory Management – Method 1

Organize blocks of channels stored in memories:

- Can be used with any D-STAR radio
- Create a group or bank of memories for each repeater
- Store commands for each function in a memory of the group

CH No	Frequency	Dup	Offset	TS	Mode	Name	Your Call Sign	RPT1 Call Sign	RPT2 Call Sign
1	145.200	DUP-	0.6	10kHz	DV	KI4SBA C	CQCQCQ	KI4SBA C	KI4SBA G
2	145.200	DUP-	0.6	10kHz	DV	UNLINK	U	KI4SBA C	KI4SBA G
3	145.200	DUP-	0.6	10kHz	DV	SBA C ID	I	KI4SBA C	KI4SBA G
4	145.200	DUP-	0.6	10kHz	DV	REF001C	REF001CL	KI4SBA C	KI4SBA G
5	145.200	DUP-	0.6	10kHz	DV	REF002A	REF002AL	KI4SBA C	KI4SBA G
6	145.200	DUP-	0.6	10kHz	DV	REF004A	REF004AL	KI4SBA C	KI4SBA G
7	145.200	DUP-	0.6	10kHz	DV	REF030A	REF030AL	KI4SBA C	KI4SBA G
8	145.200	DUP-	0.6	10kHz	DV	REF030B	REF030BL	KI4SBA C	KI4SBA G
9	145.200	DUP-	0.6	10kHz	DV	REF030C	REF030CL	KI4SBA C	KI4SBA G
10	145.200	DUP-	0.6	10kHz	DV	ECHOTEST	E	KI4SBA C	KI4SBA G

Radio Memory Management - Talk

- Use this channel for general QSO
- No linking commands required or repeater already linked
- CQCQCQ in UR field

CH No	Frequency	Dup	Offset	TS	Mode	Name	Your Call Sign	RPT1 Call Sign	RPT2 Call Sign
1	145.200	DUP-	0.6	10kHz	DV	KI4SBA C	CQCQCQ	KI4SBA C	KI4SBA G
2	145.200	DUP-	0.6	10kHz	DV	UNLINK	U	KI4SBA C	KI4SBA G
3	145.200	DUP-	0.6	10kHz	DV	SBA C ID	I	KI4SBA C	KI4SBA G
4	145.200	DUP-	0.6	10kHz	DV	REF001C	REF001CL	KI4SBA C	KI4SBA G
5	145.200	DUP-	0.6	10kHz	DV	REF002A	REF002AL	KI4SBA C	KI4SBA G
6	145.200	DUP-	0.6	10kHz	DV	REF004A	REF004AL	KI4SBA C	KI4SBA G
7	145.200	DUP-	0.6	10kHz	DV	REF030A	REF030AL	KI4SBA C	KI4SBA G
8	145.200	DUP-	0.6	10kHz	DV	REF030B	REF030BL	KI4SBA C	KI4SBA G
9	145.200	DUP-	0.6	10kHz	DV	REF030C	REF030CL	KI4SBA C	KI4SBA G
10	145.200	DUP-	0.6	10kHz	DV	ECHOTEST	E	KI4SBA C	KI4SBA G

Radio Memory Management - ID

- Use to see if repeater is linked or unlinked
- If linked, repeater says “Remote system linked”
- Data line will indicate where repeater or reflector linked
- Return to CQCQCQ channel to talk

CH No	Frequency	Dup	Offset	TS	Mode	Name	Your Call Sign	RPT1 Call Sign	RPT2 Call Sign
1	145.200	DUP-	0.6	10kHz	DV	KI4SBA C	CQCQCQ	KI4SBA C	KI4SBA G
2	145.200	DUP-	0.6	10kHz	DV	UNLINK	U	KI4SBA C	KI4SBA G
3	145.200	DUP-	0.6	10kHz	DV	SBA C ID	I	KI4SBA C	KI4SBA G
4	145.200	DUP-	0.6	10kHz	DV	REF001C	REF001CL	KI4SBA C	KI4SBA G
5	145.200	DUP-	0.6	10kHz	DV	REF002A	REF002AL	KI4SBA C	KI4SBA G
6	145.200	DUP-	0.6	10kHz	DV	REF004A	REF004AL	KI4SBA C	KI4SBA G
7	145.200	DUP-	0.6	10kHz	DV	REF030A	REF030AL	KI4SBA C	KI4SBA G
8	145.200	DUP-	0.6	10kHz	DV	REF030B	REF030BL	KI4SBA C	KI4SBA G
9	145.200	DUP-	0.6	10kHz	DV	REF030C	REF030CL	KI4SBA C	KI4SBA G
10	145.200	DUP-	0.6	10kHz	DV	ECHOTEST	E	KI4SBA C	KI4SBA G

Radio Memory Management - Link

- Tune to channel and key briefly to initiate link command
- System will say “Remote system linked” if successful
- Return to CQCQCQ channel to talk

