

D-STAR

Digital Voice + Digital Data

D-STAR '08 Amateur Digital Mode for the 21st Century

**ALABAMA
D★STAR**



Alabama

**Dayton 08 Forum:
Technical Aspects &
Finesse Gateway
Ron Shaffer: W4VM**



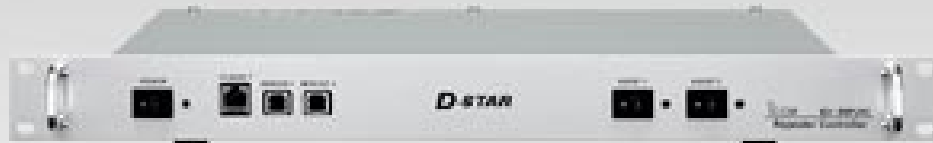
Coverage of this Sub-Session:

- From a Technical, but also, User Standpoint:
 - What is D-Star ?
 - I Bought a Radio, How do I use it ?

What is D-STAR?

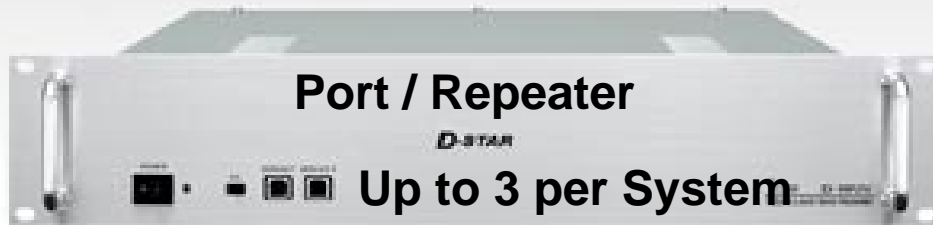
- Digital Smart Technology for Amateur Radio
- Developed by JARL
- Digitally Modulated voice and data comms
- Open Protocol Specification
- Manufactured by ICOM, (Kenwood in Japan)

D-STAR Repeater Equipment



Controller: Routes Voice & Data (Digital format) to other modules or to the Internet via a Gateway PC

DV



**DV Band Module: Full Duplex Digital RF to Digital Voice – to & from controller
Up to 3 modules per system
2M, 70 Cm and 23 Cm**

DD



DD Module: Half Duplex Wide Band Digital RF (23 Cm) to & from controller at 128 K bps

D-STAR

Digital Voice + Digital Data

- User Radios – Stop by the Booth !



- How do I use it ? – instructions & tips
 - Installation suggestion for mobiles
 - Understand the Call signs
 - Program for Local / Dongle
 - Get registered for gateway usage
 - Program your radio first ! For more successful operating

D-STAR

Digital Voice + Digital Data

Installation tip

Heads Up Mounting



Makes Memory Flipping Safer!

Four call signs used – You will see many examples

MYCALL – Call sign of the originating station – your own call
D-Star spec calls this “Own Callsign”

URCALL – Call sign of the desired target station – destination call
D-star spec calls this the “Companion Callsign”

This is the key to determine where your signal is heard

RPT1 – Call sign (& port) of the originating (input) repeater
spec calls this the “Departure Repeater Callsign”

Set it for the local repeater call and input port: Example: KI4PPF C

RPT2 – Call sign & designator of the gateway (or cross band port)

Set it for the local repeater call and Gateway: Example: KI4PPF G

Many memories: All the same except for the URCALL

Local Simplex Operation Example

MYCALL – Call sign of the originating station – your own call – Example: W4VM^{^^^}/RON Where ^ = space

URCALL – typically just CQCQCQ (Default)

RPT1 – Not Needed for simplex

RPT2 – Not needed for simplex

- Getting Started:
Bare Minimum Local Repeater Operating
 - You can get through the local repeater by just programming the DV frequency .. But..
 - **At least program your own call sign: “MYCALL”**
 - If you at least do this, you can set your radio to copy the repeater call signs and you’ll be fine for local operating

