

D-PRS Interface User's Guide

3.14b04

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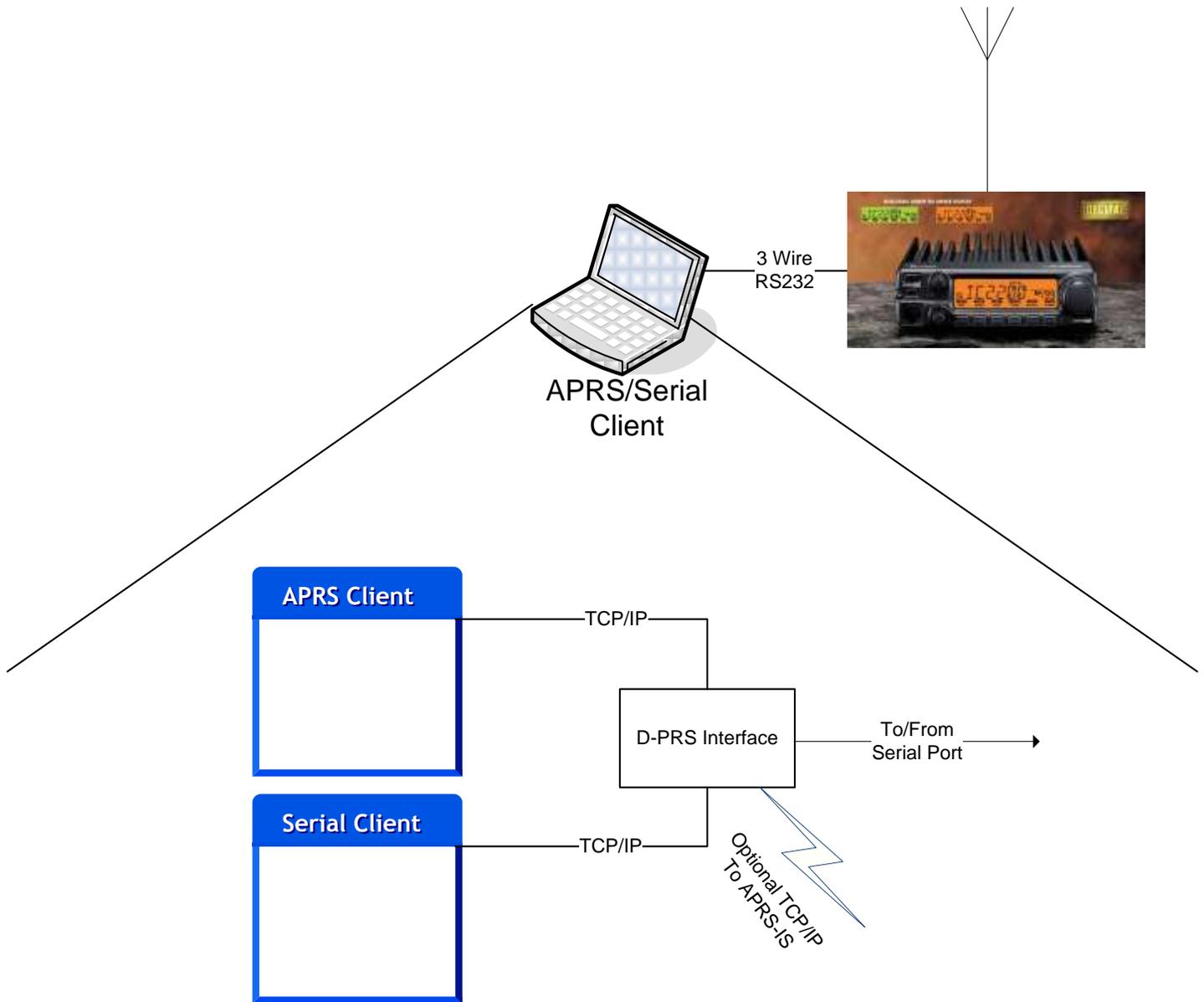
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Section 1 - Introduction

D-PRS Interface is written to provide a universal interface between APRS clients and an Icom D-STAR enabled radio with a low speed port.



Section 2 - Program Requirements and Description

D-PRS Interface is designed to run on any Windows system running .NET 2.0 and J# 2.0.