CH No	Frequency	Dup	Offset	TS	Mode	Name	Your Call Sign	RPT1 Call Sign	RPT2 Call Sign
1	145.200	DUP-	0.6	10kHz	DV	KI4SBA C	CQCQCQ	KI4SBA C	KI4SBA G
2	145.200	DUP-	0.6	10kHz	DV	UNLINK	U	KI4SBA C	KI4SBA G
3	145.200	DUP-	0.6	10kHz	DV	SBA C ID	I	KI4SBA C	KI4SBA G
4	145.200	DUP-	0.6	10kHz	DV	REF001C	REF001CL	KI4SBA C	KI4SBA G
5	145.200	DUP-	0.6	10kHz	DV	REF002A	REF002AL	KI4SBA C	KI4SBA G
6	145.200	DUP-	0.6	10kHz	DV	REF004A	REF004AL	KI4SBA C	KI4SBA G
7	145.200	DUP-	0.6	10kHz	DV	REF030A	REF030AL	KI4SBA C	KI4SBA G
8	145.200	DUP-	0.6	10kHz	DV	REF030B	REF030BL	KI4SBA C	KI4SBA G
9	145.200	DUP-	0.6	10kHz	DV	REF030C	REF030CL	KI4SBA C	KI4SBA G
10	145.200	DUP-	0.6	10kHz	DV	ECHOTEST	E	KI4SBA C	KI4SBA G

Radio Memory Management - Unlink

- Tune to channel and key briefly to initiate link command
- System will say “Remote system unlinked” if successful
- Return to CQCQCQ channel to talk

CH No	Frequency	Dup	Offset	TS	Mode	Name	Your Call Sign	RPT1 Call Sign	RPT2 Call Sign
1	145.200	DUP-	0.6	10kHz	DV	KI4SBA C	CQCQCQ	KI4SBA C	KI4SBA G
2	145.200	DUP-	0.6	10kHz	DV	UNLINK	U	KI4SBA C	KI4SBA G
3	145.200	DUP-	0.6	10kHz	DV	SBA C ID	I	KI4SBA C	KI4SBA G
4	145.200	DUP-	0.6	10kHz	DV	REF001C	REF001CL	KI4SBA C	KI4SBA G
5	145.200	DUP-	0.6	10kHz	DV	REF002A	REF002AL	KI4SBA C	KI4SBA G
6	145.200	DUP-	0.6	10kHz	DV	REF004A	REF004AL	KI4SBA C	KI4SBA G
7	145.200	DUP-	0.6	10kHz	DV	REF030A	REF030AL	KI4SBA C	KI4SBA G
8	145.200	DUP-	0.6	10kHz	DV	REF030B	REF030BL	KI4SBA C	KI4SBA G
9	145.200	DUP-	0.6	10kHz	DV	REF030C	REF030CL	KI4SBA C	KI4SBA G
10	145.200	DUP-	0.6	10kHz	DV	ECHOTEST	E	KI4SBA C	KI4SBA G

Radio Memory Management - Echotest

- Tune to channel, key and speak
- System will echo back your transmission
- Return to CQCQCQ channel to talk

CH No	Frequency	Dup	Offset	TS	Mode	Name	Your Call Sign	RPT1 Call Sign	RPT2 Call Sign
1	145.200	DUP-	0.6	10kHz	DV	KI4SBA C	CQCQCQ	KI4SBA C	KI4SBA G
2	145.200	DUP-	0.6	10kHz	DV	UNLINK	U	KI4SBA C	KI4SBA G
3	145.200	DUP-	0.6	10kHz	DV	SBA C ID	I	KI4SBA C	KI4SBA G
4	145.200	DUP-	0.6	10kHz	DV	REF001C	REF001CL	KI4SBA C	KI4SBA G
5	145.200	DUP-	0.6	10kHz	DV	REF002A	REF002AL	KI4SBA C	KI4SBA G
6	145.200	DUP-	0.6	10kHz	DV	REF004A	REF004AL	KI4SBA C	KI4SBA G
7	145.200	DUP-	0.6	10kHz	DV	REF030A	REF030AL	KI4SBA C	KI4SBA G
8	145.200	DUP-	0.6	10kHz	DV	REF030B	REF030BL	KI4SBA C	KI4SBA G
9	145.200	DUP-	0.6	10kHz	DV	REF030C	REF030CL	KI4SBA C	KI4SBA G
10	145.200	DUP-	0.6	10kHz	DV	ECHOTEST	E	KI4SBA C	KI4SBA G

Memory Management – Method 2

- Can be used with any D-STAR radio especially IC-80, ID-880H
- Program one memory location per repeater with CQCQCQ in UR field
- Utilize “Your Call Sign” memories for UR field

Call Sign	U22	K4WAK BL	U52
My Call Sign	U23	K4DSO CL	U53
Your Call Sign	U24	K4DSO BL	U54
Received Call Record	U25	K4DSO AL	U55
VFO Call Sign			

- Select Memory location and change UR field for favorite linking command

Programming for the DVAP

- Gen 1 Standard Memories

Receive Frequency	Transmit Frequency	Offset Frequency	Offset Direction	Operating Mode	Name	Your Callsign	Rpt-1 CallSign	Rpt-2 CallSign
145.79000	145.79000		Simplex	DV	DVAP	CQCQCQ		
145.79000	145.79000		Simplex	DV	Unlink	U	DIRECT	
145.79000	145.79000		Simplex	DV	DVAP ID	DVAP I	DIRECT	
145.79000	145.79000		Simplex	DV	REF001C	REF001CL	DIRECT	
145.79000	145.79000		Simplex	DV	REF002A	REF002AL	DIRECT	

- Gen 3 Repeater List

Name	Sub Name	Repeater Call Sign	Gateway Call Sign	Operating Freq	DUP	Offset Freq	USE (FROM)
JD DVAP VHF				145.790000		0.600000	Yes
JD DVAP UHF				441.000000		5.000000	Yes
VHF DV Simplex				145.670000		0.600000	Yes
UHF DV Simplex				445.670000		5.000000	Yes
DVAP Default VHF				146.550000		0.600000	Yes
DVAP Default UHF				446.550000		5.000000	Yes

Internet Labs

Using Data on D-STAR

What is D-RATS?