- Getting Started: Local Repeater Usage
 - No Squelch Tails or courtesy beeps from Repeaters
 - But you do get a Status Readback !
 - Short Transmission from the Repeater about 1 Second after unkeying
 - RPT* or RPT? Usually means you did not go through (Except Dongle)
 - UR* or UR? Usually means you did go through
 - Interpret Status Readback in context
 - Local Repeater RPT* - Try again, calls will load to your radio
 - Gateway Ops RPT* -
 - Check your routing calls RPT1 & RPT2 or Local gateway could be down
 - Remote Repeater could be busy – most common error involves 8th position
 - Be conscious of how close to the “cliff” you or other user may be

Local Repeater Usage

MIC MYCALL – Program in your own call sign. Example: W4VM

URCALL – Typically set to CQCQCQ

RPT1 – Call sign (& port) of the local repeater. Example: KI4PPF C
If you “kerchunk” & hear a double beep, the radio has pulled this call sign from the repeater itself

RPT2 – Not needed for local repeater (same port) operation

Local Repeater Cross Banding

MYCALL – Program in your own call sign. Example: W4VM

URCALL – Typically set to CQCQCQ

RPT1 – Local repeater call sign and input port. Example: KI4PPF C

RPT2 – Local repeater call sign and output port. Example KI4PPF B

Note that your audio (and data) will be heard on both ports
Do this on systems not yet gateway connected in rehearsal for gateway ops

User radio programming

- **LOTS** of memory channels for effective usage
- Pick a setup which works for you:
I have an example in the following charts
- Programming software strongly recommended when you begin to program for gateway usage
You don't want to program calls while driving !

Gateway Operations

Registration

No registration required for local use

Registration for the new “G2” gateway systems is easy via web !

Find the web site for your local system: Simple 3 step process

No private conversations

both ends hear all

User linking / routing up till now*

Each User determines the route his transmission takes in system

Program Your Radio Ahead of time for mobile operation

* New developments by AA4RC now implement true “Site Linking”

Multiple ways to traverse Gateway

User-Specific call (Often used for “one touch reply”)

“Follow-me Roaming” – Example: URCALL = KE4LRX

Sync Timing may cause slight delays when user switches ports

Also, this type of call will typically interrupt an ongoing local QSO

Port call (My preferred method)

Example - URCALL = '/K5TIT'

Specific routing of port call – defaults to Port 'A'

Port-specific call

Example – URCALL = '/K5TIT C' be sure the C is in the 8th position

This type of call is “polite” to local QSOs. It will typically not interrupt

Don't Get confused by ICOM Manual Terminology regarding “Zones” –
There are no multiple area Zones in the US (No 10 Gig Links deployed yet)

Working the Gateway: Two approaches

Reply only

- Minimal Radio Programming: Just wait on your local frequency
- For someone to call and hit the one touch reply to return call
- A lot of people do this but we need more folks to call CQ !

Be the One who calls CQ

- This requires keeping your radio programming current and fine tuned
- You will be rewarded with many more QSOs than the above approach
- The Key is memory bank organization preferring Port Calling
 - You have a limited # of “URCALLS” in the radios: Suggest using more of them for port calling rather than user calling

One example of Memory Bank organization is shown in a few charts but first, what goes into each channel ?

Basic Gateway Port Call

MYCALL – Program in your own call sign. Example: W4VM

URCALL – Set to remote repeater call & port. Example: /K5TIT^B

RPT1 – Local repeater call sign and input port. Example: KI4PPF C

RPT2 – Local repeater call sign and Gateway. Example KI4PPF G

I prefer this mode over user specific calls for 2 reasons:

1. I know exactly which remote transmitter I am keying
2. It is polite: it will not interrupt a QSO

8th

Position !

Routing Examples

Type of Call	URCALL Usage	RPT-1 Call Usage	RPT-2 Call Usage	Notes & Comments
Local Call	CQCQCQ	KI4PPF C	KI4PPF C or NOTUSE	Local Call on the 2 Meter repeater "Port" C
Gateway Port Call	/K5TIT B	KI4PPF C	KI4PPF G	Traverse Internet Gateway from Huntsville 2M to Dallas 440 Note the <u>/</u>!
Specific User Call Through Gateway	N5MIJ	KI4PPF C	KI4PPF G	Let Gateway SW Find the User where he last keyed up in the system (also for one touch reply)
G2 Gateway Multi-cast	/ALUHF1	KI4PPF C	KI4PPF G	Heard on up to 10 repeaters as programmed by Gateway admins for the multi-cast name

URCALL is Key !

