



## Digital Smart Technologies for Amateur Radio



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# WHAT IS D-STAR?

# D-STAR

- D-STAR (Digital Smart Technologies for Amateur Radio) is a digital voice and data protocol specification developed as the result of research by the Japan Amateur Radio League to investigate digital technologies for amateur radio. While there are other digital on-air technologies being used by amateurs that have come from other services, D-STAR is one of the first on-air and packet-based standards to be widely deployed and sold by a major radio manufacturer that is designed **specifically for amateur service use**. - Wikipedia

# D-STAR

- D-STAR is an open worldwide standard for digital communications over Amateur Radio
- The D-STAR standard was developed by the Japan Amateur Radio League (JARL)
- D-STAR uses the AMBE vocoder chip under license from DVSI
- Icom is initial manufacturer of mobiles, HTs, repeaters and controllers
- Non-Icom hardware and software developed for repeaters, hotspots, access points and accessories

# HOW D-STAR IS DIFFERENT

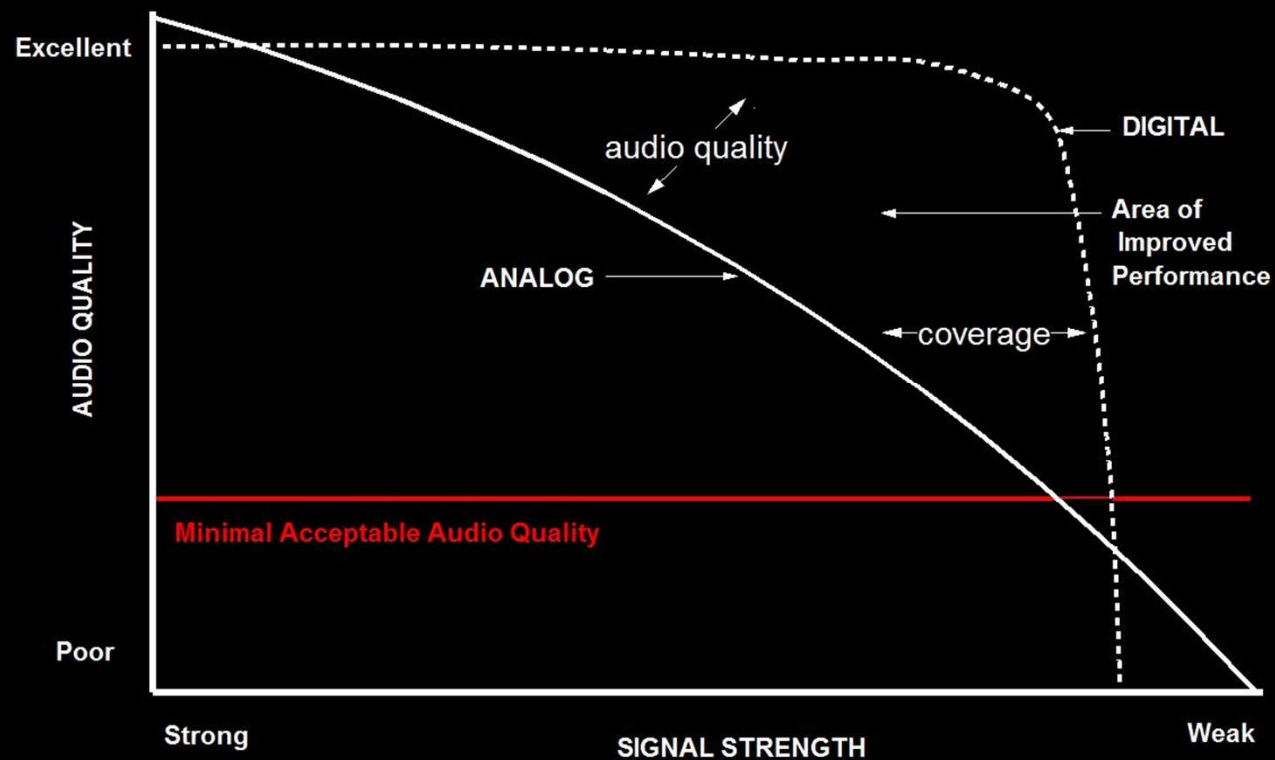
# HOW D-STAR IS DIFFERENT

- D-STAR is digital modulation
- D-Star radios convert your voice to digital before transmission.
- Additional information is included in the “digital stream” that is transmitted (and displayed on the receiving radio):
- Your call sign (“MyCall”) is included – you never have to verbally “identify” again!
- You can set a short (4 character) tag, & a short (20 character) text message that is included.
- You can also include low-speed digital data or GPS positioning information.

# HOW D-STAR IS DIFFERENT

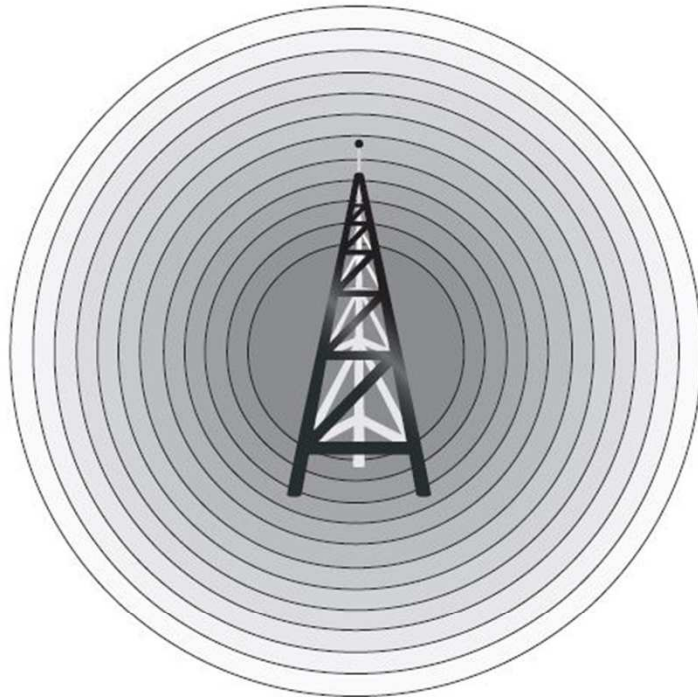
- D-Star transmissions are clear and free of noise
- Low strength signals sound just as good as full strength signals
- D-Star is not perfect, of course, neither is any system
- R2-D2 – Multipath, QRM, packet loss
- Remember, digital is different, and that must be considered when comparing digital to analog.
- Overall, just forget the silly little arguments...D-Star works just fine.

