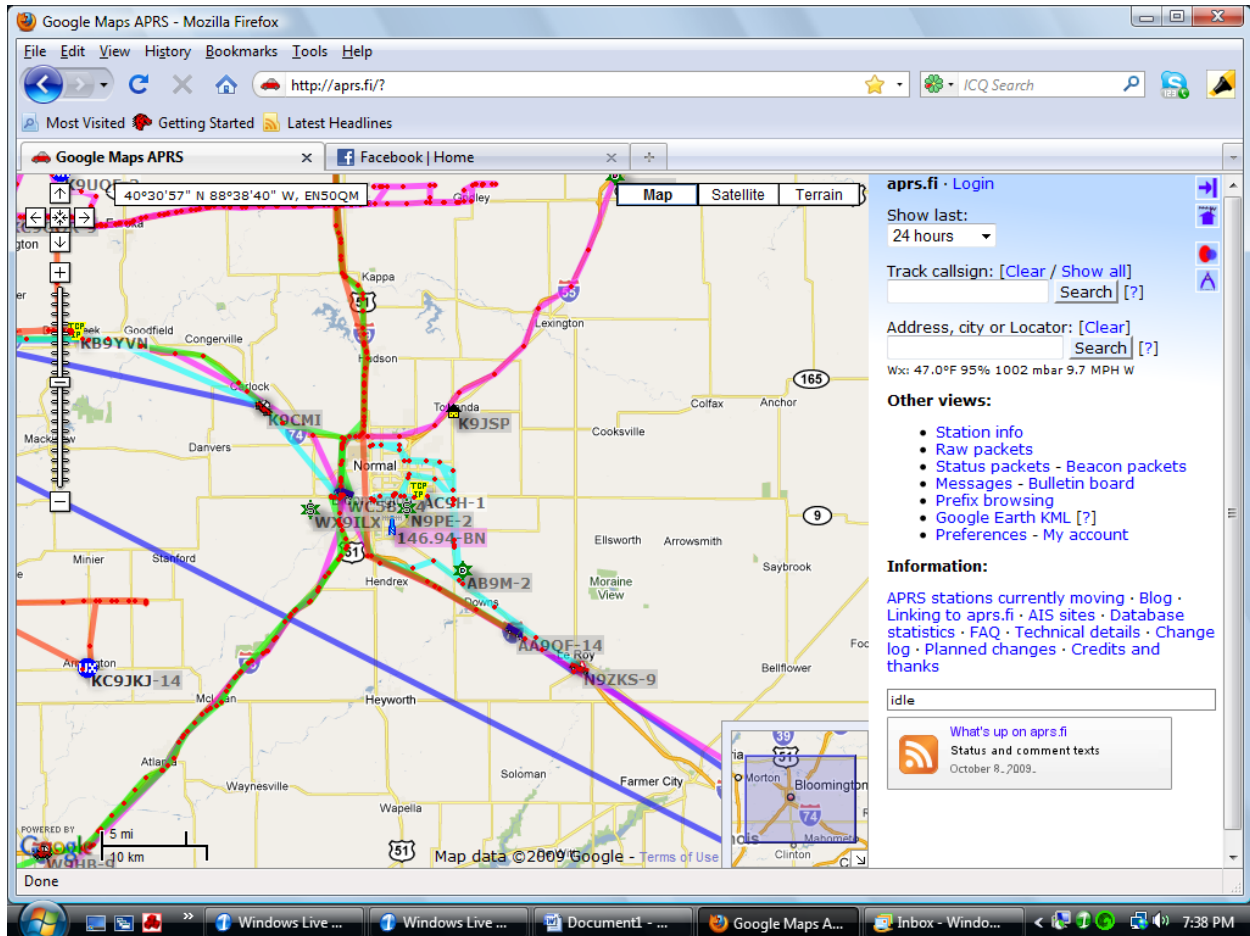


APRS

Automatic Packet Reporting System



<http://aprs.fi/>

How did we get to this with APRS?

First we should go to <http://www.aprs.org/> , Bob Bruinga, WB4APR's website.