D-PRS Interface is based on javAPRSSrvr but limited to act solely as an IGate and D-STAR/APRS bridge. It does include javAPRSFilter so local filters can be set by locally attached clients. If a client connects to D-PRS Interface using the same callsign-SSID as the IGate portion of D-PRS Interface (D-STAR callsign with a hyphen substituted for the spaces), the client's packets are gated directly to the radio.

D-PRS Interface gates to and from the radio using standard TNC2 format strings. This allows remote APRS clients to operate as if they were connected to a TNC. All APRS packets have a CRC sequence added to the beginning of the line to reduce packet corruption. The same algorithm/technique used in computing the D-STAR RF header FCS is used for the TNC2 lines. The CRC string is stripped from line before gating to APRS-IS. The line is of the format `$$CRCxxxx,AE5PL>APRS:rest of packet`

D-PRS Interface also converts the ICOM GPS-mode transmissions into an APRS posit. The first four letters of the GPS "message" are interpreted as a symbol per Appendix 2 of the APRS specification. A checksum (xor'ed from zero) prefixed by an asterisk is required in the GPS message. To simplify setting the GPS message, use the [D-PRS Calculator](http://www.aprs-is.net/dprscalculator.htm) at <http://www.aprs-is.net/dprscalculator.htm> You must have JavaScript enabled in your browser to use that page.

The first three letters of the message are used if they are separated from the rest of the text by a space (total of 4 characters) or there are only two or three letters in the message. The first three characters are interpreted as the xyz part of the APRS GPSxyz destination call system as outlined in the APRS specification. For instance, the GPS message (without quotes) "LK PETE IN TEXAS*17" would be interpreted as a truck symbol. Note that a space is in the z position as well as another space in the fourth character position.

This allows the DSTAR radios to be used as standard trackers. **Only the \$GPRMC and \$GPGGA strings are supported; other GPS strings are ignored.** DSTAR callsigns are trimmed (leading and trailing spaces are eliminated) and imbedded space(s) are converted to a hyphen (the DSTAR radios do not support hyphens in the callsign). This allows a standard SSID configuration. The GPS message is also trimmed of all leading and trailing spaces.

The `$$CRCxxxx,packet` format is compatible with the Icom GPS-A mode. This is the same format used by radios in that mode. Packets received from an Icom radio in GPS-A mode will be gated to APRS-IS once per transmission. Like GPS mode, GPS-A mode sends positions continuously while transmitting voice so only the first packet in a transmission is gated. IC-2820s should be run in GPS-A mode with the UNPROTO set to API282,DSTAR*

Section 3 - Installation Instructions

Icom radios running as trackers (GPS mode) should have their callsign set to be callsign-space(s)-SSID. The SSID is in the 8th character position (last character). The SSID may be any letter or number. Due to D-STAR repeater design, do not use A, B, C, D, G, S, zero, or space. See Section 2 regarding symbol interpretation for GPS-mode radios.

Icom radios running as trackers should be configured to only pass RMC and GGA strings. The radios may have the UR Call set to CQCQCQ for "broadcast" mode.

Icom radios used with D-PRS Interface should be set with GPS turned off. Use a standard RS-232 3 wire (TX, RX, Gnd) connection or a USB connection as appropriate for the radio between the radio and the PC.