# DIGITAL VS. ANALOG

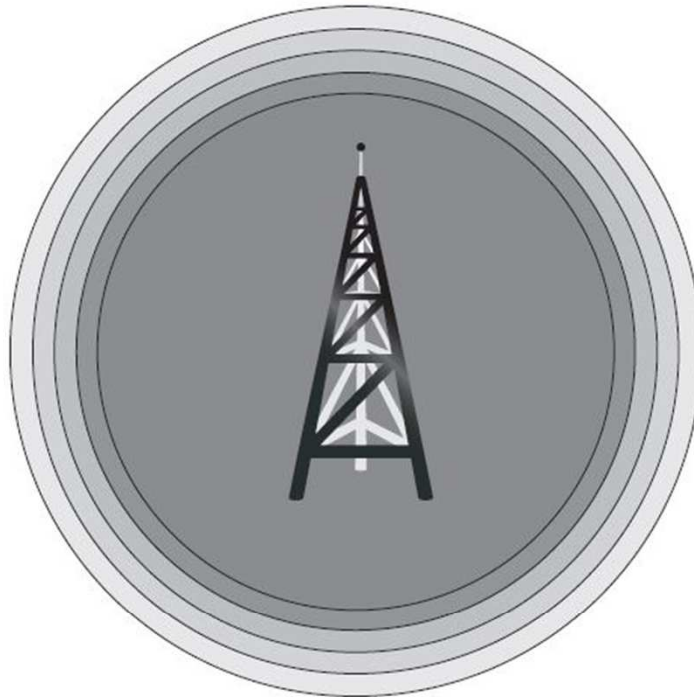




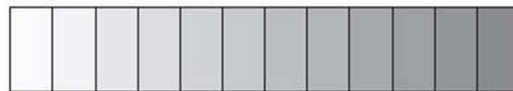
Analog



Digital



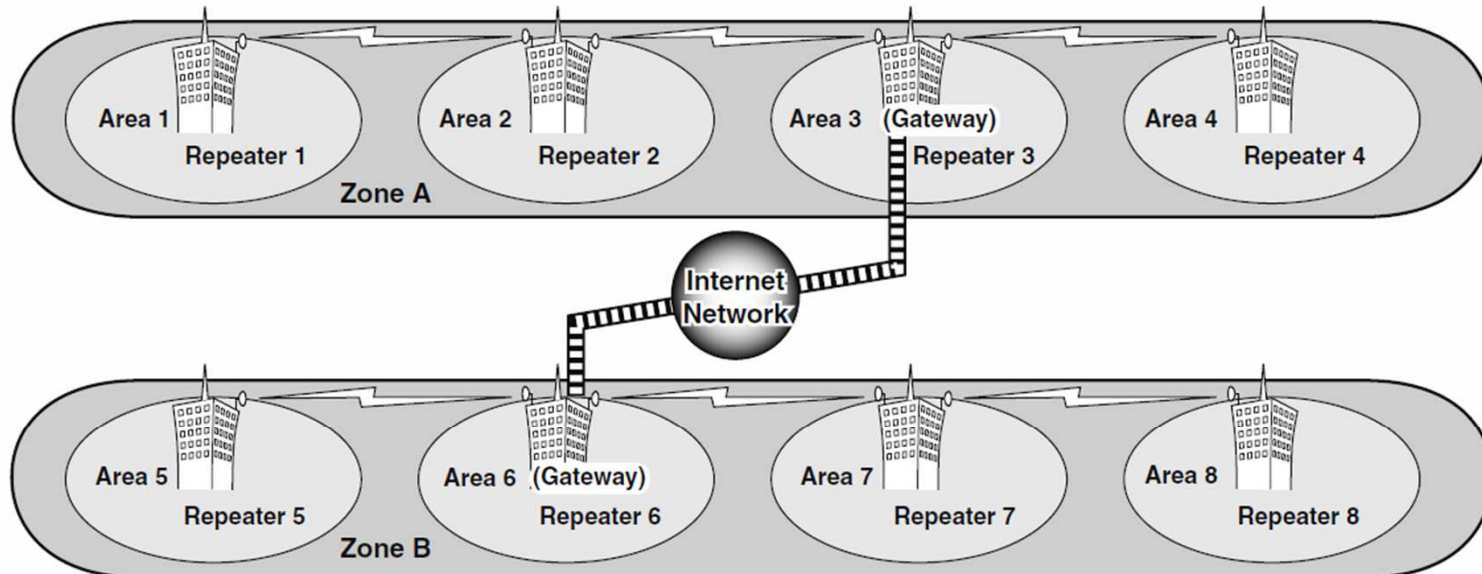
Improving Audio Quality



# D-Star History and Evolution

## Original Architecture

### ◇ System description



#### Area:

The Area is the communication range that is covered by a single repeater. The repeater is called an area repeater in the D-STAR system.



#### Link repeater:

The microwave (10 GHz) link repeater provides to linking with another repeater site (Area) for zone construction.



#### Zone:

The Zone is composed of several areas, that are linked by a 10 GHz microwave link. The areas 1 to 4 and 5 to 8 make up a zone at the example above.



#### Gateway repeater:

Gateway repeaters provide communications between different zones via the internet. The repeater 3 and 6 are gateway repeaters at the example above.

# D-Star History and Evolution

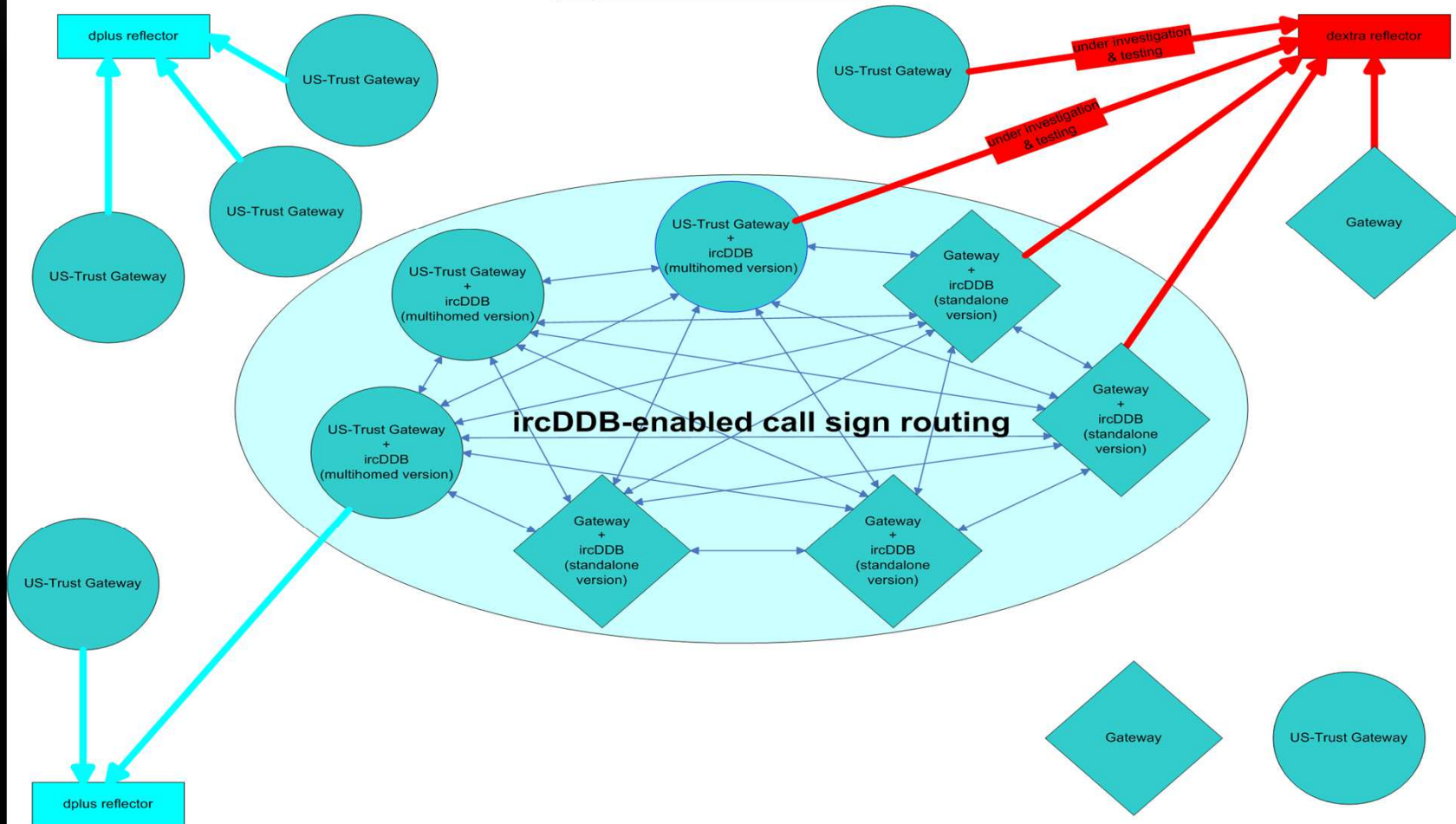
## D-Plus reflectors added

Reflector	Usage	Location	Links	Speed
REF001B	Illinois D-STAR repeaters	London, England	<a href="#">Status</a>	100 Mbps
REF001C	D-STAR's MegaRepeater	London, England	<a href="#">Status</a>	100 Mbps
REF002A	<a href="#">Southeastern US D-STAR Weather Net</a>	NE, United States	<a href="#">Status</a>	100 Mbps
REF002B	<a href="#">Southern Arizona Linked Repeater Network</a>	NE, United States	<a href="#">Status</a>	100 Mbps
REF002C	Some Nets	NE, United States	<a href="#">Status</a>	100 Mbps
REF003A	Ad-hock & Emergency Use - Australia	Australia	<a href="#">Status</a>	
REF003B	Permalink for Repeaters, including all WIA Port B Repeaters - Australia	Australia	<a href="#">Status</a>	
REF003C	Australian Nets	Australia	<a href="#">Status</a>	
REF004A	<a href="#">Alternate for Southeastern US D-STAR Weather Net</a>	United States	<a href="#">Status</a>	1 Gbps
REF004B	Texas Permalink Repeaters	United States	<a href="#">Status</a>	1 Gbps
REF004C	General Rag Chew (English only please)	United States	<a href="#">Status</a>	1 Gbps
REF005A	UK Nets, Permalink Repeaters	London, England	<a href="#">Status</a> <a href="#">Usage Guide</a> <a href="#">Information</a>	100 Mbps
REF005B	Kent Net (UK Repeaters around Kent)	London, England	<a href="#">Status</a> <a href="#">Usage Guide</a> <a href="#">Information</a>	100 Mbps
REF005C		London, England	<a href="#">Status</a> <a href="#">Usage Guide</a> <a href="#">Information</a>	100 Mbps
REF005D	<a href="#">UKFMGW Net (North West UK Repeaters)</a>	London, England	<a href="#">Status</a> <a href="#">Usage Guide</a> <a href="#">Information</a>	100 Mbps
REF006A	Scottish Net	London, England	<a href="#">Status</a> <a href="#">Usage Guide</a> <a href="#">Information</a>	100 Mbps
REF006B		London, England	<a href="#">Status</a> <a href="#">Usage Guide</a> <a href="#">Information</a>	100 Mbps
REF006C	German Net	London, England	<a href="#">Status</a> <a href="#">Usage Guide</a> <a href="#">Information</a>	100 Mbps
REF007A	Florida	Orlando, FL, United States	<a href="#">Status</a>	100 Mbps
REF007B	Florida	Orlando, FL, United States	<a href="#">Status</a>	100 Mbps
REF007C	Florida	Orlando, FL, United States	<a href="#">Status</a>	100 Mbps
REF008A	Japan G2 repeaters, DVDongles and DVAPs	Japan	<a href="#">Status</a>	
REF008B	Japan G2 repeaters, DVDongles and DVAPs	Japan	<a href="#">Status</a>	
REF008C	Japan G2 repeaters, DVDongles and DVAPs	Japan	<a href="#">Status</a>	
REF009A		AZ, United States	<a href="#">Status</a>	
REF009B		AZ, United States	<a href="#">Status</a>	
REF009C	Arizona Permalink Repeaters	AZ, United States	<a href="#">Status</a>	
REF010A	Emergency Communications	New England, United States	<a href="#">Status</a>	100 Mbps
REF010B	Open	New England, United States	<a href="#">Status</a>	100 Mbps
REF010C	New England Repeaters	New England, United States	<a href="#">Status</a>	100 Mbps
REF011A		Italy	<a href="#">Status</a>	
REF011B		Italy	<a href="#">Status</a>	
REF011C		Italy	<a href="#">Status</a>	
REF012A	Permalink Repeaters	Southern California, United States	<a href="#">Status</a>	100 Mbps
REF012B		Southern California, United States	<a href="#">Status</a>	100 Mbps
REF012C		Southern California, United States	<a href="#">Status</a>	100 Mbps
REF013A		London, England	<a href="#">Status</a>	100 Mbps
REF013B		London, England	<a href="#">Status</a>	100 Mbps
REF013C		London, England	<a href="#">Status</a>	100 Mbps
REF014A	US west coast repeater linking	NE, United States	<a href="#">Status</a>	
REF014B	US west coast repeater linking	NE, United States	<a href="#">Status</a>	
REF014C	US west coast repeater linking	NE, United States	<a href="#">Status</a>	
REF015A	Multimedia (non-DSTAR)	London, England	<a href="#">Status</a>	
REF015B	Multimedia (non-DSTAR)	London, England	<a href="#">Status</a>	
REF015C	Data Only - Worldwide use	London, England	<a href="#">Status</a>	
REF016A		British Columbia, Canada	<a href="#">Status</a>	100 Mbps
REF016B		British Columbia, Canada	<a href="#">Status</a>	100 Mbps
REF016C		British Columbia, Canada	<a href="#">Status</a>	100 Mbps
REF017A	Netherlands (Dutch Speaking repeaters, hotspots and dongles)	Amsterdam, the Netherlands	<a href="#">Status</a>	100 Mbps
REF017B		Amsterdam, the Netherlands	<a href="#">Status</a>	100 Mbps
REF017C		Amsterdam, the Netherlands	<a href="#">Status</a>	100 Mbps
REF018A	Brazil	United States	<a href="#">Status</a>	
REF018B	Brazil	United States	<a href="#">Status</a>	
REF018C	Brazil	United States	<a href="#">Status</a>	
REF019A		WI, United States	<a href="#">Status</a>	100 Mbps
REF019B		WI, United States	<a href="#">Status</a>	100 Mbps
REF019C		WI, United States	<a href="#">Status</a>	100 Mbps
REF020A		NJ, United States	<a href="#">Status</a>	
REF020B		NJ, United States	<a href="#">Status</a>	