“APRS is not a vehicle tracking system. It is a two-way tactical real-time digital communications system between all assets in a network sharing information about everything going on in the local area. On ham radio, this means if something is happening now, or there is information that could be valuable to you, then it should show up on your APRS radio in your mobile. APRS also supports global callsign-to-callsign messaging, bulletins, objects email and Voice because every local area is seen by the Internet System

(APRS-IS)! APRS should enable local and global amateur radio operator contact at anytime-anywhere and using any device.”

For a complete introduction to APRS, download the APRS by Bob PowerPoint®.

OVERVIEW: The **A**utomatic **P**acket **R**eporting **S**ystem was designed to support rapid, reliable exchange of information for local, tactical real-time information, events or nets. The concept, which dates back to the mid 1980's, is that all relevant information is transmitted immediately to everyone in the net and every station captures that information for consistent and standard display to all participants. Information was refreshed redundantly but at a decaying rate so that old information was updated less frequently than new info. Since the primary objective is consistent exchange of information between everyone, APRS established standard formats not only for the transmission of POSITION, STATUS, MESSAGES, and QUERIES, it also establishes guidelines for display so that users of different systems will still see the same consistent information displayed in a consistent manner (independent of the particular display or mapping system in use). See the original [APRS.TXT](#). The two images below should give you an idea of the kinds of information available to the mobile operator on his APRS radio. On the top is the Kenwood D710 radio showing the station list, and below is the attached GPS with map display showing the location of other APRS stations.



Ed, KC9GF provided the following questions:

What kind of radio?

Usually 2M or 70CM FM transceivers are used as long as they can transmit a 1200 baud AFSK signal from the Terminal Node Controller (TNC). I use the Alinco Dr-1200 with a KPC-3 TNC or the Kenwood D7-A(g) handheld with its built-in TNC. I also have a BYONICS Micro-Trak AIO tracker. <http://www.byonics.com/microtrak/>

Can you use your radio while sending APRS data?

Only if the radio is dual VFO and full duplex such as the Kenwood D7-A and D700 series transceivers. There may be others with the capability.

What kind of GPS is compatible with APRS?

Generally its an older GPS capable of sending and receiving NEMA formatted messages with the TNC.

How does your (and others) info make it to the internet? Through dedicated repeaters, private stations, etc.?

In order for APRS information to get into or out of the internet, a gateway or I-gate consisting of a transceiver, TNC, and internet connected computer must be used. The RF portion is originated or delivered by your transceiver, TNC, and I/O interface. The RF signal is most likely forwarded by WIDE1-1 private stations and WIDE2-2 digipeaters which have greater range due to antenna height.

Can you see other stations on your GPS?