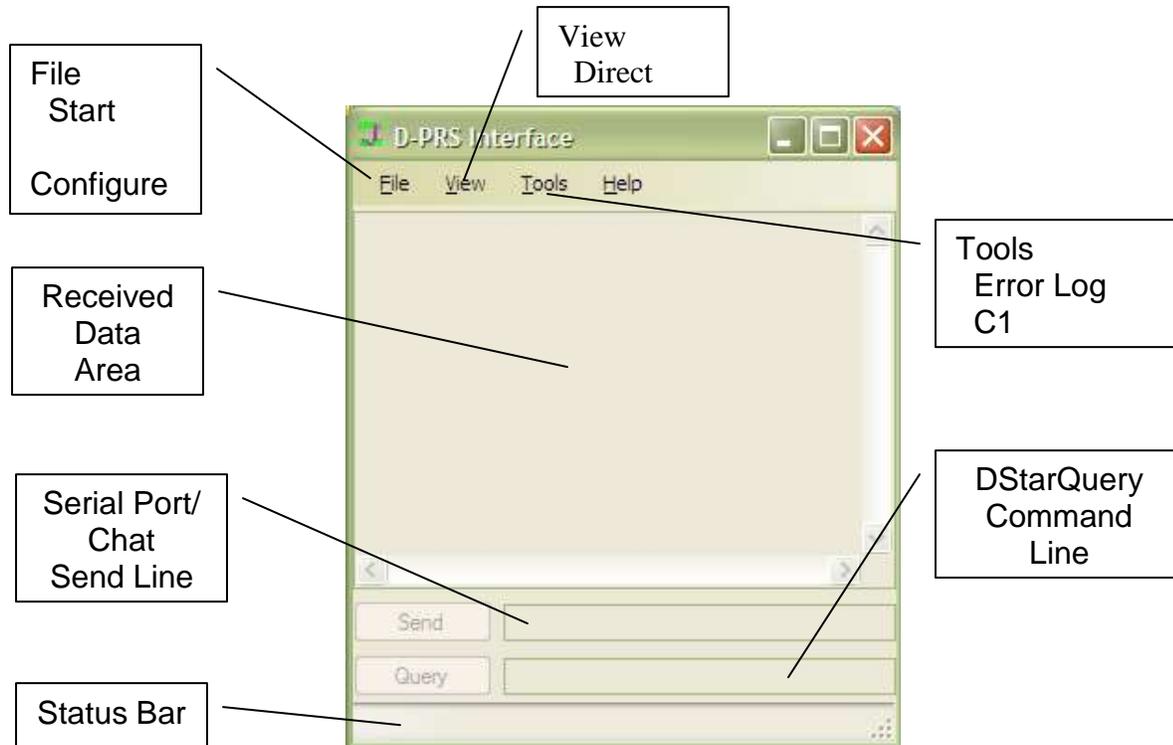
To install D-PRS Interface, download and run DPRSIntfSetup.msi. If you do not have .NET 2.0 or J# 2.0 already installed, it will take you through those installations as well. .NET 2.0 can be installed on a machine with 1.0 and/or 1.1 without affecting those installations. .NET 3.0 (Vista) is based on .NET 2.0 so only J# 2.0 would be needed on this operating system.

Once installed, a shortcut has been put into your Start Menu. Click on this shortcut to start D-PRS Interface. Go to Configure in the File menu to set the configuration.

Section 4 – Configuration & Operation

Main Screen

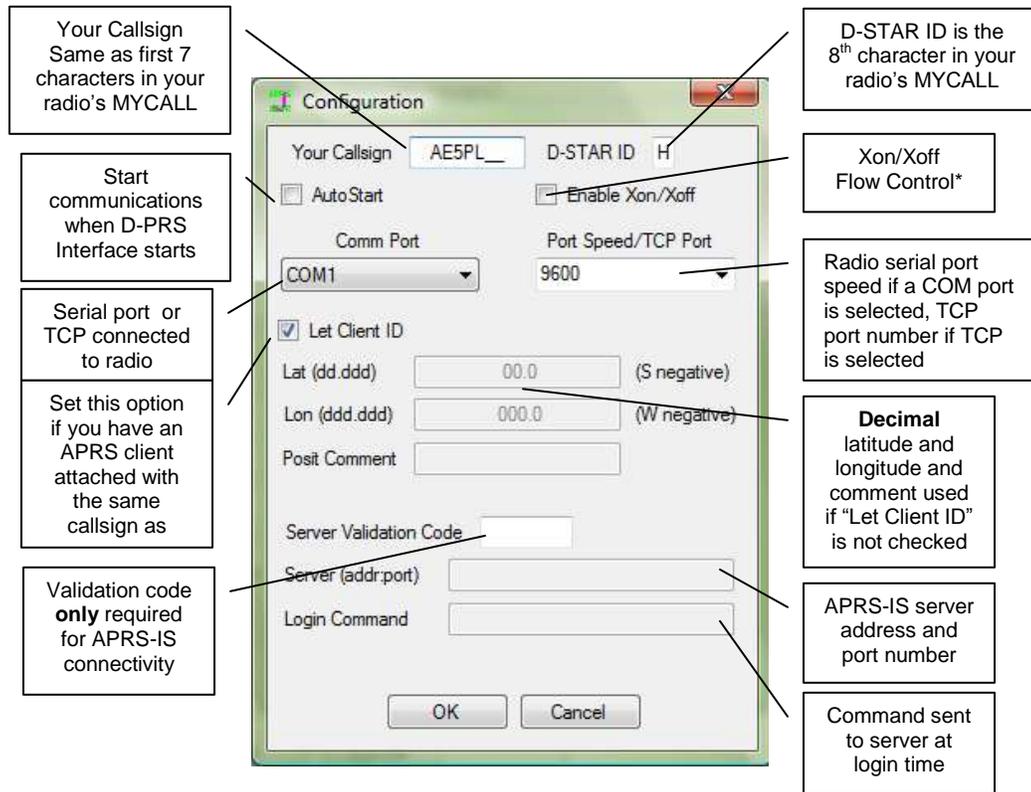
The main screen appears as below with two major features: the menu bar at the top and the serial port monitor/access in the main area.