- D-RATS is a free, easy to use, multi-platform data communications package that provides messaging, email, file transfer, mapping and position reporting written by Dan Smith, KK7DS
- Originally developed for use with D-STAR radio
 - Also used with Internet connection (no radio)
 - Developing AX.25/packet interface
- Download at www.d-rats.com

Why Use D-RATS?

- D-RATS can be used for simple data communications between one or more stations
- Can be used to support Emergency Communications (adopted by GAARES as one of three data applications)
- Use without radio on Internet
- Allows use of tactical calls while radio transmits legal FCC callsign
- Can be used for displaying positions of D-STAR GPS equipped stations

Who Can Use D-RATS?

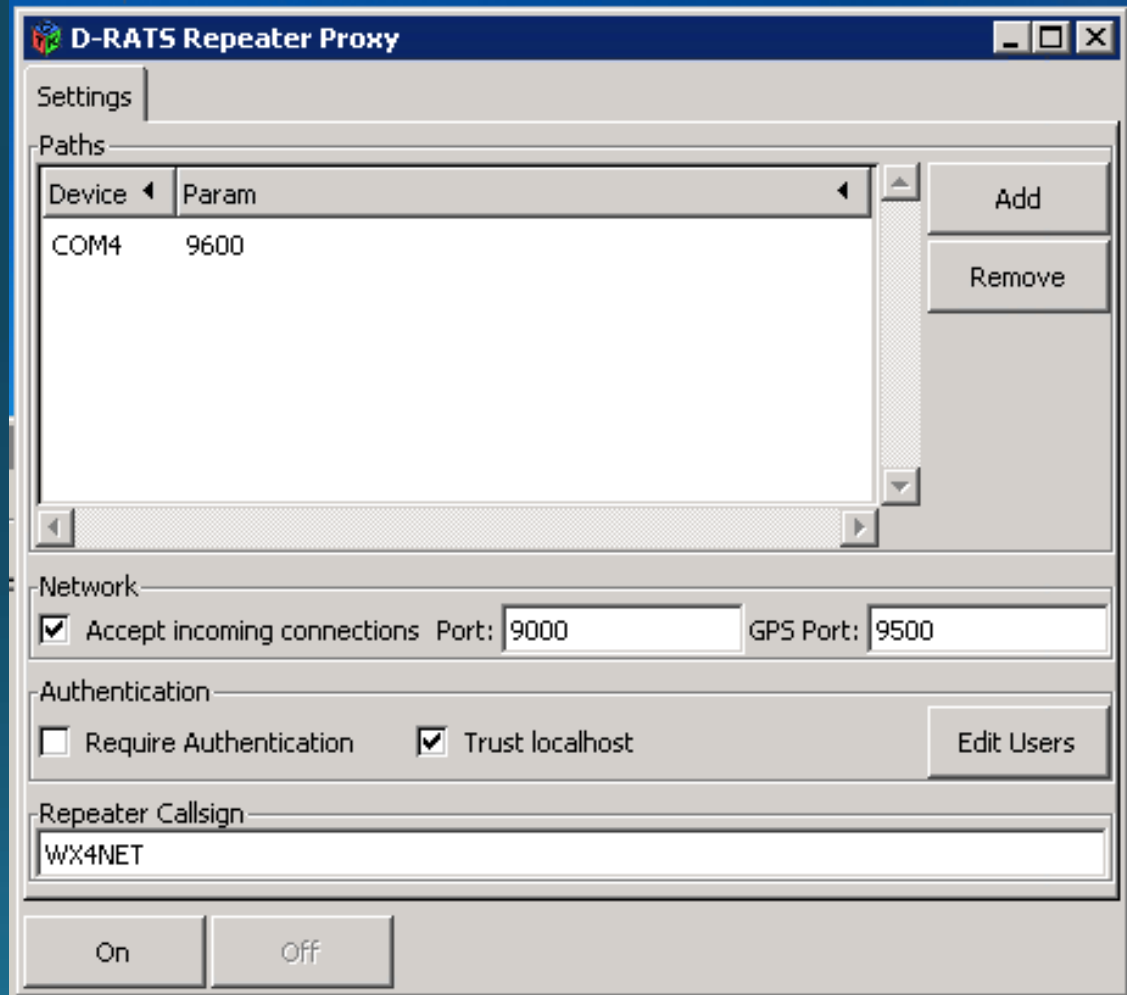
- Multi-platform
 - Windows (2000, XP, 7)
 - Mac OS
 - Linux
- Multiple Interfaces
 - D-STAR Radio
 - Internet connection
 - DV Dongle
 - KISS TNC

D-RATS Functions

- **Messaging** – radio messages, email, Winlink 2000
- **Chat** – quick, simple keyboard-to-keyboard, multi-user, private channels
- **File Transfer** – unattended file sharing, upload/download from common shared site
- **Forms** – Use predefined forms (NTS, ICS-213) or add custom forms
- **Mapping/Position Reporting** – map download, GPS position reporting on map

What is a Ratreflector?