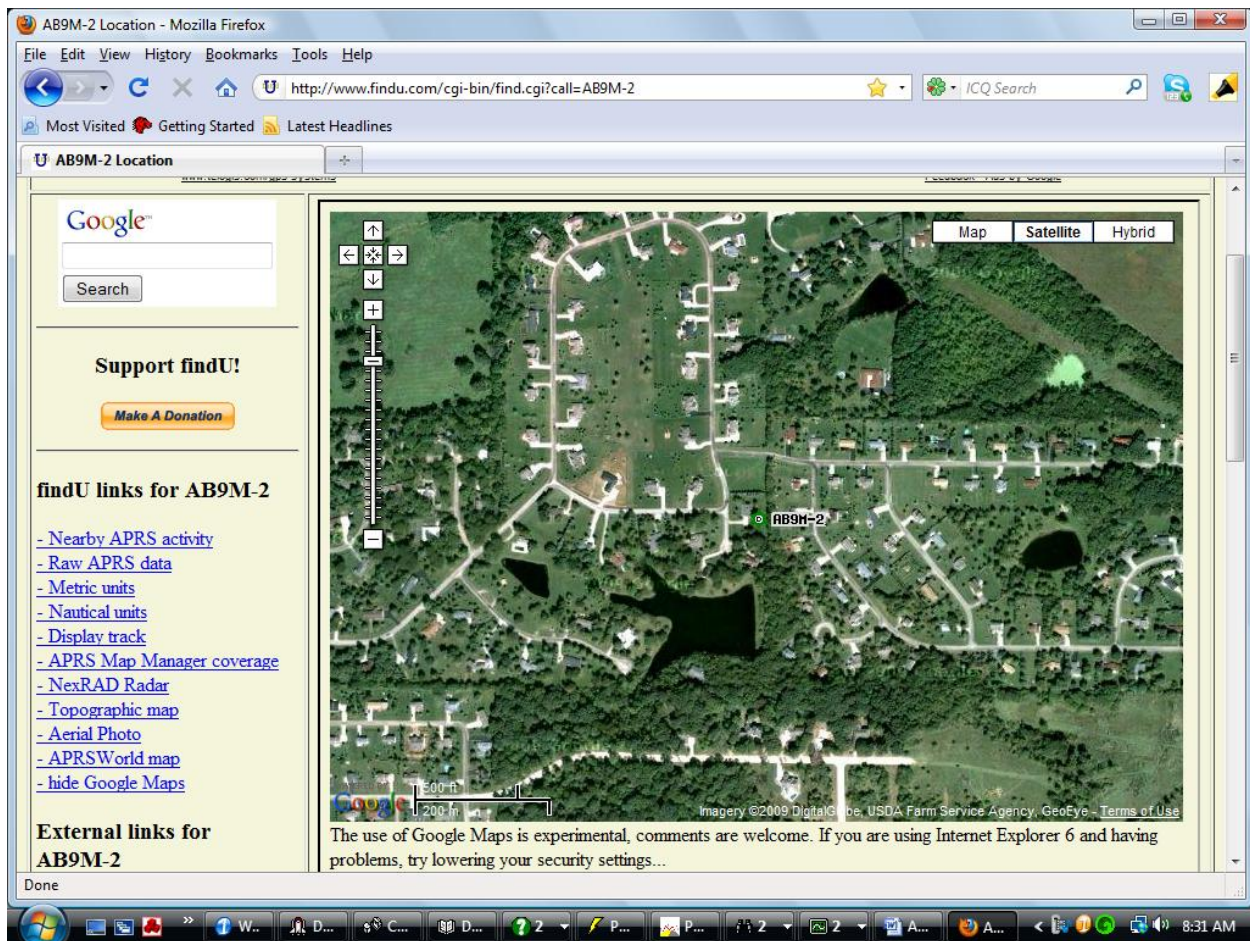
Only if the GPS has a working display AND two-way NEMA messaging with the TNC and transceiver.

Can you send other data besides your position?

Yes, you can send short email messages, voice, objects, anything that can be encapsulated in an AX.25 APRS message format.

Where can I find more information about APRS?

<http://www.aprs.org/>



<http://www.findu.com/cgi-bin/find.cgi?call=AB9M-2>

APRS Stations Near AB9M-2 - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.findu.com/cgi-bin/near.cgi?call=AB9M-2

Most Visited Getting Started Latest Headlines

APRS Stations Near AB9M-2

APRS Stations Near AB9M-2 (last 240 hours)

Google™

Search

findU general links

- Latest News
- Advanced cgi parameters
- Emergency beacons
- Packet errors
- About K4HG
- Email K4HG

Ads by Google

Real Time Vehicle Tracking™

Track Any Vehicle, Person, Or Asset— With a \$199 GPS Tracking System! BrickHouseSecurity.com/GP