Menu items:

- File
 - Start – Starts communications with the serial port and (if configured) an APRS server.
 - Configure – Configure D-PRS Interface. Changes take place upon the next communications start.
 - Exit – Exit D-PRS Interface
- View
 - Direct – Select direct input/reception to the serial port
- Tools
 - Error Log – Snapshot of D-PRS Interface error log.
 - C1 Calculator – Calculator to help remote D-STAR GPS mode radio users configure their GPS message.
 - Server Status – HTML status page of internal javAPRSSrvr.
- Help
 - About – Version information

Configuration screen



Configure the callsign and ID to match the callsign of the radio. The IGate call will use callsign-ID (ID is the character entered in the D-STAR ID box) as its callsign and if you connect to an APRS-IS server, D-PRS will use callsign-DS (DS are the actual characters used for the APRS-IS login). If the D-STAR ID is blank, then no hyphen or ID will be appended to the IGate callsign.

Xon/Xoff flow control should only be used when transmitting with small buffer radios such as handhelds. It is subject to intermittent lockups due to xoff characters being received over RF. Xon/Xoff flow control is only used with serial ports. It is ignored when connecting to a TCP port.

The server validation code can be obtained from Pete Loveall AE5PL at pete@ae5pl.net by supplying your name, callsign, and QTH. **The server validation code is only required if you intend to connect to APRS-IS. D-PRS Interface has built-in round-robin DNS support so you can use one of the many round-robin DNS names available to APRS-IS users. For more information on regional DNS names, try www.aprs2.net**

If you want to send a login line or other text to the serial port upon connection, place the desired text to transmit in a file called serialinit.txt in the directory that you installed D-PRS Interface in.

View/Direct Menu Item

The Direct menu item lets you enable direct sending and receiving data from the serial port. It also enables the DStarQuery area on the main screen allowing you to enter a query and D-PRS Interface will wrap the query with ?D* and ? so a remote radio with DStarQuery running on an attached PC will be able to recognize the query. For instance, entering info in the query text box and clicking the Query button will cause ?D*info? to be sent to the serial port.

