

D-PRS Interface User's Guide

4.3.3b09

D-PRS Interface is Copyright © 2023 - Pete Loveall AE5PL pete@ae5pl.net

Use of the software is acceptance of the agreement to not hold the author or anyone associated with the software liable for any damages that might occur from its use.

APRS is a registered trademark of Bob Bruninga

D-STAR is a registered trademark of Icom Incorporated Corporation

Other trademarks included in the following text are recognized as belonging to the respective trademark holders.

Table of Contents

Section 1 - Introduction 1

Section 2 - Program Requirements and Description 2

Section 3 - Installation Instructions 4

Section 4 – Configuration & Operation 5

Main Screen..... 5

Configuration Dialog 6

 Base Settings 6

 APRS Server Settings 6

 Radio Connection Settings 6

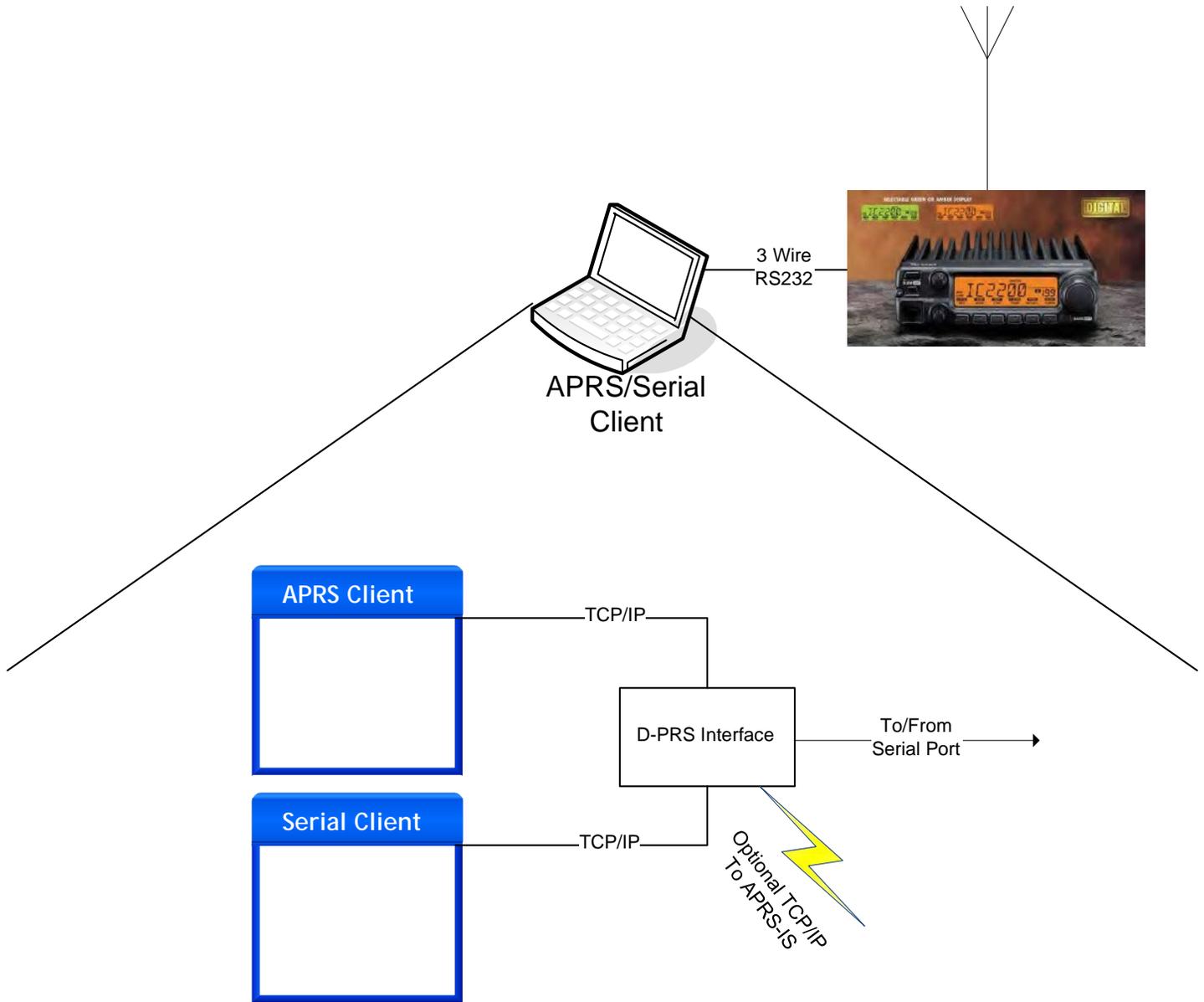
 APRS-IS Settings 7

Connecting a client to D-PRS Interface 8

Section 5 – Symbols 9

Section 1 - Introduction

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



Section 2 - Program Requirements and Description

D-PRS Interface 4.3 runs on any Java 1.8 or later platform (JVM) in a GUI environment. D-PRS Interface now uses Java Native Access (JNA) for serial port support which currently supports most Linux, BSD, Windows, Mac, and Sun platforms. Other platforms supported if using the TCP/IP serial interface.

D-PRS Interface is based on javAPRSSrvr but limited to act solely as an IGate and D-STAR/APRS bridge (D-PRS). You can specify the callsign-SSID of one or more locally attached APRS clients to be gated to the radio encapsulated in the D-PRS CRC format.

D-PRS Interface gates to the radio using standard TNC2 format strings encapsulated in the D-PRS format which includes a CRC. The same algorithm/technique used in computing the D-STAR RF header FCS is used for the TNC2 lines which is also the AX.25 CRC. The CRC string is stripped from the line before gating to APRS-IS. The line sent to the radio is of the format

```
$$CRCxxxx,AE5PL>APRS,DSTAR*:rest of packet
```

while the line sent to APRS-IS or local APRS clients is

```