# D-Star History and Evolution

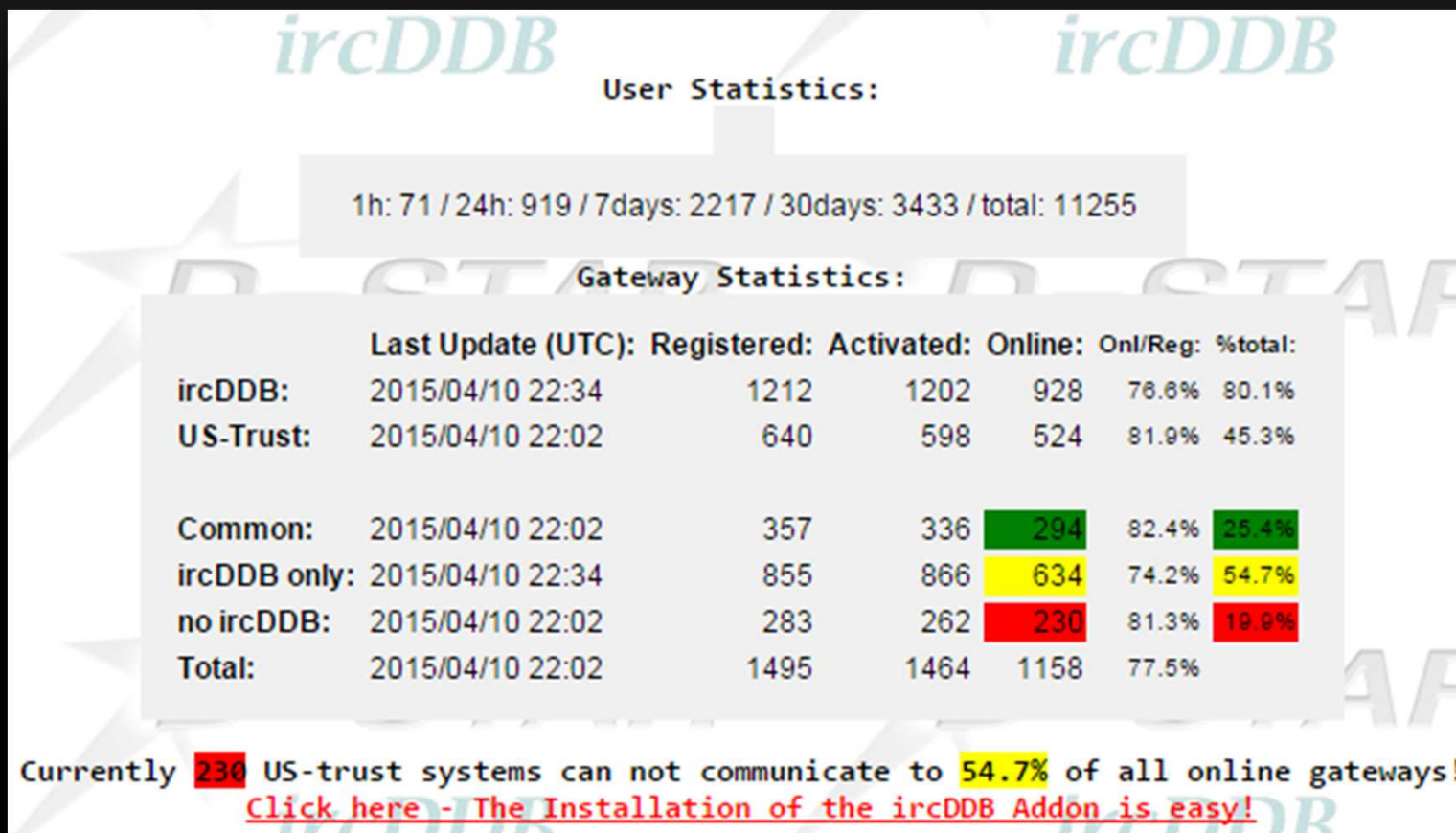
## IRCDDDB added (G4KLX)

D-Star Gateway solutions with ircDDDB connection  
(digital voice data flow)



## D-Star History and Evolution

### US-Trust vs. IRCDDDB/DCS use statistics



# D-Star History and Evolution

## The DCS reflector system

xREFLECTOR x xreflector.net/neu3/

**x-NET DCS024 Dashboard** | Reflector Status and Control

DCS024 Reflector System DCS024

Nr.	MyCall	Source	S+Modul	User DTMF	Your	Message	Last Heard	GROUP	Group DTMF
1	IT9ZHS	IT9ZHS	IT9ZHS B	7900	CQCCQ	ROBERTO*PALERMO	54 m 22 s	Florida DCS024 C	D24C
2	K1WIZ <sup>6PS</sup>	K1WIZ	K1WIZ C	3935	CQCCQ	WWW.WIZWORKS.NET	4 h 48 m 13 s	USA DCS024 B	D24B
3	ND1L <sup>6PS</sup>	ND1L	ND1L B	1291	CQCCQ	JESS - MOBILE	1 d 7 m 52 s	Florida DCS024 C	D24C
4	KD4JMV <sup>6PS A</sup>	AC4FL	AC4FL B	6185	CQCCQ	HARRYPI551	1 d 3 h 32 m 54 s	Florida DCS024 C	D24C
5	N1DL	AB4FL	AB4FL B	1941	CQCCQ	KARL IN NAPLES, FL	1 d 4 h 37 m 30 s	Florida DCS024 C	D24C
6	K1DSP	K1DSP	K1DSP C	no dtmf	CQCCQ	No Info	1 d 7 h 1 m 6 s	USA DCS024 B	D24B
7	ZL2TWS <small>ZL2TWS L is no Call</small>	ZL2VH	ZL2VH B	7028	CQCCQ	RPI2+DVRPTR-V1	1 d 20 h 14 m 21 s	Florida DCS024 C	D24C
8	AG0X	AG0X	AG0X C	3371	CQCCQ	Uli Naples, FL	1 d 23 h 2 m 27 s	Florida DCS024 C	D24C
9	N1PA	N1PA	N1PA B	1000	CQCCQ	Paul / D-HAP Mobile	2 d 10 h 46 m 40 s	USA DCS024 B	D24B
10	EA5IKG	EA5IKG	EA5IKG C	3471	CQCCQ	Juan Jose QTH SAX	3 d 3 h 39 m 39 s	Florida DCS024 C	D24C
11	VA3AM	VA3FS	VA3FS B	no dtmf	CQCCQ	Hamilton Ont Canada	3 d 4 h 21 m 30 s	USA DCS024 B	D24B
12	K3AVR	K5MI	K5MI C	8307	CQCCQ	No Info	3 d 8 h 49 m 35 s	Florida DCS024 C	D24C
13	G1BJY	N1PA	N1PA B	1322	CQCCQ	Alan dv-mega Kempsey	4 d 1 h 31 m 13 s	USA DCS024 B	D24B
14	OE7MKT <sup>6PS</sup>	OE7FMI	OE7FMI B	8657	CQCCQ	OE7MKT ++portabel++	4 d 10 h 17 m 45 s	Florida DCS024 C	D24C
15	AB1EI	KS1R	KS1R B	4841	CQCCQ	AB1EI	4 d 22 h 6 m 19 s	Florida DCS024 C	D24C
16	K1CGZ <sup>6PS</sup>	KS1R	KS1R B	5740	CQCCQ	Paul, Marco Is., FL	4 d 22 h 16 m 13 s	Florida DCS024 C	D24C
17	W9KB	AA4PP	AA4PP B	2468	CQCCQ	NAPLES, FL	5 d 3 h 19 m 10 s	Florida DCS024 C	D24C
18	DK1EHK <sup>6PS A</sup>	DK1EHK	DK1EHK D	6237	CQCCQ	HELMUT IN WERTH	5 d 7 h 27 m 55 s	Florida DCS024 C	D24C
19	DO4IX	DO4IX	DO4IX B	8636	CQCCQ	Jean Ratingen R12	5 d 8 h 45 m 7 s	Florida DCS024 C	D24C
20	DG9EIS	DB0PBS	DB0PBS B	7136	CQCCQ	FRANK NEAR EDLP	6 d 1 h 47 m 40 s	USA DCS024 B	D24B
21	AC0YV	AC0YV	AC0YV B	5828	CQCCQ	880H COLORADO MIKE	6 d 2 h 33 m 51 s	California DCS024 D	D24D
22	K0BAN	AC0YV	AC0YV B	no dtmf	CQCCQ	K0BAN ID-E1A Plus DD	6 d 7 h 33 m 25 s	California DCS024 D	D24D
23	M0ZMX	GB7OK	GB7OK C	5750	CQCCQ	Mark /Isle Of Grain	6 d 10 h 30 m 30 s	Florida DCS024 C	D24C
24	DL2ZEA	DL2ZEA	DL2ZEA B	1104	CQCCQ	Andreas - Zerst	7 d 6 h 59 m 1 s	Florida DCS024 C	D24C
25	K2RHK <sup>6PS</sup>	K2RHK	K2RHK B	no dtmf	CQCCQ	ALAN NEW YORK NY	9 d 4 s	USA DCS024 B	D24B
26	G4DBR	G4DBR	G4DBR B	8806	CQCCQ	CHRIS- HILL RIDWARE-	9 d 13 h 40 m 8 s	USA DCS024 B	D24B
27	CT2IHP	MultiLink	HB9AC B	8052	CQCCQ	Rui Bernardo - 73	11 d 3 h 6 m 16 s	World Wide DCS024 A	D24A