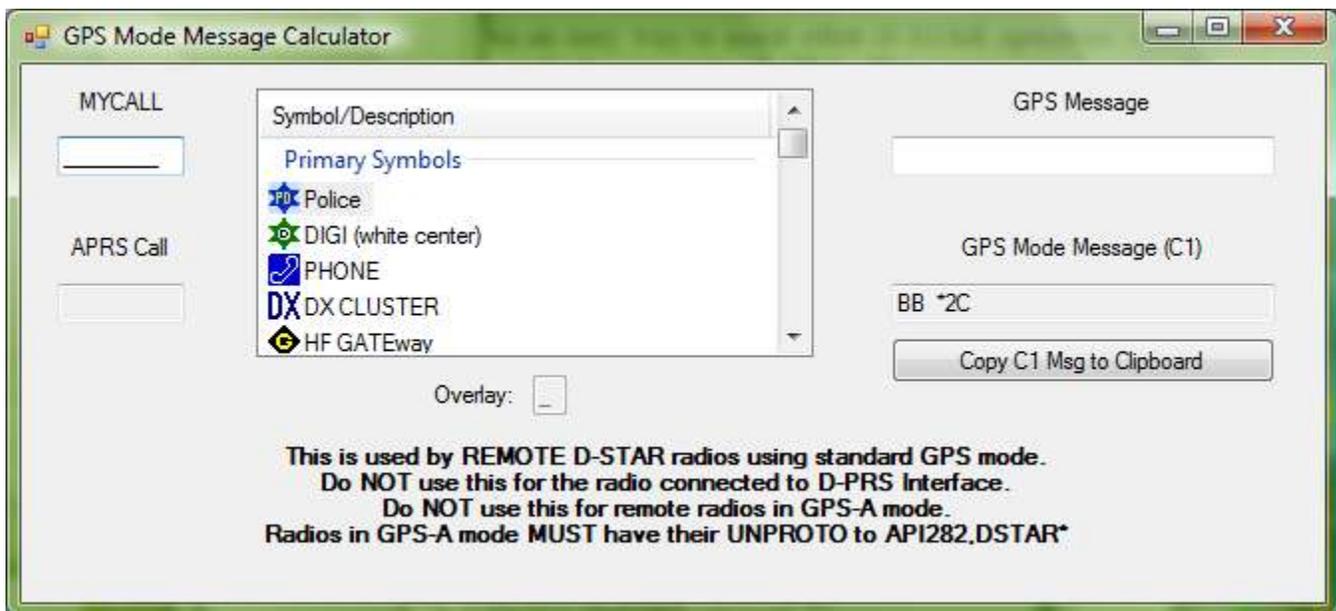
If Direct is not selected, the text window will only display lines received with a radio callsign in the first 8 characters followed by a colon followed by a text and terminated with a correct checksum. Text entered on the Send line will be sent formatted the same way (radio callsign:text*CS (CS=checksum)). This mode effectively gives you a chat mode that is compatible with sharing the channel with D-PRS.

C1 Configuration Screen

The C1 Configuration screen gives you an easy way to assist other D-STAR operators configure their GPS mode (not GPS-A mode) radios to be trackers which will be seen by you and others running D-PRS.

Radios running GPS-A mode must have UNPROTO set to API282,DSTAR* if they are an Icom 2820 or API92,DSTAR* if they are an Icom 92 handheld.