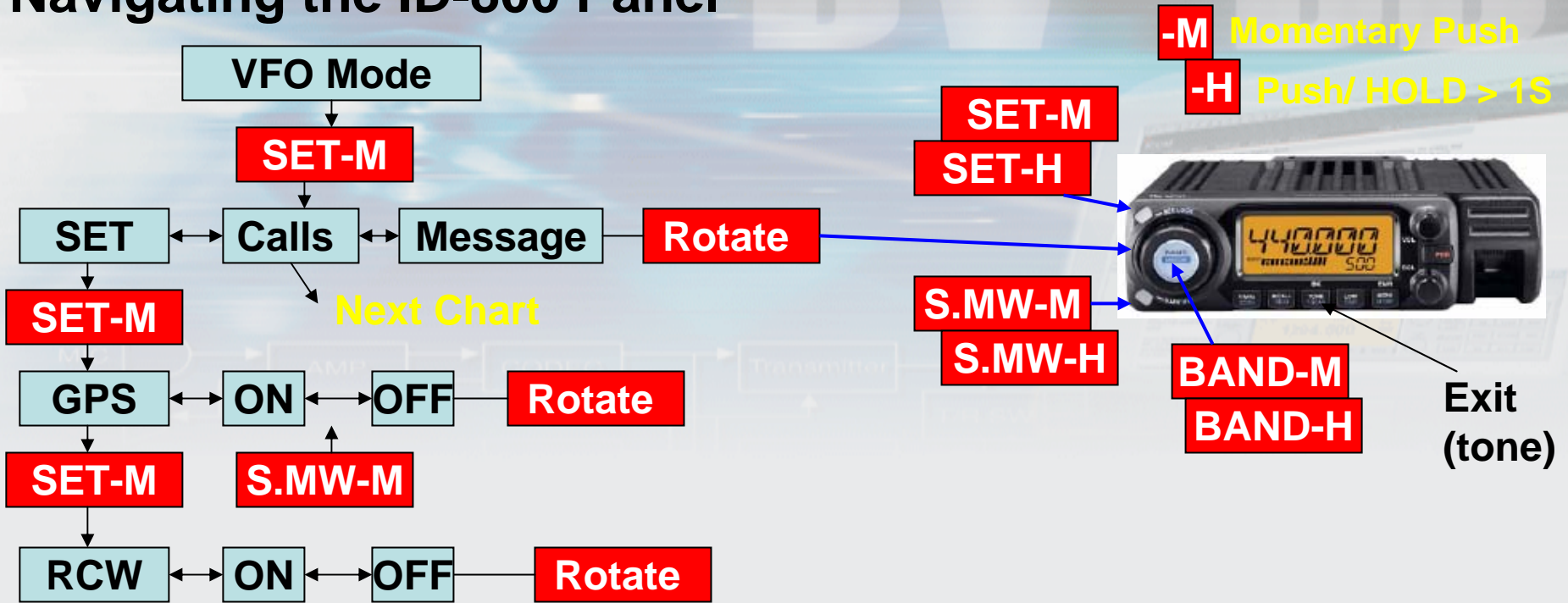
These don't change from memory to memory

Radio Programming for DV

- With so many systems around the globe, the value of pre-programming should be obvious by now
- ID-800 & IC-2820 Software are “Cloning Software”
- IC-91AD and ID-1 software are “Operational Software”
- Front Panel operation is also important for EmComm – don’t get spoiled with software

The following chart is busy: Don’t study too hard, it’s just there for comparison

Navigating the ID-800 Panel



Get the AE7Q Cheat Sheet**
(Augments the ICOM manual)

Key to Usage in Menu Modes

SET-M SET/LOCK Button: M- Enter, Scroll right / H - Pull *

S.MW-M S.MW/MW Button: M- back?, Scroll left / H - Push *

BAND-M BAND/MODE Button: M- Enter?, Scroll right / H - PGM start/end *

Use this in the field when you don't have software – continued in back-up charts

Now that you've seen the hard way, consider the easy way!