AE5PL>APRS,DSTAR*:rest of packet
```

The packet is gated to APRS only if the received CRC is valid and the DSTAR* “digi” is the only digipeater in the path.

D-PRS Interface also converts the D-STAR 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](https://www.aprs-is.net/dprs) at <https://www.aprs-is.net/dprs>. 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 and should be disabled.**

Per the D-PRS specification, D-STAR callsigns and IDs are converted to TNC2 format as follows:

- Callsign with space ID (space in 8th position) is sent as just the callsign;
- 3-6 character callsign with non-space alphanumeric character ID is sent as callsign-ID; • 7 character callsign with non-space alphanumeric character ID is sent as callsignID. It is important to note the following D-STAR restrictions:
- no punctuation is allowed;

- all callsigns start in the first character position, is uppercase alphanumeric, and cannot contain embedded spaces;
- the eighth character is the ID character and is uppercase alphanumeric or a space;
- characters between the callsign and ID character are 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 if properly formatted (FROMCALL>TOCALL,DSTAR*:positionpacket).

GPS and GPS-A modes send positions continuously while transmitting voice so only the first valid position in a transmission is gated to APRS-IS.

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. The D-PRS specification excludes using zero as an ID. 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 must 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.

Unzip the D-PRS Interface files into their own directory (note to Windows Vista and later users: do **not** place the folder in Program Files folder as this may prevent proper operation).

For direct serial port support, D-PRS Interface uses PureJavaComm (download from <https://github.com/nyholku/purejavacomm>) and JNA (download from <https://github.com/java-nativeaccess/jna>) and are not products of AE5PL. These jars must be placed in the same directory with DPRSInterface.jar if you are directly attaching to a serial port.