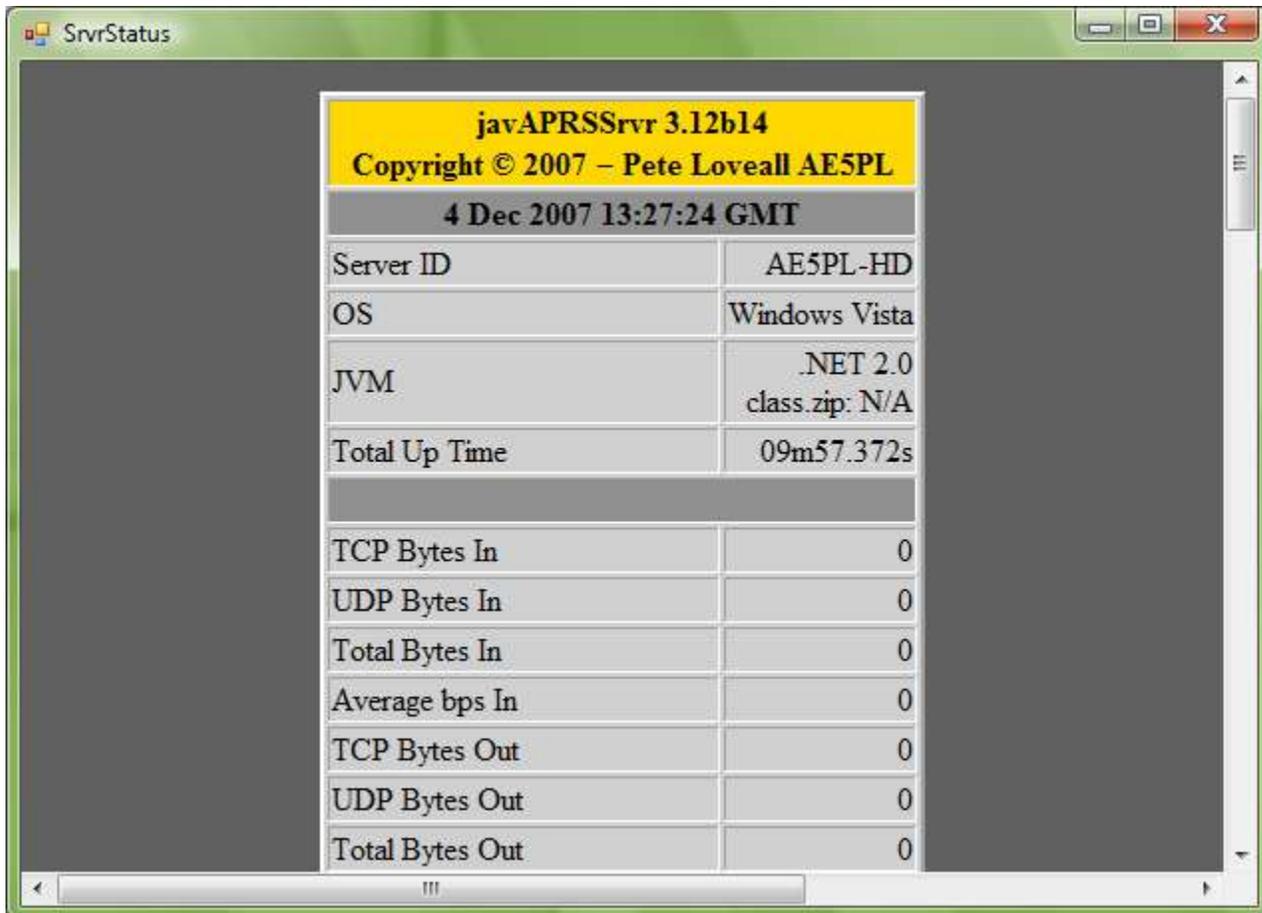
Most D-STAR gateways have D-PRS installed. To be seen on APRS-IS via a D-STAR gateway, set RPT1 to your local repeater and RPT2 to the gateway callsign ('G' in the 8th position).



The screenshot shows the 'GPS Mode Message Calculator' window. It features a 'MYCALL' input field, an 'APRS Call' input field, and a list of 'Primary Symbols' including Police, DIGI (white center), PHONE, DX CLUSTER, and HF GATEway. There is an 'Overlay' checkbox and a 'GPS Message' output field. A button labeled 'Copy C1 Msg to Clipboard' is present. Below the interface, a warning message states: 'This is used by REMOTE D-STAR radios using standard GPS mode. Do NOT use this for the radio connected to D-PRS Interface. Do NOT use this for remote radios in GPS-A mode. Radios in GPS-A mode MUST have their UNPROTO to API282,DSTAR*'

Server Status Screen

D-PRS Interface is based on javAPRSSrvr, the primary APRS server software in use today on APRS-IS. This screen lets you look at the HTML status page of the internal javAPRSSrvr. This can be used for diagnostics and overall health checking. Local APRS client connection status is at the bottom of the screen.



The screenshot shows a window titled "SvrStatus" with a table of server information. The table has a yellow header section and a grey body section. The header section contains the version number, copyright information, and the current date and time. The body section is a table with two columns: the left column lists various system and network metrics, and the right column shows their corresponding values.

javAPRSSrvr 3.12b14	
Copyright © 2007 – Pete Loveall AE5PL	
4 Dec 2007 13:27:24 GMT	
Server ID	AE5PL-HD
OS	Windows Vista
JVM	.NET 2.0 class.zip: N/A
Total Up Time	09m57.372s
TCP Bytes In	0
UDP Bytes In	0
Total Bytes In	0
Average bps In	0
TCP Bytes Out	0
UDP Bytes Out	0
Total Bytes Out	0

Connecting a client to D-PRS Interface

D-PRS Interface provides 3 TCP/IP ports on 127.0.0.1 for your client to connect to. All ports support multiple connections.

Port 14550 is for a client such as telnet or HyperTerminal to get data access to the serial port. This port is an unfiltered access to the serial port and should NOT be used for an APRS client.