CH	Call Sign	Your	Rpt1	Rpt2	Name ON/OFF	Name
401	U--: CQCQCQ		r26: W4WBC C	r26: W4WBC C	ON	WBCLOC
402	U--: CQCQCQ		r26: W4WBC C	r29: W4WBC G	ON	WBCL G
403	U65: /KI4SAZC		r26: W4WBC C	r29: W4WBC G	ON	ALGULC
404	U66: /KI4SAZB		r26: W4WBC C	r29: W4WBC G	ON	ALGULB
405	r18: /K4DSO C		r26: W4WBC C	r29: W4WBC G	ON	ALBHMC
406	r19: /K4DSO B		r26: W4WBC C	r29: W4WBC G	ON	ALBHMB
407	U43: /K4DSO A		r26: W4WBC C	r29: W4WBC G	ON	ALBHMA
408	r16: /W4KCQ C		r26: W4WBC C	r29: W4WBC G	ON	ALTUSC
409	U46: /W4KCQ B		r26: W4WBC C	r29: W4WBC G	ON	ALTUSB
410	U41: /KI4SBAC		r26: W4WBC C	r29: W4WBC G	ON	GACUMC
411	U42: /KI4SBAB		r26: W4WBC C	r29: W4WBC G	ON	GACUMB
412	U33: /KI4SBAA		r26: W4WBC C	r29: W4WBC G	ON	GACUMA
413	U17: /W4DOC C		r26: W4WBC C	r29: W4WBC G	ON	GAATLC
414	U16: /W4DOC B		r26: W4WBC C	r29: W4WBC G	ON	GAATLB
415	U81: /W5GAD C		r26: W4WBC C	r29: W4WBC G	ON	LANEWC
416	U34: /W5GAD B		r26: W4WBC C	r29: W4WBC G	ON	LANEWB
417	U85: /KI4TMJC		r26: W4WBC C	r29: W4WBC G	ON	MSHENC
418	U86: /KI4TMJB		r26: W4WBC C	r29: W4WBC G	ON	MSHENB
419	U03: /K5TIT C		r26: W4WBC C	r29: W4WBC G	ON	TXDALC
420	U02: /K5TIT B		r26: W4WBC C	r29: W4WBC G	ON	TXDALB
421	U07: /K6MDD C		r26: W4WBC C	r29: W4WBC G	ON	CAMDDC
422	U06: /K6MDD B		r26: W4WBC C	r29: W4WBC G	ON	CAMddb
423	U04: /K6MDD A		r26: W4WBC C	r29: W4WBC G	ON	CAMDDA
424	U51: /K6SOA C		r26: W4WBC C	r29: W4WBC G	ON	CALAGC

Note 6
Character
Convention

SSCCCP
Where:
SS = State
CCC = City
P = Port

Now, here is that promised Memory Bank Channel Organization Example

Local Channels for 2 Meter Repeater
Memory for 1st favorite city & port (2m in)
Memory for 2nd favorite city & port
Memory for 1st favorite "buddy"
Memory for first favorite Multi-cast Group
Memory for first favorite DPLUS Reflector
Local Channels for 2 Meter Repeater

First bank of memory channels
For most frequently used local Repeater: Likely your 2 Meter (Port C) (Next chart shows what this bank might look like)

Local Channels for 440 Repeater
Memory for 1st favorite city & port (440 in)
Memory for 2nd favorite city & port
Memory for 1st favorite "buddy"
Memory for first favorite Multi-cast Group
Memory for first favorite DPLUS Reflector
Local Channels for 440 Repeater

Second bank of memory channels in case the other port is busy: Likely your UHF or "B" Port.

Only difference from above is the frequency and RPT1 port Designator- otherwise cut & paste (maybe use dstarcom**)

Repeat this bank configuration for each repeater and port you use locally
Also, repeat it for any frequently visited cities.