- Bridges all connections defined (radio, Internet)
- Provides path from radios to Internet for email, Winlink 2000
- Allows both Internet-based and radio users to connect together
- Allows bridging of multiple Ratreflectors

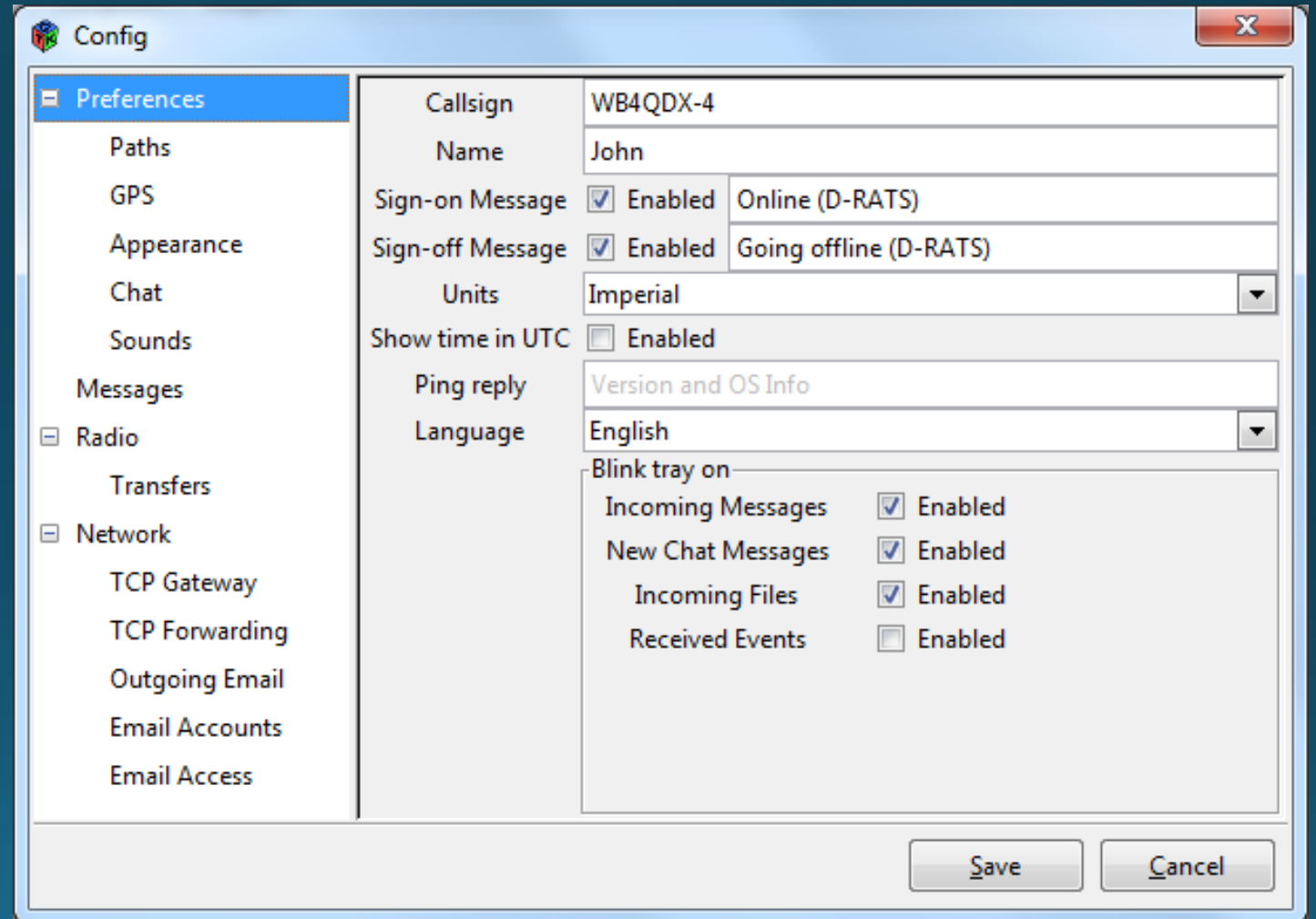


Getting Started With D-RATS

- Download “Getting Started With D-RATS” document on d-rats_group Yahoo Group in Files section and www.DSTARinfo.com
- Download and install latest version
 - www.d-rats.com/download
 - Current version – 0.3.3
- Setup preferences
 - File / Preferences (General station information)
 - File / Preferences / Radio (COM ports)