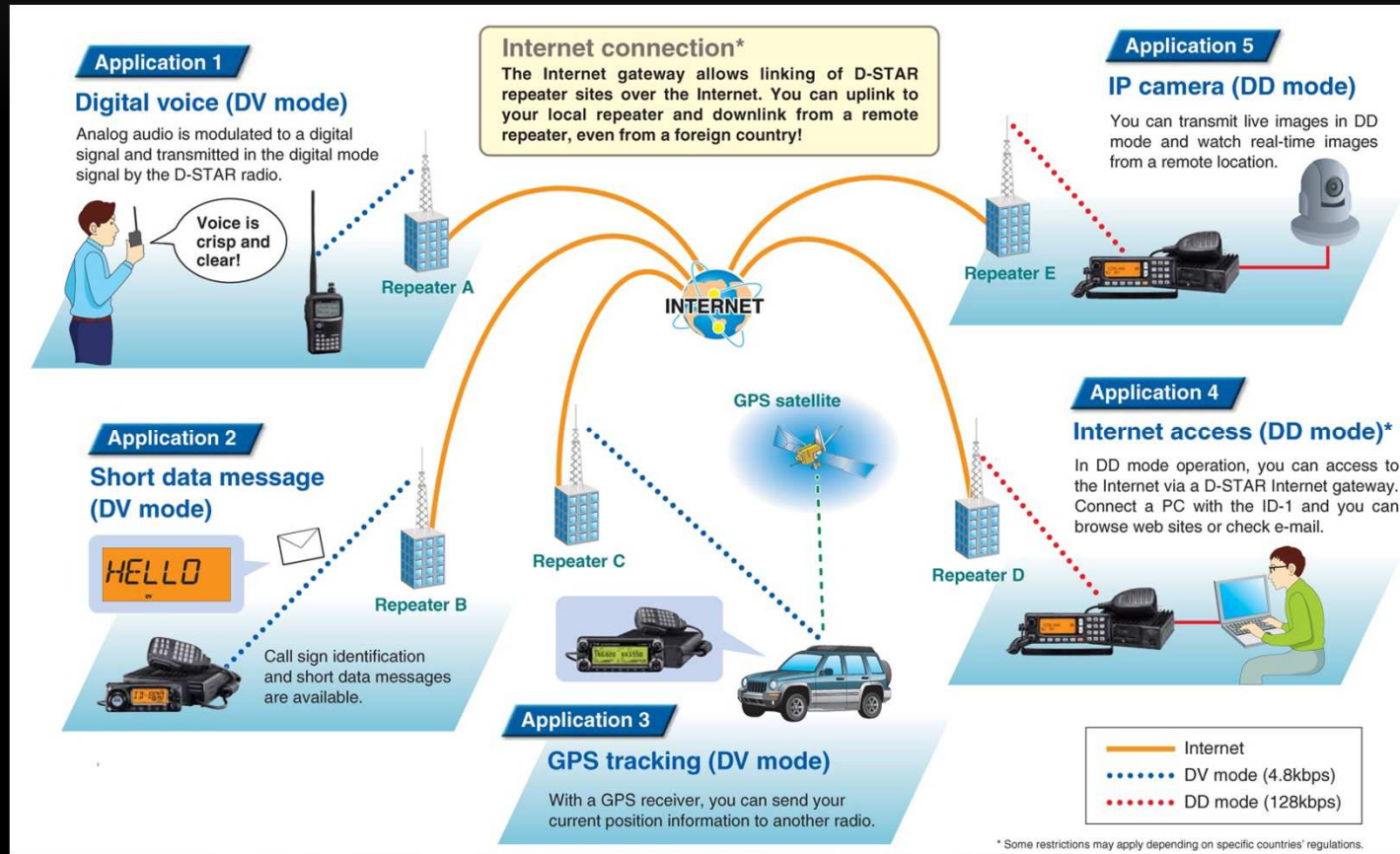
# WHAT CAN YOU DO WITH D-STAR?

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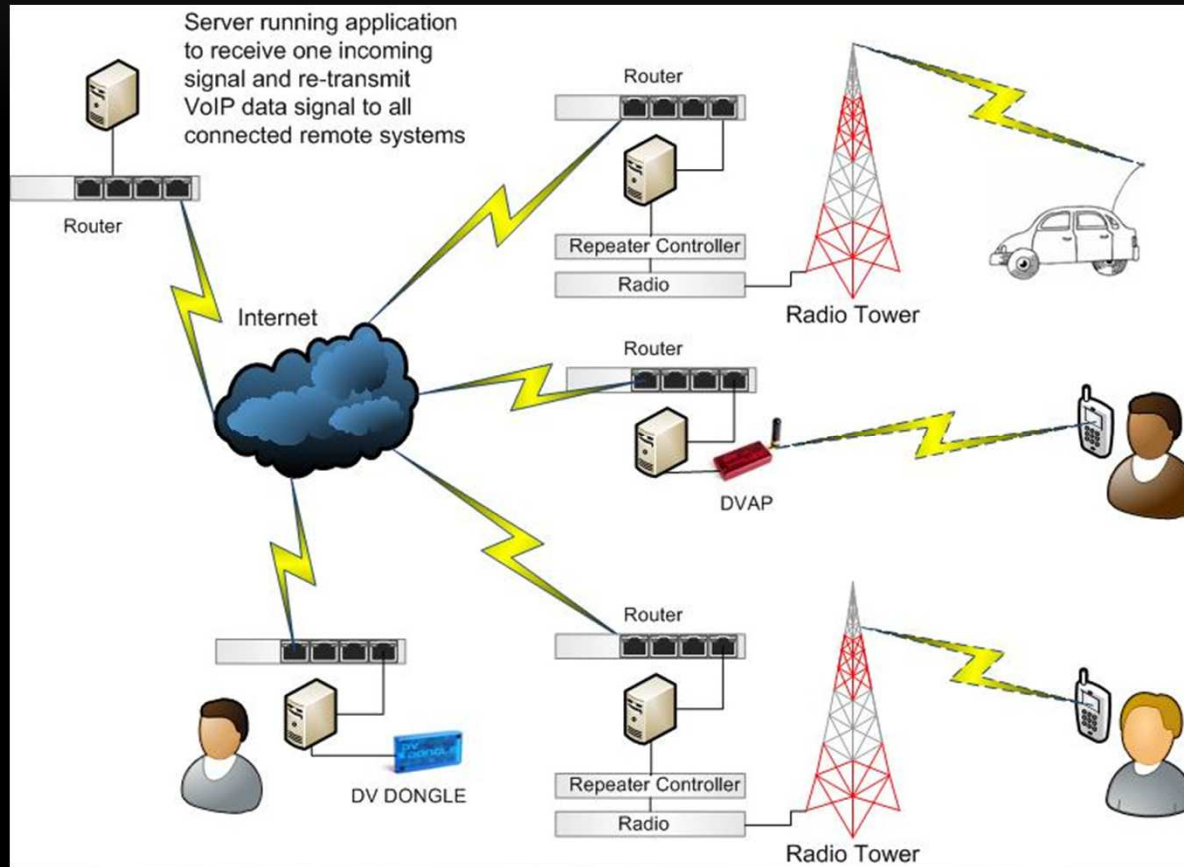
- Simplex communications, of course
- Repeaters
- Reflectors – This is where most of the traffic is found
- Data
- Call Sign Routing
- Repeater Linking
- CCS – Call Connection Service
- Registration is required to use most US reflectors