GPS Teen Tracking

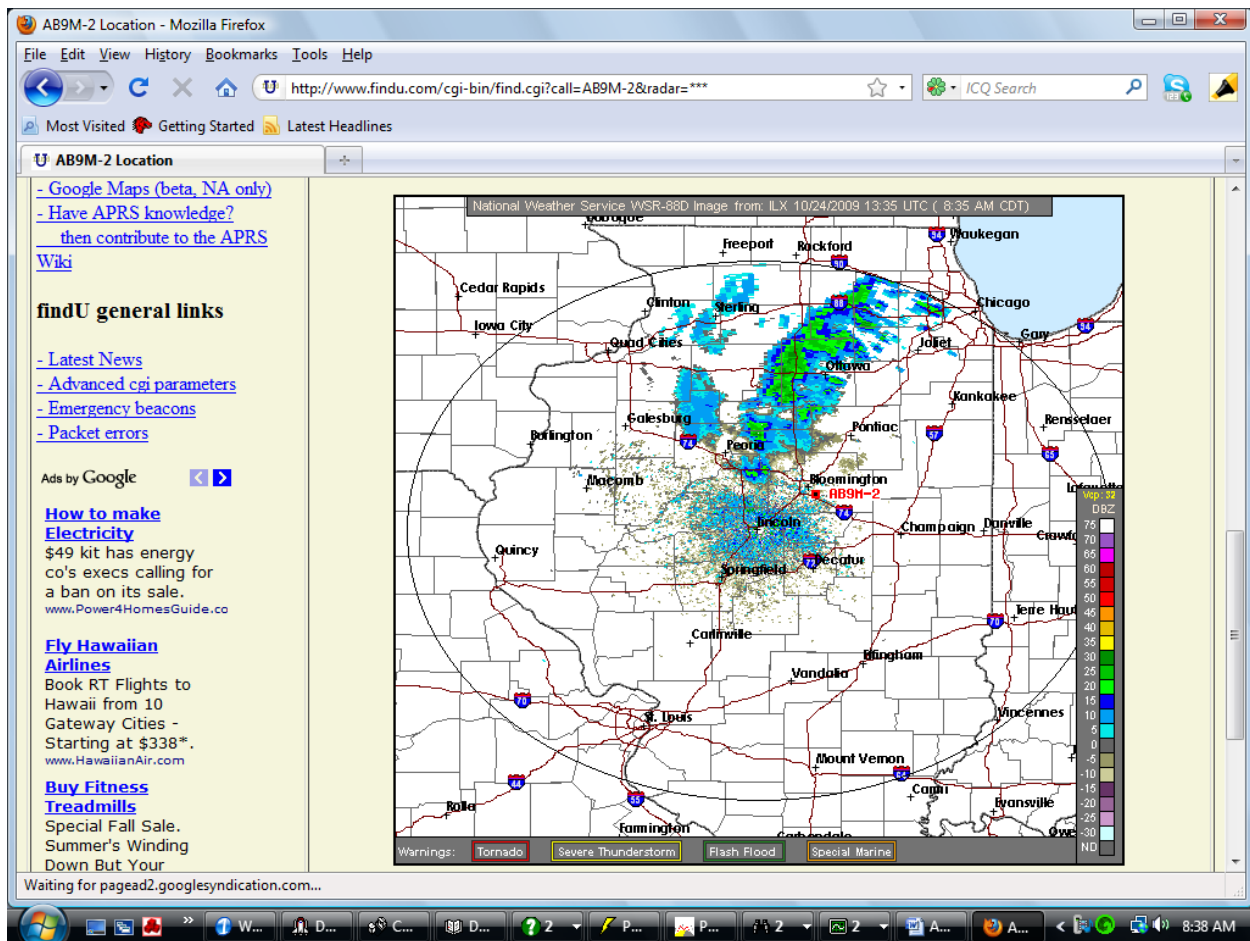
Monitor your teen's driving Save \$170 Today. Coupon:

Call	callbook	msg	wx	lat	lon	distance	direction	Last Position
★ AB9M-2	**	.	.	40.42417	-88.89233	0.0		00:00:24:18
🏠 N9ZKS	**	.	.	40.41633	-88.89567	0.5	SW	09:20:52:00
🚗 N9ZKS-10	**	.	.	40.41600	-88.89567	0.5	SW	02:11:07:43
📶 CW3379	**	.	**	40.47050	-88.95867	4.9	NW	00:00:14:38
★ N9PE-2	**	.	.	40.47733	-88.95500	4.9	NW	00:00:09:30
📶 AC9H-1	**	**	.	40.49283	-88.94133	5.1	NW	00:00:00:34
📶 146.94-BN	**	.	.	40.46217	-88.97083	5.2	NW	00:00:05:36
🏠 K9JSP	**	**	.	40.56117	-88.90200	8.2	N	00:00:09:25
📶 WC5B-14	**	**	.	40.48933	-89.02683	9.0	NW	00:00:02:28
★ WX9ILX	**	.	.	40.47667	-89.06383	10.8	NW	00:00:06:20
📶 CW1417	**	.	**	40.64500	-88.78050	14.9	NE	00:00:15:53
★ N9LOE	**	**	.	40.76217	-88.72000	22.8	NE	00:15:08:18
📶 DW1759	**	.	**	40.50883	-88.52167	22.8	E	00:00:00:22
🚗 KC9JKJ-14	**	**	.	40.34017	-89.31450	25.8	W	00:13:03:51
📶 KC9JKJ	**	.	**	40.34000	-89.31467	25.8	W	00:00:06:54
📶 CW9767	**	.	**	40.87133	-88.86017	26.9	N	00:00:02:59

Done

8:34 AM

<http://www.findu.com/cgi-bin/near.cgi?call=AB9M-2>



http://www.findu.com/cgi-bin/find.cgi?call=AB9M-2&radar=***



Amateur Radio



Universal Text Messaging/Contact Initiative

Bob Bruninga, WB4APR

Pending approval of the Amateur Radio
[Advanced Project Development Committee](#)

Updated 21 Feb 09 to add Echolink Text
Messaging

Updated 26 Jan 09 to add POGSAG text pagers

Updated 25 Jan 09 to add the Tracker2's

Nuvi/messaging capability



Identified below are more than TWO DOZEN Amateur Radio *TEXT MESSAGING* systems. The purpose of this web page is an initiative to tie them all together!

Universal Local and Global Text-Messaging -by-callsign- is needed throughout Amateur Radio. Although text messaging has been a fundamental APRS capability for over 15 years and is now embedded in many APRS amateur radios as shown here to the right, I count over 26 other Amateur Radio Text-messaging capabilities below that are not yet fully integrated into a single over-arching amateur radio-wide capability! Yet it would be so easy to do... if we just got excited about the possibility and did it!

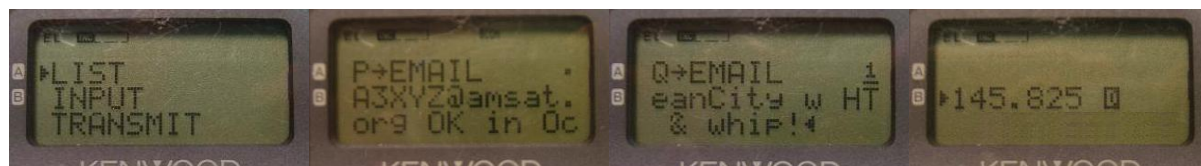
After 9/11 and Katrina it was clear that amateur radio needs immediate responsive communications to simply locate and establish initial communications. Such fundamental local/global communications are trivial on the National APRS frequency. . This web page summarizes all of the capabilities for TEXT-Messaging not only in dedicated APRS radios shown to the right, but ALL radios and ALL devices in the field including cell phones!

Surely, every Ham radio operator can find one of these techniques below he/she can use! And if we tie them all together, then it doesn't matter what he uses! *ANY Ham, ANY where, using ANY device can text message ANY other ham, ANY where, on any of his devices, knowing nothing but his CALLSIGN!*

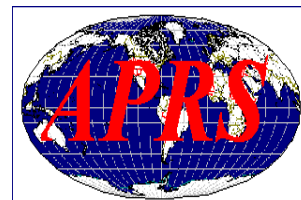
The remainder of this web page discusses the existing systems that involve amateur radio text messaging in the following Broad Categories:

- **Organic Packet Systems:** all existing APRS and Winlink systems can send and receive messages
 - **Text Paging Radios:** 500,000 DTMF text paging amateur radio HT's were sold in the 90's
 - **All other HT's with DTMF:** Every radio with a key pad can send brief text messages
 - **DTMF decoding software:** can receive and display these messages
 - **Other Consumer Devices:** Applications on cellphones and other hand-held devices to TX/RX APRS messages
 - **Ham Radio Voice Internet systems:** Echolink and IRLP can exchange text messages
 - **APRS Internet Systems:** can send and receive text messages and email such as the following:
 - **APRS -to- Email:** Sending an email from any APRS or compatible system [exists]
 - **WEB page -to- APRS:** Amateurs using Browsers to send into the APRS system [exists]
 - **SMS -to- APRS:** Global text messaging to APRS users
 - **EMAIL -to- APRS:** Global Email to APRS users
-

ORGANIC PACKET SYSTEMS:



APRS RADIOS: . For APRS client software and APRS built-in radios (shown at the top of this page) it is trivial to send and receive text-messages and Email on their front panel. The TH-D7 display is shown above... In this case, it is sending an Email. . Just press the MSG button, select INPUT on the MSG Menu, enter EMAIL as the address, and make the first text of the message be an email address followed by your message. . In the example above, an **EMAIL** to **A3XYZ@AMSAT.ORG** says **OK in OceanCity with HT & whip!**. . If your email is digipeated, then you will see **MY MESSAGE** flashed on the screen indicating success.



UI-Instant Messenger was written by Andy Pritchard to correct the problems with some details of APRS messaging that were not complete in UIview. His add-on not only improved UIview's efficiency in handling messages, but the program can also operate stand-alone as an application with the AGW Packet Engine, or as a direct IP client on Internet connections. Use it as a replacement for the messaging function inside UIview to overcome the lack of the proper decaying repetition rate for unacked msgs and the lack of the full ACK algorithms of APRS.

Winlink Text-Messaging: . An APRS interface has been added to the Winlink system so that any APRS radio can be used to send and receive Email via the Winlink system. The system is called **APRSlink** and was designed by Lee, K0QED. It allows any APRS radio operator to log in and send/receive email via Winlink using only the front panel display and keypad of the radio. In addition to full two-way Winlink and Email messaging, there are two other features that fully link Winlink and APRS for quick messaging:



- **One-Line Messages:** One line messages can be sent from any APRS radio or HT to any winlink address (callsign, or email) by sending the message to WLNK-1 and having the first two words of the message be **SMS ADDRESS** where **SMS** alerts the WLNK-1 server to convert the one line to a standard SMS message and the second word **ADDRESS** is either a winlink callsign or an email address.
- **Message Alerts:** You can receive message alerts on the front panel of your APRS radio each time your Winlink account receives a new message. This is automatically activated as long as you have the callsign **WLNK-1** in your position comment or status text. Something like **QRU WLNK-1** would to the trick nicely.

OTHER HAM RADIO MESSAGING: .

Message Displays on Any Radios: . There are many devices that can turn any two-way radio into a Universal Text-Messaging device by simply adding an APRS display system at the speaker/mic interface.



- **HAMHUD:** Shown here to the right is the HAMHUD that gives a display and basic text entry capability to any radio by connection to the speaker-mic connection. It includes the TNC and all needed input/output capability. Previous models used an external TNC, recent models include the TNC, and future models have many many new features.



- **TINY-TRACK-4:** The new Tiny-Track-4 is a full 2-way but low-cost APRS device that not only serves as a mobile APRS tracker and display system, but also it can be configured as a stand-alone digipeater. It includes an optional Text display for mobile info, objects and text messaging.

- **Tracker2 Messaging with Nuvi 350:** Argent Data Systems has added a capability to his OT2 trackers that allow users of the older NUVI 350 GPS units with front panel "fleet messaging" capability to send and receive APRS text messages through the use of the Garmin serial cable.

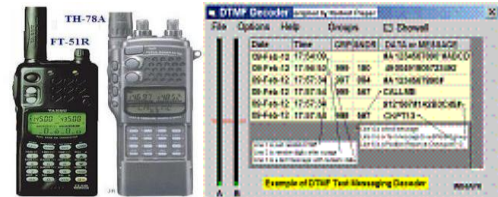


These GPS's with the tracker2 interface also do some symbol translation from APRS symbols into the Garmin symbol set. Although this model of NUVI is no longer available, the combination makes a great inexpensive APRS mobile system if you can find one.