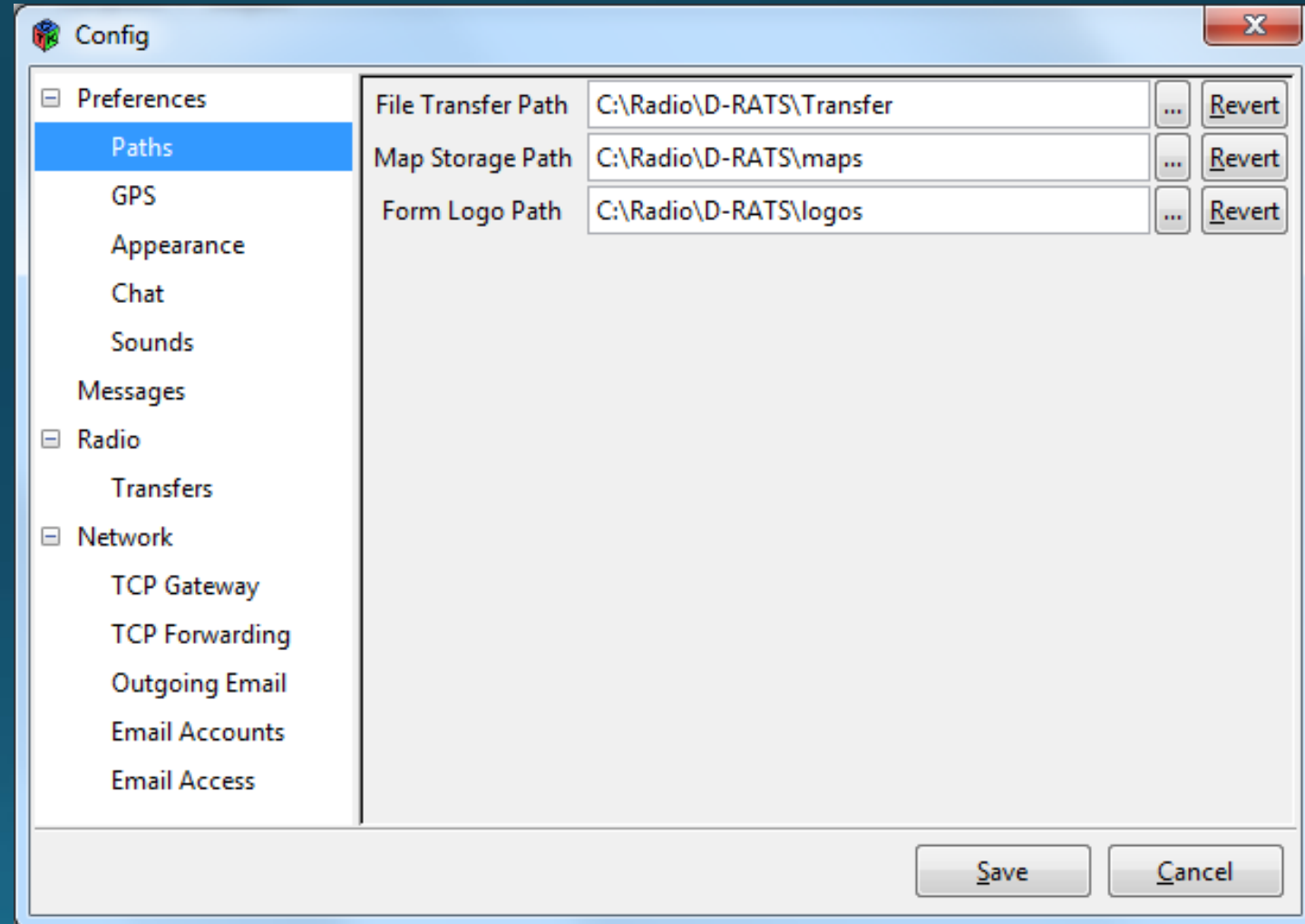
Setup – General Info

- Use callsign or tactical call for EmComm



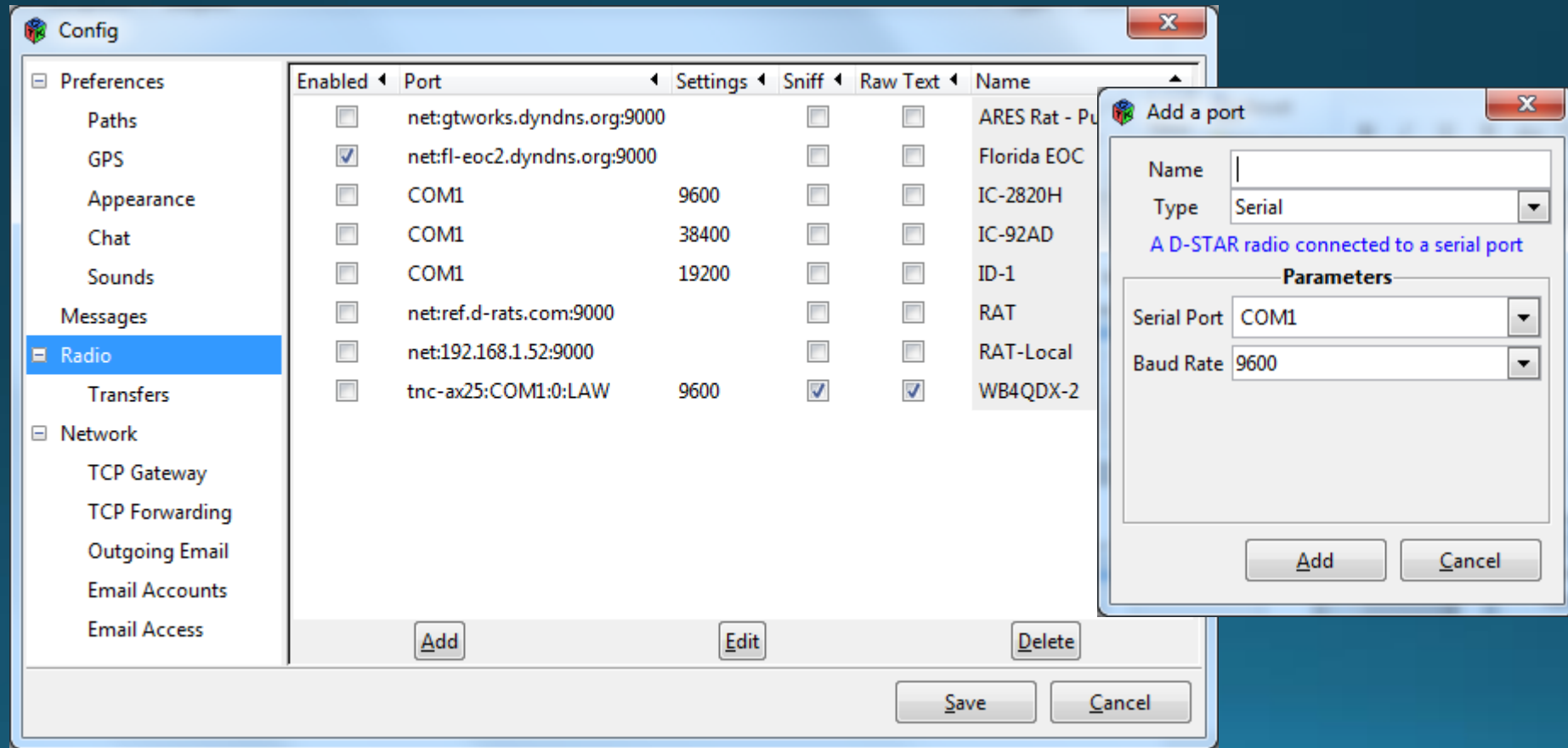
Setup -Paths

- Set folder for File Transfer Path for uploading, downloading, sharing files



Setup - Radio

- Configure radios, Ratreflectors, TNCs



The screenshot shows the 'Config' application window with the 'Radio' section selected in the left sidebar. The main area displays a table of radio configurations. An 'Add a port' dialog box is open in the foreground, showing the configuration for a new serial port.

Enabled	Port	Settings	Sniff	Raw Text	Name
<input type="checkbox"/>	net:gtworks.dyndns.org:9000		<input type="checkbox"/>	<input type="checkbox"/>	ARES Rat - Pu
<input checked="" type="checkbox"/>	net:fl-eoc2.dyndns.org:9000		<input type="checkbox"/>	<input type="checkbox"/>	Florida EOC
<input type="checkbox"/>	COM1	9600	<input type="checkbox"/>	<input type="checkbox"/>	IC-2820H
<input type="checkbox"/>	COM1	38400	<input type="checkbox"/>	<input type="checkbox"/>	IC-92AD
<input type="checkbox"/>	COM1	19200	<input type="checkbox"/>	<input type="checkbox"/>	ID-1
<input type="checkbox"/>	net:ref.d-rats.com:9000		<input type="checkbox"/>	<input type="checkbox"/>	RAT
<input type="checkbox"/>	net:192.168.1.52:9000		<input type="checkbox"/>	<input type="checkbox"/>	RAT-Local