# WHAT CAN YOU DO WITH D-STAR?



# WHAT CAN YOU DO WITH D-STAR?



# HOW DO I DO IT?

# PROGRAM MY RADIO

Memory Channel																			
CH	Frequency						Tone/TSQ/DTCS					Digital		Call Sign			Bank		
	Operating Freq	DUP	Offset Freq	TS	Mode	Name	Skip	Tone	Repeater Tone	TSQ Freq	DTCS	DTCS Polarity	DSQL	Code	Your	RPT1	RPT2	Group	Ch
0	146.520000		0.600000	15k	FM	SIMPLEX			141.3	141.3	023	Both N		00	CQ			A	0
1	146.670000	-DUP	0.600000	15k	FM	ARASWF		TONE	136.5	136.5	023	Both N		00	CQ			A	1
2	146.640000	-DUP	0.600000	15k	FM	NAPLES64		TONE	136.5	136.5	023	Both N		00	CQ			A	2
3	147.030000	+DUP	0.600000	15k	FM	EOC		TONE	136.5	88.5	023	Both N		00	CQ			A	3
4	147.105000	-DUP	0.600000	15k	FM	147.105		TONE	136.5	88.5	023	Both N		00	CQ				
5	147.505000	-DUP	1.000000	10k	FM	KC1AR		TONE	67.0	88.5	023	Both N		00	CQ			A	5
6	443.900000	+DUP	5.000000	25k	FM	KC1AR U		TONE	67.0	88.5	023	Both N		00	CQ			A	9
7	443.100000	+DUP	5.000000	15k	FM	KC4RRP		TONE	136.5	136.5	023	Both N		00	CQ			A	4
8	443.600000	+DUP	5.000000	25k	FM	VINEYRDS		TONE	114.8	88.5	023	Both N		00	CQ			A	11
9	442.750000	+DUP	5.000000	25k	FM	KC1AR		TONE	67.0	88.5	023	Both N		00	CQ	KC1AR B	KC1AR G	A	12
10	145.725000		0.600000	12.5k	DV	HOTSPOT			88.5	88.5	023	Both N		00	CQ	AG0X C	AG0X G	A	31
11	441.500000	+DUP	5.000000	15k	DV	AA4PP B			88.5	88.5	023	Both N		00	CQ	AA4PP B	AA4PP G	A	13
12	145.490000	-DUP	0.600000	15k	DV	AA4PP C			88.5	88.5	023	Both N		00	CQ	AA4PP C	AA4PP G	A	14
13	145.270000	-DUP	0.600000	15k	DV	AB4NP C			88.5	88.5	023	Both N		00	CQ	AB4NP C	AB4NP G	A	16
14	443.275000	+DUP	5.000000	15k	DV	AC4FL B			88.5	88.5	023	Both N		00	CQ	AC4FL B	AC4FL G	A	17
15	146.985000	-DUP	0.600000	15k	DV	AC4FL C			88.5	88.5	023	Both N		00	CQ	AC4FL C	AC4FL G	A	18
16	147.315000	+DUP	0.600000	15k	DV	AD4SW C			88.5	88.5	023	Both N		00	CQ	AD4SW C	AD4SW G	A	19
17	443.650000	+DUP	5.000000	15k	FM	K5MI FM		TONE	141.3	88.5	023	Both N		00	CQ	K5MI B	K5MI G	A	20
18	146.985000	-DUP	0.600000	15k	DV	K5MI C			88.5	88.5	023	Both N		00	CQ	K5MI C	K5MI G	A	21
19	146.850000	-DUP	0.600000	15k	FM	MARCO V		TONE	141.3	88.5	023	Both N		00	CQ			A	22
20	443.650000	+DUP	5.000000	15k	FM	MARCO U		TONE	141.3	88.5	023	Both N		00	CQ			A	23
21	442.125000	+DUP	5.000000	25k	FM	ESTERO U		TONE	67.0	88.5	023	Both N		00	CQ			A	24
22	444.450000	+DUP	5.000000	25k	FM	FT MYERS		TONE	77.0	88.5	023	Both N		00	CQ			A	35
23	146.880000	-DUP	0.600000	15k	FM	FMARCV		TONE	136.5	88.5	023	Both N		00	CQ			A	26
24	145.170000	-DUP	0.600000	15k	FM	FMARC 2		TONE	136.5	88.5	023	Both N		00	CQ				
25	442.450000	+DUP	5.000000	25k	FM	FMARC U		TONE	136.5	88.5	023	Both N		00	CQ			A	27
26	146.880000	-DUP	0.600000	15k	FM	LEE EOC		TONE	136.5	88.5	023	Both N		00	CQ			A	28
27	146.790000	-DUP	0.600000	15k	FM	SANIBEL		TONE	136.5	88.5	023	Both N		00	CQ			A	29
28	443.425000	+DUP	5.000000	25k	FM	SANIBEL		TONE	136.5	88.5	023	Both N		00	CQ			A	30
29	445.400000		5.000000	25k	DV	UHF HOTS			88.5	88.5	023	Both N		00	CQ	AG0X B	AG0X G	A	6
30	147.975000	-DUP	0.600000	15k	DV	W7AES C			88.5	88.5	023	Both N		00	CQ	W7AES C	W7AES G	A	32
31	449.575000	-DUP	5.000000	12.5k	DV	W7AES B			88.5	88.5	023	Both N		00	CQ	W7AES B	W7AES G	A	33
32	443.400000	+DUP	5.000000	5k	FM	MARCO HB		TONE	141.3	88.5	023	Both N		00	CQ			A	25

# REGISTER WITH US-TRUST

D-STAR Gateway System x

w4aes.dstargateway.org/Dstar.do

**D-STAR**

**D-STAR Gateway System (W4AES)**

**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

# GET A CCS NUMBER (YOUR "PHONE NUMBER")

The screenshot shows a web browser window with the address bar displaying 'xreflector.net/neu3/'. The page title is 'Registration page for Digital Voice Services.' Below the title, there is a paragraph: 'This is a central registration system for different Digitale Voice services around D-Star and DMR for Amateur Radio. You may register CCS/DTMF, DMR-IDs and D-Star-Registrations from one platform.'

**Step 1**

There are two radio button options:

- Register services for an individual callsign (no repeater!).
- Register services for a public station (repeater/gateway).

Below the options is a text input field labeled 'Callsign:'. Below the input field are two buttons: 'OK' and 'Reset'.

Below the buttons, there is a paragraph: 'In the next step you will be offered available services for your callsign.'

The left sidebar contains several menu items:

- HOME**
  - [ircDDB Live](#)
  - [Impressum](#)
  - [DCS Live \*beta\*](#)
  - [QTH locator?](#)
- HAM-DMR**
  - [Hytera User](#)
  - [Hytera Live](#)
- DCS Multiserver**
  - [User](#)
  - [DCSMultiLink](#)
  - [DCS Software](#)
  - [DCS Monitor](#)
- CCS System**
  - [CCS Repeater](#)
  - [CCS Monitor](#)
  - [User Register](#)
  - [DTMF List](#)
- Germany DCS001**
  - [User](#)
  - [Repeater](#)
  - [Group Info](#)
- World Wide DCS002**
  - [User](#)
  - [Repeater](#)
  - [Group Info](#)
- Switzerland**

# THE CCS PHONE BOOK

xREFLECTOR x xreflector.net/neu3/

HOME  
[ircDDB Live](#)  
[Impressum](#)  
[DCS Live](#)  
[QTH locator](#)

HAM-DNR  
[Hytera User](#)  
[Hytera Live](#)

DCS Multiserver  
[User](#)  
[DCSMultiLink](#)  
[DCS Software](#)  
[DCS Monitor](#)

CCS System  
[CCS Repeater](#)  
[CCS Monitor](#)  
[User Register](#)  
[DTMF List](#)

Germany  
**DCS001**  
[User](#)  
[Repeater](#)  
[Group Info](#)

World Wide  
**DCS002**  
[User](#)  
[Repeater](#)  
[Group Info](#)

Switzerland  
**DCS003**  
[User](#)  
[Repeater](#)  
[Group Info](#)

Denmark  
**DCS004**  
[User](#)  
[Repeater](#)  
[Group Info](#)