Port 14551 is an APRS port similar to the APRS-IS port 10152. All APRS packets (including translated D-STAR GPS positions) passing through D-PRS Interface are seen by the APRS client. The APRS client connects to port 14551 the same way it would connect to an APRS-IS server. D-PRS Interface's address is 127.0.0.1 and the port is 14551.

Port 14552 is an APRS port similar to the APRS-IS port 14580 (user-defined filter port). If D-PRS Interface is connected to the APRS-IS, you might want to use this port for an APRS client to see a more limited number of packets than what you would see on port 10152. This port does not filter packets inbound from the client, only packets outbound from D-PRS Interface to the client are filtered.

Section 5 – Symbols

The following table shows the xyz values and their respective symbols. This table is derived from the table found at Bob Bruninga's web site. If Z=#, an overlay of 0-9 or A-Z is allowed (overlays only allowed for secondary symbols).

/ \$	XYZ	PRIMARY SYMBOL TABLE	\ \$	XYZ	SECONDARY SYMBOL TABLE (\)
/!	BB	Police, Sheriff	\!	OB	EMERGENCY (!)
/"	BC	reserved (had been rain)	\"	OC	reserved
/#	BD	DIGI (white center)	\#	OD#	NUMBERED STAR (green)
/\$	BE	PHONE	\\$	OE	Bank or ATM (green box)
/%	BF	DX CLUSTER	\%	OF	
/&	BG	HF GATEway	\&	OG#	Overlaid GATEway
/'	BH	Small AIRCRAFT (SSID = 7)	\'	OH	Crash site
/(BI	Mobile Satellite Station	\(OI	CLOUDY
/)	BJ	Wheelchair (handicapped)	\)	OJ	Firenet MEO, MODIS Earth Obs...(NEW)
/*	BK	SnowMobile	*	OK	SNOW
/+	BL	Red Cross	\+	OL	Church
/,	BM	Boy Scouts	\,	OM	Girl Scouts
/-	BN	House QTH (VHF)	\-	ON	House (HF)
./	BO	X	\.	OO	Ambiguous Plot (Big Question mark)
//	BP	Dot	\/	OP	Waypoint Destination (D7/D700)
/0	P0	# circle (obsolete)	\0	A0#	Overlaid CIRCLE (E/I =IRLP/Echolink)
/1	P1	TBD (these were all)	\1	A1	
/2	P2	TBD (numbered circles)	\2	A2	
/3	P3	TBD (looking like billiard)	\3	A3	
/4	P4	TBD (balls until we came)	\4	A4	
/5	P5	TBD (up with Overlays)	\5	A5	
/6	P6	TBD (Now they are all)	\6	A6	
/7	P7	TBD (available for new)	\7	A7	
/8	P8	TBD (definitions...)	\8	A8	
/9	P9	TBD	\9	A9	Gas Station (blue pump)
/:	MR	FIRE	\:	NR	Hail
/;	MS	Campground (Portable ops!)	\;	NS	Park/Picnic area
/<	MT	Motorcycle (SSID = 10)	\<	NT	ADVISORY
/=	MU	RAILROAD ENGINE	\=	NU	
/>	MV	CAR (SSID = 9)	\>	NV#	NUMBERED CAR
/?	MW	SERVER for Files	\?	NW	INFO Kiosk (Blue box with ?)
/@	MX	HC FUTURE predict (dot)	\@	NX	HURICANE/Trop-Storm
/A	PA	Aid Station	\A	AA#	NUMBERED BOX
/B	PB	BBS or PBBS	\B	AB	Blowing Snow
/C	PC	Canoe	\C	AC	Coast Guard
/D	PD		\D	AD	Drizzle
/E	PE	EYEBALL (Eye catcher!)	\E	AE	Smoke
/F	PF	Farm Vehicle (tractor) NEW	\F	AF	Freezing rain
/G	PG	Grid Square (6 digit)	\G	AG	Snow Shower
/H	PH	HOTEL (blue bed symbol)	\H	AH	Haze
/I	PI	Tcplp on air network stn	\I	AI	Rain Shower
/J	PJ		\J	AJ	Lightening
/K	PK	School	\K	AK	Kenwood HT (W)
/L	PL	Logged-on PCuser (Jan 03)	\L	AL	Lighthouse
/M	PM	MacAPRS	\M	AM	
/N	PN	NTS Station	\N	AN	Navigation Buoy
/O	PO	BALLOON (SSID = 11)	\O	AO	Rocket (new June 2004)
/P	PP	Police	\P	AP	Parking
/Q	PQ	TBD	\Q	AQ	QUAKE
/R	PR	REC. VEHICLE (SSID = 13)	\R	AR	Restaurant
/S	PS	SHUTTLE	\S	AS	Satellite/Pacsat
/T	PT	SSTV	\T	AT	Thunderstorm
/U	PU	BUS (SSID = 2)	\U	AU	SUNNY