<input type="checkbox"/>	tnc-ax25:COM1:0:LAW	9600	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	WB4QDX-2

Add a port dialog box details:

- Name: [Empty]
- Type: Serial
- Parameters:
 - Serial Port: COM1
 - Baud Rate: 9600

Messaging

- Used to send/receive messages between stations, Internet email users
- Addressable to specific station
- Familiar email look and feel
- Message can be email, form or memo format
- Standard forms included (ICS-213, radiogram), create custom forms easily
- Station to station – can use callsign or tactical call for addressing
- Send and receive to Internet email addresses
- Compatible with Winlink 2000 addresses
- Supports attachments (small file size recommended)

Messaging Screen

D-RATS: WB4QDX-4

File View Help

Messages Chat Files Event Log

New Forward Reply Delete Mark Read Mark Unread Send/Receive

	Sender	Recipient	Subject	Type	Date
	WB4QDX-4	WB4QDX-4	Test message	email	10:18:37 2011-04-20
	WB4QDX-4	WB4QDX-4	Test message	email	10:14:09 2011-04-20

Stations (16)

- IW5BVM
- 9A6AIB-5 (1m)
- 9Z4CG-1 (1m)
- W4KTJ (1m)
- KG4Q (1m)
- N1KXJ (1m)
- N1RCW (1m)
- 9Y4PJ (1m)
- IK5PWA-L (1m)
- LA2MQ (1m)
- VE7AAT (1m)
- ON2AAV (1m)
- IW2OHX-L (1m)
- ON0THN (1m)
- OE1OWA (1m)
- N1SO D (1m)

My Status

Online

Online (D-RATS)