Great Britain

CCS | DTMF Modul

CCS Admin System by HB9SDB

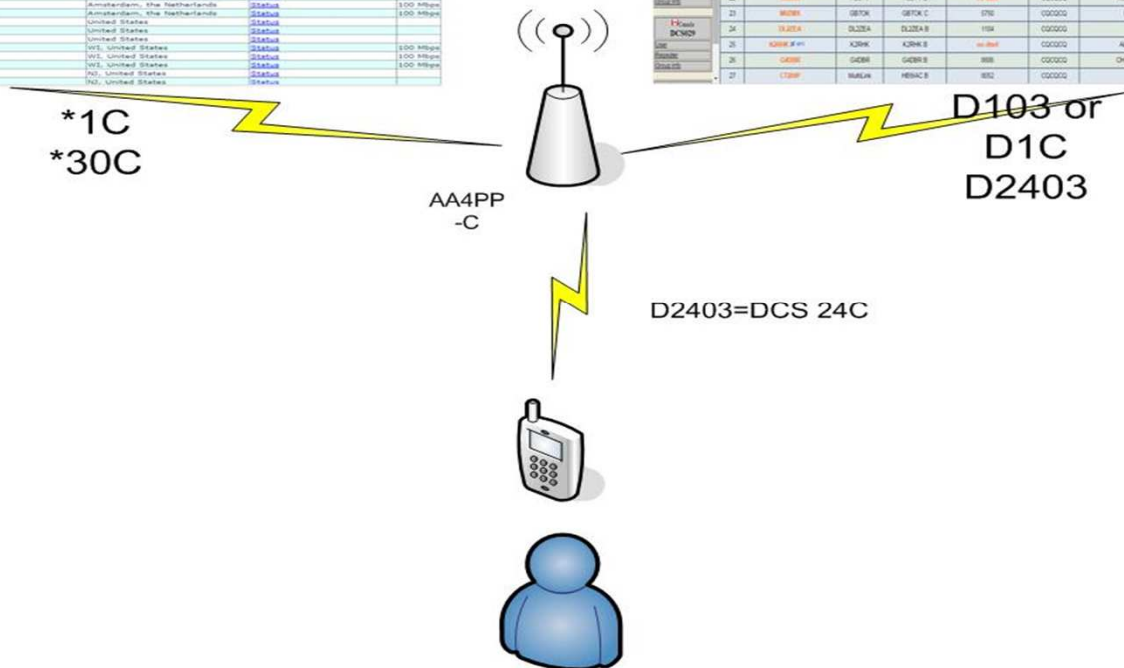
Callsign Search: AA4PP

N1PA [1000]	HB9EZO [1001]	2E0SVZ [1003]	KD0ZP [1005]	W5ELM [1007]	DL1DBL [1008]	SP8XXE [1011]	PJT7CA [1012]	9Y4T [1015]	EA7IWX [1016]	DG3PT [1018]
M1SKI [1021]	M5DUO [1022]	2E0YNT [1023]	LZ4DZ [1024]	M0VBD [1026]	OE3SCC [1027]	EA7AHG [1028]	EA7OC [1029]	N1DOT [1030]	N3MAW [1031]	DK1PR [1034]
HB9MFY [1035]	DL1NAT [1036]	N1FZH [1039]	LA8UU [1041]	G4VRX [1042]	OE1PHS [1045]	OZ2JJ [1046]	DO2GSP [1051]	DF4FV [1055]	OE3ELG [1057]	SP6TPY [1059]
DG4UAK [1061]	IZ8QIG [1063]	VE3EFF [1064]	HA7PTY [1065]	F1ORJ [1066]	PD0LEX [1069]	CT5KJE [1071]	SM6FRZ [1072]	OE9PKV [1074]	DB6NM [1075]	DG0FIH [1076]
DO1HM [1078]	PE1NMM [1079]	N8JUC [1081]	HB9DTK [1082]	M0PYU [1084]	SP7PPT [1085]	DF9CA [1086]	DL4DP [1087]	PD0PIW [1089]	DO9AJH [1092]	IZ0XBM [1093]
SM6RDA [1094]	F1UBF [1095]	IU0CX5 [1099]	W6SAT [1102]	KD2BDU [1103]	DL2ZEA [1104]	CT7ABO [1105]	2W0OGY [1107]	OK2MO [1108]	SATAXT [1110]	DG1HT [1111]
M6XUP [1112]	DG1BGS [1113]	PURAO [1114]	M0JMM [1115]	PD0KOK [1118]	DO6BF [1119]	DG5MS [1120]	HB9DSE [1122]	IZ1DRY [1123]	DL5UR [1124]	MM0RKN [1125]
PY4RSE [1126]	DL2LW [1127]	GI4MHD [1130]	MB6OR [1131]	SM7NUM [1133]	H57WGO [1134]	VK5UZ [1135]	CT2HDQ [1136]	PA3PM [1137]	SM0RUX [1139]	PD8R [1140]
IT9KGH [1141]	DF8AY [1142]	DO8UK [1143]	K1PDY [1144]	M0MID [1146]	LA9JSA [1149]	2E0PSV [1151]	SM3LWP [1152]	AD4UU [1153]	OE5VCO [1154]	PP6PP [1155]
OZ3DST [1156]	OE7MMT [1157]	KI4IKM [1159]	DH6FAA [1161]	S6LLB [1165]	WB5EKU [1166]	SQ5PTN [1167]	CT1DTE [1171]	M0TTL [1173]	DO7RZ [1176]	N1RXE [1177]
PD0JX [1178]	JJ0NNU [1180]	DG0OVP [1181]	DG9AW [1184]	SM5RVH [1186]	DL1DE [1188]	DG3PO [1189]	OE1JTB [1191]	DC1TJH [1193]	WB1EZK [1194]	E20QVD [1195]
OE9FWW [1196]	ZL2YD [1197]	DG0CAW [1198]	DB8TA [1200]	SQ7AYJ [1201]	M6EHF [1202]	PD0JB [1203]	DG3KCE [1206]	NN1D [1207]	DO8GT [1209]	SM4POF [1210]
DG4BBR [1213]	DJ0PR [1214]	LZ3SP [1215]	DF3EC [1218]	W4LOV [1219]	IW0GWT [1221]	EA1DBB [1222]	DL9BBH [1223]	PY4LH [1226]	M3UYF [1227]	HS7XRH [1228]
EA6AMB [1229]	DK8ZV [1230]	DG3FW [1234]	OE8WLK [1237]	KC3AAD [1239]	DL2MDC [1240]	PA3BAT [1241]	HB9KNN [1243]	SQ6RMA [1246]	DM6HB [1248]	M0VNK [1249]
DM3FB [1250]	K4QHR [1251]	EABEE [1252]	DL1WM [1253]	DK3EM [1254]	ON4PN [1255]	DM1HE [1256]	EA1GIZ [1257]	OZ5LJ [1259]	DL7VTS [1260]	IZ3ALU [1262]
HB9FPF [1264]	EA1EZ [1266]	SA5YLX [1268]	MIGWOF [1271]	DL0NOT [1272]	DO8PT [1273]	SP7QHR [1275]	OE9PGV [1277]	G1HIG [1278]	DG1EIR [1279]	HB9ERV [1280]
OE7AHJ [1281]	PU7RKA [1284]	DK3WS [1285]	SM3ULU [1286]	DG3SMA [1287]	G7UFI [1288]	CT2JYO [1289]	ND1L [1291]	DO1ZZ [1292]	SP3UUI [1293]	DM1HD [1294]
EA5GTX [1295]	SO3JAB [1296]	DC1CC [1297]	DO7EN [1299]	LA5II [1304]	DJ9CN [1308]	SK2TP [1309]	DL8MMA [1312]	M0TTF [1313]	SQ5KVZ [1314]	IR6UCP [1315]
IW9GZS [1316]	EA1CI [1317]	ON3TGV [1318]	2E0DMB [1319]	SP5XHC [1320]	ISNQC [1321]	G1BJY [1322]	W4DSL [1323]	E20TVU [1324]	VK4BQ [1325]	EB1HYS [1326]
DC8KZ [1328]	F1NUJ [1331]	OE3FPA [1333]	I5PVX [1335]	M0WFK [1337]	DO1KDK [1338]	F4EIR [1340]	F1MHV [1343]	CT5KEE [1344]	YO2LOJ [1345]	DO8DW [1346]
VA2YRC [1348]	VE3JA [1349]	HL5KY [1350]	DO6FA [1351]	SM6VTT [1352]	W5LND [1353]	PA7D [1354]	OZ9ED [1356]	EA3ES [1357]	SP5RDU [1358]	DL0RT [1361]
MW0MWV [1363]	SM7AWE [1366]	DO4HMK [1368]	DG5ZY [1369]	DL2HAU [1371]	M6NAE [1372]	MM0SJT [1373]	CT2IUL [1374]	OE1TKS [1377]	IW3BYL [1379]	KC7JFC [1380]
SM6LKT [1381]	JA3ICQ [1383]	MW0AEL [1384]	SA5BUE [1388]	DO1YKL [1389]	DF3DT [1390]	ON3HGL [1391]	K4AWC [1394]	SM6OPW [1398]	2E0HTC [1403]	MB6AE [1404]
G6GOS [1406]	LZ1USD [1407]	F4ELP [1408]	IR9BQ [1409]	HB3YJY [1410]	VK4HOG [1412]	SQ6ROK [1413]	IZ2ODN [1415]	DO4FG [1416]	2E0NCO [1417]	DL5EBW [1418]
DL8MCO [1420]	LA5XFA [1423]	DO6NP [1424]	PU2LXW [1426]	SR4VVQ [1427]	HB9NBG [1428]	DG4HH [1430]	DL9QY [1431]	AC6I [1432]	MB6ZE [1433]	LA3MAA [1435]
DO1FRK [1436]	PY1LT [1439]	OE7AGT [1441]	SM6UUJ [1442]	LZ2BIK [1445]	PA3CPI [1446]	P11KAR [1448]	OE3MSU [1449]	OK2VEW [1452]	DC3BI [1453]	IW5EKH [1454]
DG9KAF [1456]	SQ9MUO [1458]	DG1IMM [1461]	DB7MJ [1464]	SA7AXO [1465]	G0MBA [1466]	DK3TT [1469]	DO4WG [1472]	M0JVV [1473]	M0JMO [1474]	PA3CVV [1475]
DG7HG [1476]	DL5FJW [1478]	SQ6ODL [1479]	DO2TW [1480]	DJ2PE [1481]	K4WHE [1483]	JF2ANH [1484]	IN3EQL [1485]	SP9JJC [1486]	DL3NDS [1489]	IZ0RTO [1490]
F4ASS [1494]	HB3YJT [1495]	ON3MCA [1497]	N9TV [1498]	DK8ZT [1499]	SQ9IWS [1500]	KC2NM [1502]	KQ8N [1504]	M0TEX [1505]	DD1PVP [1506]	SP7GJA [1510]
G0WOU [1512]	SP5Y [1514]	2E0ECG [1515]	VK2AAA [1517]	HS5AC [1518]	M0ZZR [1519]	GI4EBS [1520]	2E0DDK [1521]	G7EWW [1522]	SM5TEY [1524]	SP2GG [1526]
DJ2GZ [1528]	DL1ELF [1529]	KC4CLB [1530]	G0BAI [1531]	SQ7NM [1532]	DL4GAI [1535]	G3IOI [1536]	DB7MY [1540]	DL3TW [1541]	G0S5W [1542]	M3LKC [1545]
DK8QU [1546]	G4FHN [1547]	G8PUO [1552]	KC0ZQQ [1553]	DK7AT [1559]	KC8CFI [1560]	2E0WOL [1561]	GW6WTK [1562]	DH4KG [1563]	SQ1EUY [1566]	DL8DD [1568]
DO1CC [1569]	DO9ATV [1570]	DK9VV [1571]	DL9NCY [1573]	F6JMI [1574]	N0KBL [1575]	LA4L SA [1576]	DB9WY [1577]	ZL1HN [1578]	KF9TA [1579]	SM6PVB [1583]
G1CQF [1585]	IW4BP [1586]	SQ5SCS [1589]	DB8BT [1590]	SQ1PQQ [1591]	SR2UVO [1592]	VE3XMS [1593]	LZ1ZDX [1597]	DL2DUB [1598]	IW9HRZ [1600]	SA7AKU [1601]
IK1SPR [1602]	G4HFG [1603]	LA9OW [1606]	PD1EDS [1609]	OE5DRP [1610]	DK6NZ [1611]	VE2DWE [1612]	ZP3BGA [1614]	KJ4TPQ [1615]	SK4BW [1617]	DL4GP [1618]
F5USS [1619]	PY4MAB [1620]	2E0ENN [1622]	IT9DVT [1623]	VK4NSP [1624]	PY7AM [1625]	DL1RPE [1626]	DM8AH [1629]	SR9AD [1631]	SP2FT [1636]	M0BPY [1638]
DB0LER [1640]	KD8YCF [1641]	PD3JDM [1642]	VK4AA [1643]	DG4ZM [1646]	IU1BPR [1648]	ON5SA [1650]	SQ6NLN [1651]	M13WWF [1652]	DO7KN [1655]	PY2JM [1657]
HB9ERR [1658]	G7NZR [1659]	ON3JPB [1661]	LZ5MO [1664]	GB7BE [1668]	DB1FE [1670]	EA5FWX [1671]	PY2EQJ [1673]	KB1FBQ [1674]	W8DR [1676]	G0CTP [1677]