/ \$	XYZ	PRIMARY SYMBOL TABLE	\ \$	XYZ	SECONDARY SYMBOL TABLE (\)
/V	PV	ATV	\V	AV	VORTAC Nav Aid
/W	PW	National WX Service Site	\W	AW#	NUMBERED NWS site (NWS options)
/X	PX	HELO (SSID = 6)	\X	AX	Pharmacy Rx (Apothecary)
/Y	PY	YACHT (sail) (SSID = 5)	\Y	AY	
/Z	PZ	WinAPRS	\Z	AZ	
/[HS	Jogger	\[DS	Wall Cloud
/\	HT	TRIANGLE(DF station)	\\	DT	
/]	HU	MAIL/PostOffice (was PBBS)	\]	DU	
/^	HV	LARGE AIRCRAFT	\^	DV#	NUMBERED Aircraft
/_	HW	WEATHER Station (blue)	_	DW#	NUMBERED WX site (green digi)
/`	HX	Dish Antenna	\`	DX	Rain
/a	LA	AMBULANCE (SSID = 1)	\a	SA#	ARRL Overlays: ARES(A), WinLINK (W)
/b	LB	BIKE (SSID = 4)	\b	SB	Blowing Dust/Sand
/c	LC	Incident Command Post (NEW)	\c	SC#	Civil Defense Overlays R=RACES C=CERTS
/d	LD	Dual Garage (Fire dept)	\d	SD	DX spot by callsign
/e	LE	HORSE (equestrian)	\e	SE	Sleet
/f	LF	FIRE TRUCK (SSID = 3)	\f	SF	Funnel Cloud
/g	LG	Glider	\g	SG	Gale Flags
/h	LH	HOSPITAL	\h	SH	HAM store
/i	LI	IOTA (islands on the air)	\i	SI#	Indoor BOXn digipeater (w overlay)
/j	LJ	JEEP (SSID-12)	\j	SJ	WorkZone (Steam Shovel)
/k	LK	TRUCK (SSID = 14)	\k	SK	SUV (new 29 June 2004)
/l	LL	Logged-on laptop (Jan 03)	\l	SL	Area Locations (box,circles,etc)
/m	LM	Mic-E Repeater	\m	SM	Value Signpost (3 digit display)
/n	LN	Node	\n	SN#	NUMBERED TRIANGLE
/o	LO	EOC	\o	SO	small circle
/p	LP	ROVER (puppy, or dog)	\p	SP	Partly Cloudy
/q	LQ	GRID SQ shown above 128 m	\q	SQ	
/r	LR	ANTENNA like Radio station	\r	SR	Restrooms
/s	LS	SHIP (pwr boat) (SSID-8)	\s	SS#	NUMBERED SHIP/boat (top view)
/t	LT	TRUCK STOP	\t	ST	Tornado
/u	LU	TRUCK (18 wheeler)	\u	SU#	NUMBERED TRUCK
/v	LV	VAN (SSID = 15)	\v	SV#	NUMBERED Van
/w	LW	WATER station	\w	SW	Flooding
/x	LX	xAPRS (Unix)	\x	SX	
/y	LY	YAGI @ QTH	\y	SY	Skywarn
/z	LZ		\z	SZ#	Shelter (evacuation) (W Overlay)
/ {	J1		\ {	Q1	Fog
/	J2	reserved (Stream Switch)	\	Q2	
/ }	J3		\ }	Q3	
/ ~	J3	reserved (Stream Switch)	\ ~	Q4	