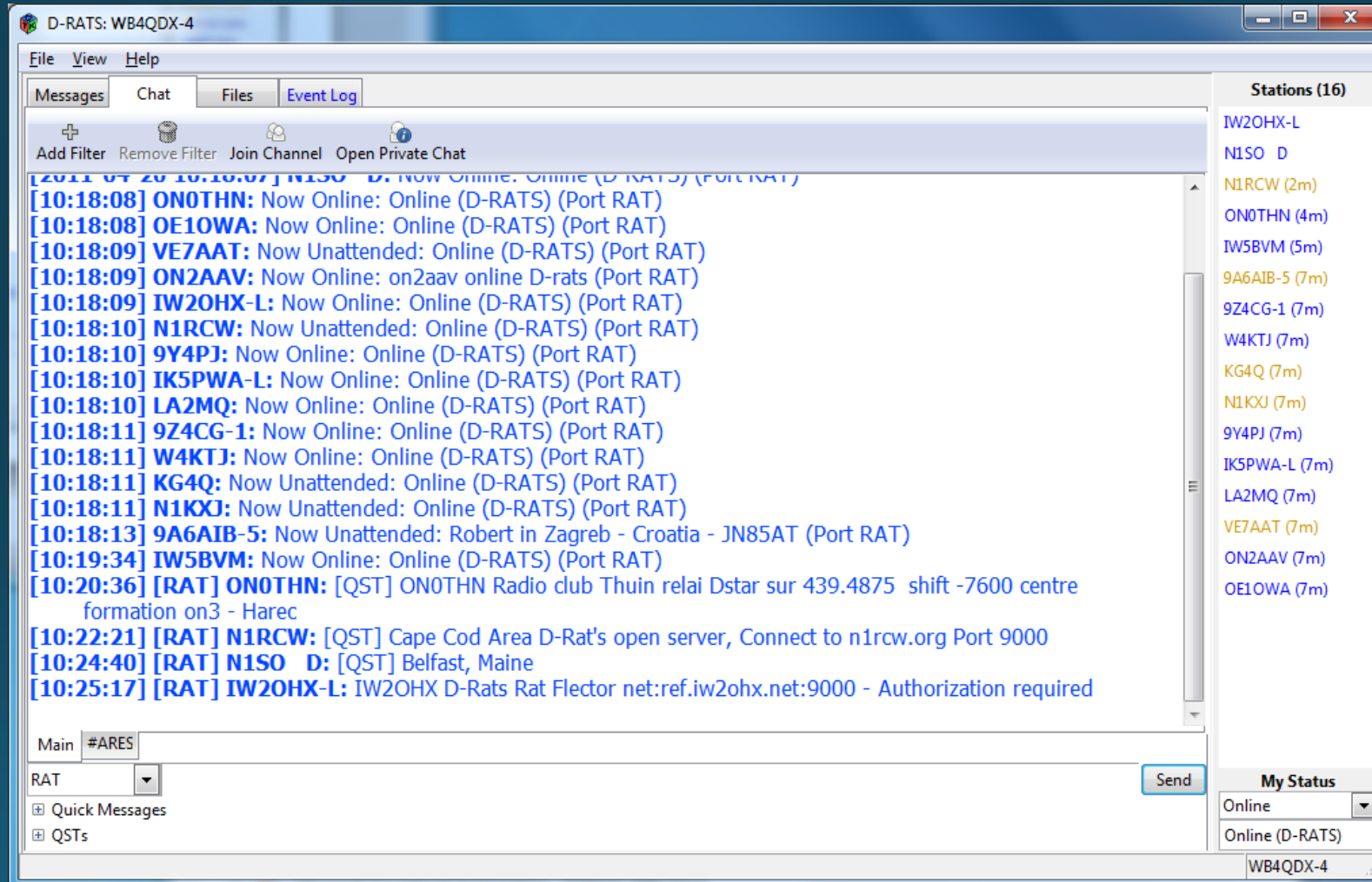
Station IW5BVM is now Online: Online (D-RATS)

WB4QDX-4

Chat

- Chat provides broadcast messages
- Can filter on strings (callsign, keywords, etc.)
- Channels provide “chat rooms” off main channel
- Private chat with specific stations

Chat Screen



The screenshot shows a chat window titled "D-RATS: WB4QDX-4". The window has a menu bar with "File", "View", and "Help". Below the menu bar are tabs for "Messages", "Chat", "Files", and "Event Log". The main chat area displays a list of messages from various stations, including:

- [10:18:08] ON0THN: Now Online: Online (D-RATS) (Port RAT)
- [10:18:08] OE1OWA: Now Online: Online (D-RATS) (Port RAT)
- [10:18:09] VE7AAT: Now Unattended: Online (D-RATS) (Port RAT)
- [10:18:09] ON2AAV: Now Online: on2aav online D-rats (Port RAT)
- [10:18:09] IW2OHX-L: Now Online: Online (D-RATS) (Port RAT)
- [10:18:10] N1RCW: Now Unattended: Online (D-RATS) (Port RAT)
- [10:18:10] 9Y4PJ: Now Online: Online (D-RATS) (Port RAT)
- [10:18:10] IK5PWA-L: Now Online: Online (D-RATS) (Port RAT)
- [10:18:10] LA2MQ: Now Online: Online (D-RATS) (Port RAT)
- [10:18:11] 9Z4CG-1: Now Online: Online (D-RATS) (Port RAT)
- [10:18:11] W4KTJ: Now Online: Online (D-RATS) (Port RAT)
- [10:18:11] KG4Q: Now Unattended: Online (D-RATS) (Port RAT)
- [10:18:11] N1KXJ: Now Unattended: Online (D-RATS) (Port RAT)
- [10:18:13] 9A6AIB-5: Now Unattended: Robert in Zagreb - Croatia - JN85AT (Port RAT)
- [10:19:34] IW5BVM: Now Online: Online (D-RATS) (Port RAT)
- [10:20:36] [RAT] ON0THN: [QST] ON0THN Radio club Thuin relai Dstar sur 439.4875 shift -7600 centre formation on3 - Harec
- [10:22:21] [RAT] N1RCW: [QST] Cape Cod Area D-Rat's open server, Connect to n1rcw.org Port 9000
- [10:24:40] [RAT] N1SO D: [QST] Belfast, Maine
- [10:25:17] [RAT] IW2OHX-L: IW2OHX D-Rats Rat Flector net:ref.iw2ohx.net:9000 - Authorization required

 At the bottom of the chat area, there is a "Main" tab with "#ARES" and a "RAT" dropdown menu. A "Send" button is located to the right of the chat area. On the right side of the window, there is a "Stations (16)" list showing the status of various stations, including:

- IW2OHX-L
- N1SO D
- N1RCW (2m)
- ON0THN (4m)
- IW5BVM (5m)
- 9A6AIB-5 (7m)
- 9Z4CG-1 (7m)
- W4KTJ (7m)
- KG4Q (7m)
- N1KXJ (7m)
- 9Y4PJ (7m)
- IK5PWA-L (7m)
- LA2MQ (7m)
- VE7AAT (7m)
- ON2AAV (7m)
- OE1OWA (7m)

 At the bottom right, there is a "My Status" section showing "Online" and "Online (D-RATS)" with a dropdown menu. The window title bar shows "WB4QDX-4".

File Transfer

- Allows unattended file transfers between stations
- View remote station files
- File transfers use error checking
- All file formats supported

File Transfer Screen

D-RATS: WB4QDX-4

File View Help

Messages Chat Files Event Log

Refresh Delete Upload Local

Connect Disconnect Download

Station: 9A6AIB-5

Filename	Size	Date
660_ACD_LOGGER.wax	1.1 KB	17:57:54 2010-10-30
9A6AIB-Ports-2010-12-19.txt	2.0 KB	17:20:08 2010-12-19
9A6AIB_Ratreflector_list_2010-12-19.txt	1.0 KB	16:59:25 2010-12-19
BD2139-Donna-inutile.jpg	61.0 KB	13:51:20 2011-01-22
Chr-9A-win.txt	14 B	21:25:29 2010-12-13
D-RATS on Dongle.doc	27.0 KB	20:40:56 2010-12-22
D-RATS operating guide.doc	597.0 KB	23:28:03 2010-12-07
D-RATS_User_Manual.pdf	624.0 KB	23:06:06 2010-12-07
Icom_cables.pdf	21.0 KB	23:19:10 2010-12-05
Interface_cable_for_the_On[1].pdf	26.0 KB	07:26:26 2010-12-13
Kenwood Connector.pdf	283.0 KB	22:50:19 2010-12-07
Mobile_1200MHzant.pdf	82.0 KB	07:27:50 2010-12-30
Operating with D-RATS.doc	305.0 KB	23:28:20 2010-12-05
Ratreflector_list.txt	910 B	07:28:31 2010-12-30
resized_badbananas.jpg	9.0 KB	07:22:22 2010-12-30
resized_donotdisturb.jpg	10.0 KB	07:23:39 2010-12-30
resized_resized_Ohmslaw.jpg	15.0 KB	00:25:19 2011-04-09
Test.txt	38 B	10:29:27 2011-02-11

Stations (19)

- 9A6AIB-5
- VE7UG
- N1RCW (1m)
- N1KXJ (2m)
- N1SO D (2m)
- LA2MQ (2m)
- KG4Q (4m)
- 9Z4CG-1 (9m)
- ON0THN (9m)
- OE1OWA (9m)
- IW2OHX-L (9m)
- ON2AAV (9m)
- VE7AAT (9m)
- W4KTJ (9m)
- IK5PWA-L (9m)
- KB3ONM (9m)
- KB3ONM-2 (9m)
- 9Y4PJ (13m)
- IW5BVM (20m)

My Status

Online

Online (D-RATS)

WB4QDX-4

Connected to 9A6AIB-5



For More Information



Where to find D-STAR Resources

- www.DSTARInfo.com – Complete source for how-tos, instructional presentations, links to training videos, best source for repeater, reflector, net listings and downloads to update radio memories.
- www.dstarusers.org – Last heard list, repeater listings, D-STAR statistics
- [Nifty E-Z Guide to D-STAR Operation](#) (second edition) – comprehensive guide by Bernie Lafreniere, N6FN

D-STAR Yahoo Groups

<http://groups.yahoo.com>

- dstar_digital
- d-rats_group
- ga_dstar
- se_wxnet
- DVDongle
- DVAPDongle