Memory Bank Channel Organization Example: One of several banks

Channel Usage	RPT 2 Call	URCALL (8 char)
Local 2 Meters	KI4PPF C	CQCQCQ
Local + Dongle	KI4PPF G	CQCQCQ
1 st favorite city	KI4PPF G	/K4DSO [^] <u>C</u>
2 nd favorite city	KI4PPF G	/KI4SAZ <u>C</u>
3 rd favorite city	KI4PPF G	/K5TIT [^] <u>B</u>
...Etc ...		
Favorite "buddy"	KI4PPF G	AA4RC
Local + Dongle	KI4PPF G	CQCQCQ

Repeat this bank configuration for each repeater and port you use locally
Use any channel with "G" for one touch replies (it reverts back when done)

Gateway Practices

- Pre-Programming your radio in an organized fashion is key
 - Then each city is just a memory flip away !
- Program a “Local Channel” for local QSOs
- Use the “BK” feature to return calls but then
Return to local operation after QSO
- Make use of www.D-STARusers.org
- Always state the repeater and port you’re calling from !

Example: “W4VM Huntsville port C”

“Don’ts” of the Gateway

- Not identifying what city & port you’re on
- Leaving your radio on a gateway call while having a local QSO.
- Setting your GPS beacon interval too short
- Making excessive use of directed calls to busy repeaters
- Not updating your radio programming often enough to be able to return calls 😊
- These become more important as more users traverse the gateway system !

How Bout that AA4RC ?

- You're about to hear how all of this gets much easier with new linking capabilities

Set your favorite memory channel similar to this:

RPT 1 = WD4STR C

RPT 2 = WD4STR **G**

URCALL = CQCQCQ

Then Sit back and enjoy system linking and DV-Dongle usage without changing channel !

Robin is up Next

D-STAR

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ALABAMA D★STAR

Questions ?

Links:



www.arrl-al.org/Alabama_Link.htm

www.dvdongle.com

www.dstarusers.org

www.k5tit.org

www.icomamerica.com

** www.ae7q.net/doc/public/ID-800H.php

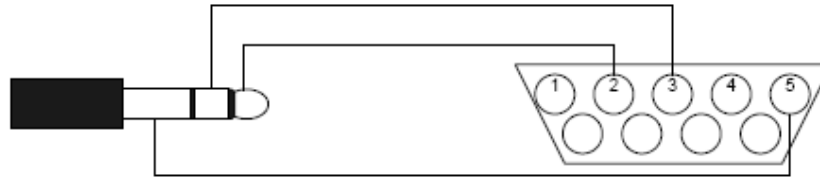
** www.ae7q.net/text/Software.php

www.aprs-is.net/dstartnc2.htm

Ask for the “Get on the Air Radio Configuration” Sheet from the AL-Star Group: Limited Quantities available

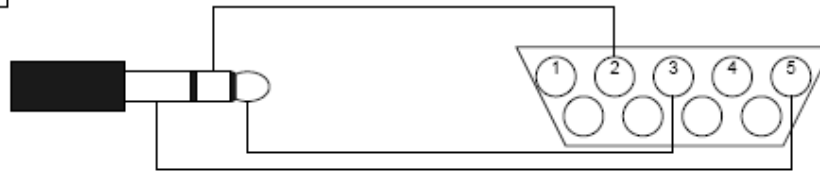
Back-Up and Reference Material
Follows

Programming Cable Configurations from N5ZPR.COM



2.5 mm Stereo Phone Plug

db9 Male To GPS



db9 Female To Computer

Serial Cables for IC-91A/D, IC-2820H, IC-2200H, V82, U82

Making your Own is not Difficult !

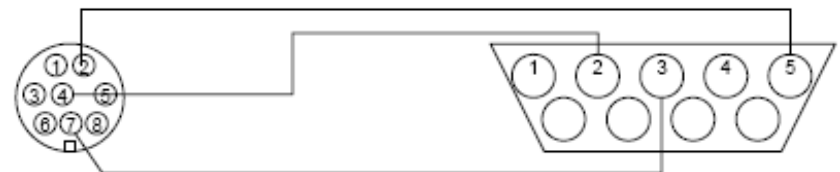
For 8 Pin Mini Din – check MAC Printer Cables

Serial Cables for ID-800



Male 8 pin Mini DIN

db9 Male To GPS



db9 Female To Computer