You can start D-PRS Interface with Java 8 using the following command in the DPRSInterface directory:

```
java -jar DPRSInterface.jar  
or  
java -cp * dprsinterface.MainFrame
```

You can start D-PRS Interface with Java 11 and above using the following command (use the jpms version of JNA for best results):

```
java --add-modules ALL-MODULE-PATH -p . -m dprsinterface.main
```

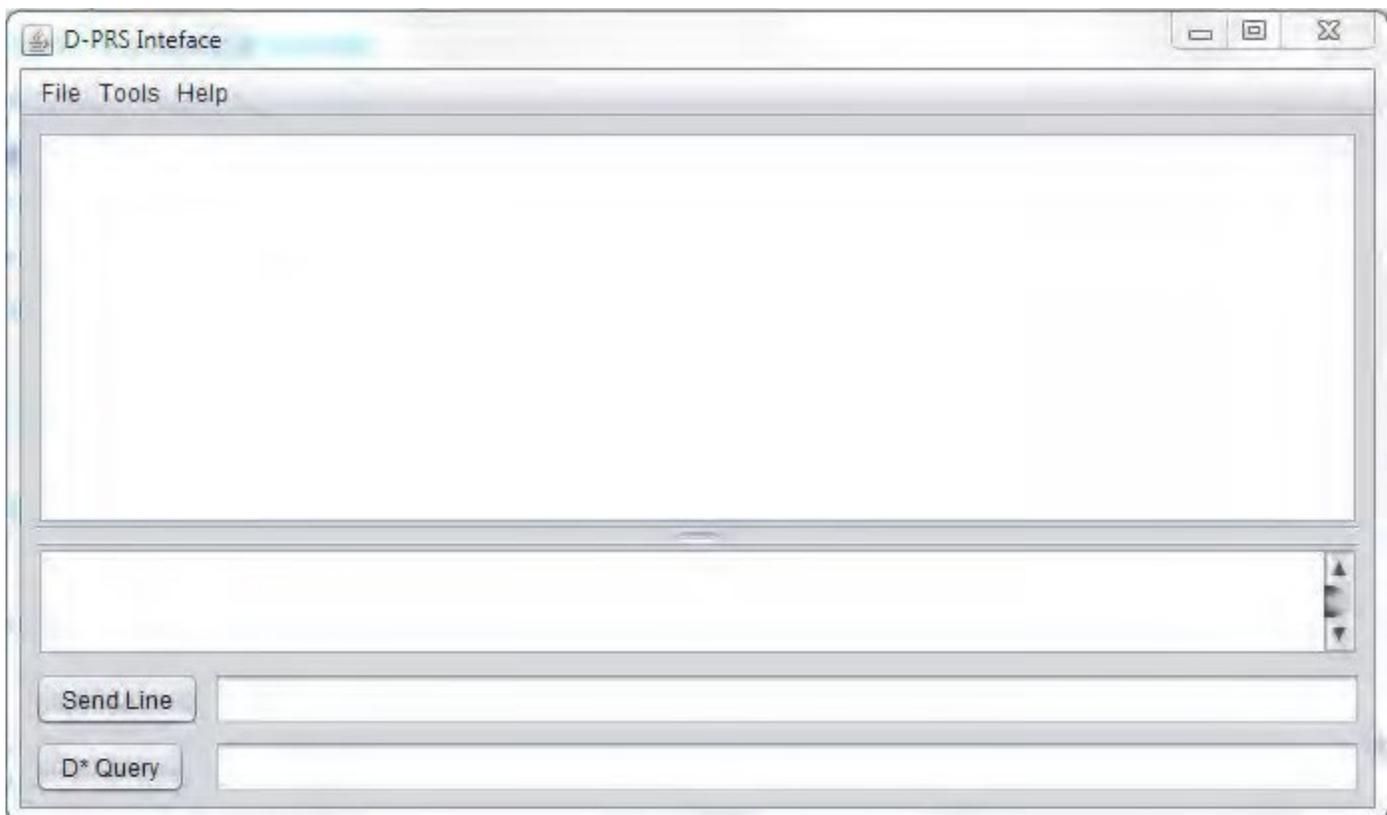
(the module path, -p, is a period)

You can append the word autostart to the command line to have the DPRS function start automatically. Otherwise, you must start the DPRS function from the menu.