# CONNECT TO US-TRUST AND DCS REFLECTORS

Reflector	Stage	Location	Status	Links	Speed
#F000A	OmniStar repeater	London, England	Status	1000 Mbps	1000 Mbps
#F000C	D-STAR's MegaRepeater	London, England	Status	1000 Mbps	1000 Mbps
#F000A	Southwest US D-STAR Weather Net	US, United States	Status	1000 Mbps	1000 Mbps
#F000B	Southwest US D-STAR Weather Net (Dutch)	US, United States	Status	1000 Mbps	1000 Mbps
#F000C	Some Nets	US, United States	Status	1000 Mbps	1000 Mbps
#F000A	Ad-hoc & Emergency Use - Australia	Australia	Status	1000 Mbps	1000 Mbps
#F000B	Permalink for Repeaters, including all USA Part B Repeaters - Australia	Australia	Status	1000 Mbps	1000 Mbps
#F000C	Australian Nets	Australia	Status	1000 Mbps	1000 Mbps
#F000A	Alternate for Southwest US D-STAR Weather Net	United States	Status	1000 Mbps	1000 Mbps
#F000B	Texas German Repeaters	United States	Status	1000 Mbps	1000 Mbps
#F000C	General Rag Chew (English only please)	United States	Status	1000 Mbps	1000 Mbps
#F000A	US Nets, German Repeaters	United States	Status	1000 Mbps	1000 Mbps
#F000B	Ham Net (UK Repeaters around here)	London, England	Status	1000 Mbps	1000 Mbps
#F000C	UK Nets, German Repeaters	London, England	Status	1000 Mbps	1000 Mbps
#F000D	UKF5000 Net (South West UK Repeaters)	London, England	Status	1000 Mbps	1000 Mbps
#F000A	Swedish Net	London, England	Status	1000 Mbps	1000 Mbps
#F000B	German Net	London, England	Status	1000 Mbps	1000 Mbps
#F000C	Florida	Orlando, FL, United States	Status	1000 Mbps	1000 Mbps
#F000D	Florida	Orlando, FL, United States	Status	1000 Mbps	1000 Mbps
#F000A	Japan QZ repeaters, DvDongles and DVAPs	Japan	Status	1000 Mbps	1000 Mbps
#F000B	Japan QZ repeaters, DvDongles and DVAPs	Japan	Status	1000 Mbps	1000 Mbps
#F000C	Japan QZ repeaters, DvDongles and DVAPs	Japan	Status	1000 Mbps	1000 Mbps
#F000A	AZ, United States	AZ, United States	Status	1000 Mbps	1000 Mbps
#F000B	Arizona Permalink Repeaters	AZ, United States	Status	1000 Mbps	1000 Mbps
#F000C	Emergency Communications	New England, United States	Status	1000 Mbps	1000 Mbps
#F000A	Open	New England, United States	Status	1000 Mbps	1000 Mbps
#F000C	New England Repeaters	New England, United States	Status	1000 Mbps	1000 Mbps
#F001A		Italy	Status	1000 Mbps	1000 Mbps
#F001B		Italy	Status	1000 Mbps	1000 Mbps
#F001C	Permalink Repeaters	Italy	Status	1000 Mbps	1000 Mbps
#F001A		Southern California, United States	Status	1000 Mbps	1000 Mbps
#F001B		Southern California, United States	Status	1000 Mbps	1000 Mbps
#F001C		Southern California, United States	Status	1000 Mbps	1000 Mbps
#F001A		London, England	Status	1000 Mbps	1000 Mbps
#F001B		London, England	Status	1000 Mbps	1000 Mbps
#F001C		London, England	Status	1000 Mbps	1000 Mbps
#F001A	US West coast repeater linking	US, United States	Status	1000 Mbps	1000 Mbps
#F001B	US West coast repeater linking	US, United States	Status	1000 Mbps	1000 Mbps
#F001C	US West coast repeater linking	US, United States	Status	1000 Mbps	1000 Mbps
#F001A	Multimedia (non-DSTAR)	US, United States	Status	1000 Mbps	1000 Mbps
#F001B	Multimedia (non-DSTAR)	US, United States	Status	1000 Mbps	1000 Mbps
#F001C	Data Only - Worldwide use	US, United States	Status	1000 Mbps	1000 Mbps
#F001A		London, England	Status	1000 Mbps	1000 Mbps
#F001B		London, England	Status	1000 Mbps	1000 Mbps
#F001C		London, England	Status	1000 Mbps	1000 Mbps
#F001A		British Columbia, Canada	Status	1000 Mbps	1000 Mbps
#F001B		British Columbia, Canada	Status	1000 Mbps	1000 Mbps
#F001C		British Columbia, Canada	Status	1000 Mbps	1000 Mbps
#F001A		Amsterdam, the Netherlands	Status	1000 Mbps	1000 Mbps
#F001B		Amsterdam, the Netherlands	Status	1000 Mbps	1000 Mbps
#F001C		Amsterdam, the Netherlands	Status	1000 Mbps	1000 Mbps
#F001A		United States	Status	1000 Mbps	1000 Mbps
#F001B		United States	Status	1000 Mbps	1000 Mbps
#F001C		United States	Status	1000 Mbps	1000 Mbps
#F001A		US, United States	Status	1000 Mbps	1000 Mbps
#F001B		US, United States	Status	1000 Mbps	1000 Mbps
#F001C		US, United States	Status	1000 Mbps	1000 Mbps
#F001A		US, United States	Status	1000 Mbps	1000 Mbps
#F001B		US, United States	Status	1000 Mbps	1000 Mbps
#F001C		US, United States	Status	1000 Mbps	1000 Mbps
#F002A		US, United States	Status	1000 Mbps	1000 Mbps
#F002B		US, United States	Status	1000 Mbps	1000 Mbps
#F002C		US, United States	Status	1000 Mbps	1000 Mbps
#F002D		US, United States	Status	1000 Mbps	1000 Mbps