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 javAPRSSrvr – Starts communications with the serial port and the internal APRS server.
 - Exit – Exit D-PRS Interface
- Tools
 - Configure – Opens the configuration dialog. Note: presentation of the configuration dialog may be delayed up to a minute allowing the serial ports on the machine to be discovered.
 - D-PRS Calc – Opens your default browser and takes you to the D-PRS calculator page at aprs-is.net.
 - Status Page – Opens status page in pop-up window.
 - Error Log – Opens a scrollable text window showing the current error log entries. This can be used for debugging purposes.
- Help
 - About – Version information

The top window displays the raw serial data received from the radio and the second window display all translated APRS packets. Both are resizable. The Send Line area allows you to send raw text to the serial port. The D* Query area will encapsulate what you enter in the ?D*...? required by DStarQuery.

Configuration Dialog

The screenshot shows a 'Configuration' dialog box with the following fields and options:

- Callsign: []
- Radio ID: []
- APRS Clients to Xmt: []
- Radio Connection: Hosted APRS Port: 14551
- TCP Host Port: 127.0.0.1:20000 Parse D74
- Serial Port: [] Speed: 9,600
- Hosted Serial Port: 14550 Status Page Port: 14501
- APRS-IS Passcode: -1
- Server: rotate.aprs2.net:14580
- Beacon IGate to APRS-IS
- Latitude (dd.ddd): 00.0000 South = Negative
- Longitude (ddd.ddd): 000.0000 West = Negative
- Comment: []
- Buttons: Save, Cancel

Base Settings

- Callsign = Your callsign
- Radio ID = The eighth character in the radio's MYCALL (normally space or A-Z)

APRS Server Settings

- Hosted APRS Port = Normally 14551 for connecting APRS clients directly to D-PRS Interface
- APRS Clients to Xmt = APRS callsign-SSIDs of directly connected APRS clients
- Status Page Port = Port for status page. If <1024, it will default to 127.0.0.1:14501

Radio Connection Settings

- TCP Host Port = TCP port providing serial data such as provided by D-RATS or DVDongle.
- Serial Port = Port name specific to OS directly connected to the radio. This may be manually typed in if your port does not appear in the list.
- Speed = Serial port speed (match the manual)
- Hosted Serial Port = Normally 14550 for connecting non-APRS clients to the serial data of the radio.
- Parse D74 – Accommodates Kenwood TH-D74 GPS strings where the message is always 20 spaces and converts to an APRS posit using \K (Kenwood) as the symbol.

APRS-IS Settings

- APRS-IS Passcode = Passcode used to log into APRS-IS to act as a D-PRS IGate. This passcode is provided to amateur radio operators by AE5PL only for use with this software. Send your name, amateur radio licensed callsign, address, and version info from the About dialog to pete@ae5pl.net to request your passcode.
- Server = This is the APRS-IS server and port you will connect to. aprs2.net rotate DNS names are recommend and port 14580 is also recommended to keep bandwidth low. WebSocket connections are supported using the WebSocket URI ws://FQDN:port/ or wss://FQDN:port/ (secure). Only server ports supporting HTTP/HTTPS upload support the WebSocket protocol.
- Beacon IGate to APRS-IS = If selected, the IGate will beacon the given coordinates to APRSIS on a periodic basis.
- Latitude = **Decimal** degrees (North is positive, South is negative)
- Longitude = **Decimal** degrees (East is positive, West is negative)
- Comment = Text to include at the end of the APRS posit.

Connecting a client to D-PRS Interface

D-PRS Interface provides up to 2 TCP/IP ports for your client to connect to. All ports support multiple connections.

The default 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.

The default 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.

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 |
| /V | PV | ATV | \V | AV | VORTAC Nav Aid |
| /S | XYZ | PRIMARY SYMBOL TABLE | \S | XYZ | SECONDARY SYMBOL TABLE (\) |
| /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 | |