No.	My-Call	Source	S-Modal	User DTMF	Year	Message	Last Heard	GROUP	Group DTMF
1	7245	7245	7245 B	760	00000	ROBERTO VALERIO	2/18/10 12:00	USA	D4B
2	4182 # # #	4182	4182 C	366	00000	WIKI WORKS NET	2/18/10 12:00	USA	D4B
3	NEE # # #	NEE	NEE B	120	00000	JESS MOBLE	2/17/10 12:00	USA	D4B
4	4048 # # #	ACPL	ACPL B	898	00000	HARDPUSH	2/17/10 12:00	USA	D4B
5	NEE	ABFL	ABFL B	194	00000	KARL BRUMLEY FL	2/17/10 12:00	USA	D4B
6	K3OP	K3OP	K3OP C	no dtmf	00000	No Info	2/17/10 12:00	USA	D4B
7	2208	2208	2208 B	720	00000	RFQ-DMP17	2/16/10 21:00	USA	D4B
8	408	408	408 C	377	00000	18 Naps, FL	2/16/10 21:00	USA	D4B
9	NPA	NPA	NPA B	180	00000	Paul / DMP Mobile	2/16/10 21:00	USA	D4B
10	4182	4182	4182 C	367	00000	Juan Jose Q7H SAK	2/16/10 21:00	USA	D4B
11	4182	4182	4182 B	no dtmf	00000	Hammer On Canada	2/16/10 21:00	USA	D4B
12	K3OP	K3OP	K3OP C	687	00000	No Info	2/16/10 21:00	USA	D4B
13	1187	1187	1187 B	132	00000	Ham in-mega Kempter	2/16/10 19:00	USA	D4B
14	4287 # # #	DEPW	DEPW B	887	00000	DEPW - mobile	2/16/10 19:00	USA	D4B
15	4182	4182	4182 B	440	00000	4182	2/16/10 19:00	USA	D4B
16	4182 # # #	K3OP	K3OP B	574	00000	Paul Napier, FL	2/16/10 19:00	USA	D4B
17	4182	4182	4182 B	348	00000	MARK FL	2/16/10 19:00	USA	D4B
18	4048 # # #	AAFP	AAFP B	427	00000	HEMAT BERTH	2/16/10 19:00	USA	D4B
19	4048	4048	4048 B	836	00000	Juan Ramirez DC	2/16/10 19:00	USA	D4B
20	4048	4048	4048 B	736	00000	FRANK NEAR DDP	2/16/10 19:00	USA	D4B
21	407Y	407Y	407Y B	923	00000	BOB COLQUHOUN	2/16/10 19:00	USA	D4B
22	4048	407Y	407Y B	no dtmf	00000	KIMBA DVAH Plus ID	2/16/10 19:00	USA	D4B
23	4048	407Y	407Y C	570	00000	Ham Net Of Spain	2/16/10 19:00	USA	D4B
24	1187A	1187A	1187A B	194	00000	Andrea -Dmit	2/16/10 19:00	USA	D4B
25	4048 # # #	K3OP	K3OP B	no dtmf	00000	ALAN NEW YORK NY	2/16/10 19:00	USA	D4B
26	4048	4048	4048 B	888	00000	CHES HILL BERNIE	2/16/10 19:00	USA	D4B
27	4048	4048	4048 B	852	00000	BOB BERNIE TX	2/16/10 19:00	USA	D4B





# D-STAR TRANSMISSION



This was recorded approximately 40 miles from the W4AES Repeater in Orlando. Notice that the signal is not even registering on the S-Meter, yet the signal is as clear as a full scale signal.

# D-STAR TERMINOLOGY

- Understand this and you are on your way
- The terminology is from the viewpoint of the transmitting station
- “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 (for the most part, you will use CQCQCQ).
- “Rpt1Call” and “Rpt2Call” (also called “R1Call” & “R2Call”) are also used, and will be discussed next.

# D-STAR PROGRAMMING

- Know repeater frequency and **callsign**
- The four parameters:
  1. MY -My callsign (Once set, this will likely never have to be changed again)
  2. UR –Your callsign (CQCQCQ for general call)
  3. RPT1 –Repeater callsign/module I’m talking to (AA4PP B)
  4. RPT2 –Where do I want to go? (usually repeater callsign and gateway ....  
example AA4PP G)
- The eighth position –Designates module regardless of callsign length  
(AA4PP●●C, W4BUG●●C, W4AES●●B)
- ● = blank space

# LINKING AND ROUTING

- Users can link directly to other repeaters and reflectors
- Linking is generally accomplished by a link command in the Ur call sign field
- Collier County D-Star Repeaters also use DTMF for linking and routing
- D-Star is capable of call sign routing to individual stations
- CCS is a new platform that enables linking to another user with a simple 4-digit DTMF command and other repeaters with a 5-digit DTMF command
- CCS is very new and should make routing to other users and stations easier in many cases

# D-STAR EQUIPMENT



D-STAR / DIGITAL SMART TECHNOLOGIES FOR AMATEUR RADIO

# D-STAR EQUIPMENT



D-STAR / DIGITAL SMART TECHNOLOGIES FOR AMATEUR RADIO

# DVAP AND DV DONGLE



The DV Access Point Dongle connects to your PC or Intel based Mac via a USB port and provides a 2 meter Access Point for use with a D-STAR radio. Using an Internet connection, a user may connect to and communicate with D-STAR gateways and reflectors around the world. The DVAPTool application used with the DV Access Point Dongle may be installed and run on Microsoft Windows XP/Vista/7, Mac OS X Leopard/Snow Leopard, or many flavors of Linux.

# DVRPTR

- The DVRPTR-2 board is a DV Modem based on two powerful 32 Bit microcontroller, an ATMEL AT32UC3B0512 and an ARM based TI controller. All DV functions are implemented in software.





# DVRPTR

- Personal Hotspot – Simplex solution uses a radio with a 9600 baud packet port, uses personal call sign
- Public Hotspot – Works the same but with higher power and a club call sign
- Gateway Link – Provides internet access for a remote repeater
- Repeater – Use a repeater or two FM transceivers and you have a D-Star repeater
- AMBE Board – Using an add on board, you can plug in a mic and speaker and use a 9600 baud capable transceiver and transmit D-Star digital

# RASPBERRY PI & DVAP



# RASPBERRY PI & DVMEGA



# DHAP (DIGITAL HAM ACCESS POINT)



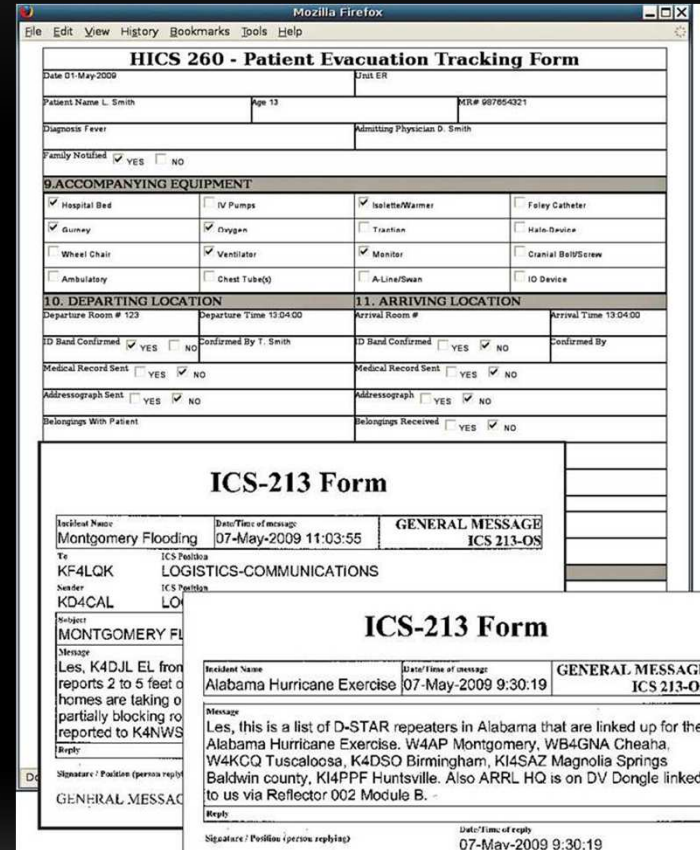
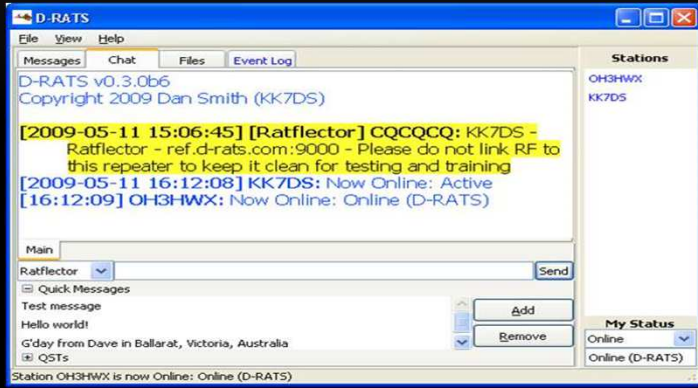
# BABYYSTAR



# D-RATS

- D-RATS is a full function data communications tool for D-STAR and more...and it's **FREE**
- Written by Dan Smith, KK7DS
- Utilizes D-STAR low-speed data mode (~1200 baud)
- PC connects directly to D-STAR radio (No TNC required)
- Windows, Linux and Mac versions available
- Can be used without radio over Internet or with DV Dongle
- Provides chat, messaging, email, forms, file transfer (unattended), mapping (maps included)

# D-RATS



# D-STAR IN COLLIER COUNTY

- 6 functional D-Star repeaters in Collier County
- 2 additional D-Star repeaters are in the planning stages
- 2 are located on County Barn Road (AA4PP C & B)
- 1 is located near Wiggins Pass State Park (AC4FL B)
- AB4NP C is co-located with the WB2QLP repeater in North Pelican Bay
- 1 repeaters (K5MI) is on Marco Island 2 m
- 1 repeater is in Ave Maria (AD4SW) (will be simplex UHF repeater and the VHF becomes AllStar node)
- This allows allow D-Star coverage in most of Collier County
- Coverage extends into Lee County and SW Hendry County



# D-STAR IN COLLIER COUNTY