- **RC-D710:** The full-up, but more expensive option, of course, is to simply add the RC-D710 APRS Display Head to any radio. This Display head, that comes with the TM-D710 APRS radio, can also be purchased separately so that it can be added to ANY radio at the speaker-mic level. The full APRS functionality of this fully integrated APRS system is all contained in the display head including the TNC, so it is transportable to any radio. Take it indoors with your HT and use it at your desk attached via audio cable to your HT. Shown here, it is attached to an \$88 Alinco HT (with 9 AA NiCd's to power it's 350 mA needs).



Message Displays on Paging Radios: . In addition to the APRS radios, there are an estimated 500,000 **FT-51R** family and **TH-78A** radios (from the 1990's) that have a built-in TEXT messaging and paging function that can also be used for messaging. Messages are entered from the Keypad and displayed on the radio front panel.



Messages can also be received and displayed on PC's using simple **DTMF decoding software**. But not only can this capability be used for sending and receiving text messages, we can also push other important local information to the front panel displays of these radios. . For example, the locally recommended **voice frequency** for travelers and visitors. Please see **details** on how we can integrate this into APRS.

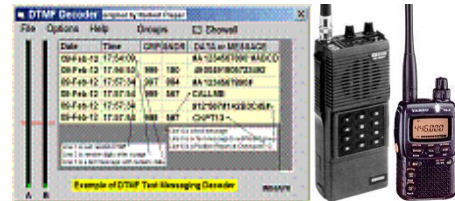
Surplus Text Pagers: With the rise of the cell phone industry there appear to be thousands of low cost one and two-way text messaging pagers that can be easily converted to amateur frequencies. The link takes you to DL3SDW's work on these surplus pagers. It would be easy to tie these pagers into the Universal Text Messaging System with something as simple as a Xtal change and a little firmware in a Paging Gateway to APRS.



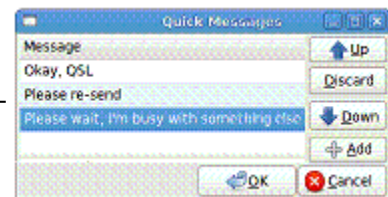
DCS-Text Messaging Radios: . Still newer radios use the DCS codes to send and receive text messaging. Again, gateway software can be written for these radios as well so that they can send and receive ham radio text messages with not only themselves but any other ham radio, APRS radio, DTMF radio, Cell phone, Blackberry or what have you. Known radios with the DCS-Text Message capability are the VX-8R, VX-3R, and FTM-10R/SR. See [Message set-up](#), [Member list](#), and [Sending & Receiving](#)



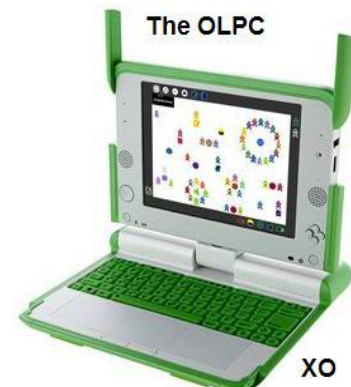
All Other Radios with DTMF: . There are two methods for Text Messaging using the simple DTMF built into almost all amateur radios. First is sending in the paging-format defined above for the older Text Paging radios. These messages can be sent by ANY radio, and received on the special paging radios above or on a separate DTMF decoding software on a PC. See an [example here](#) . Secondly is the APRS Touchtone project started in 2001 using the gateway program called APRStt. This DTMF Messaging extends basic information exchange to all radio amateurs, not just those that are APRS equipped. . Even the old crumudgen that shows up with his venerable IC-2AT for example can participate. . Reading your text messages is as simple as entering your callsign in a DTMF memory. When you send your pre-loaded DTMF callsign on the APRStt voice frequency, the APRStt engine will respond by voice with any listed traffic and will read them to you on demand. . See [the APRStt web page](#).



D-STAR Radios: Although the Dstar radios do not have any built-in radio-to-radio text messaging capability, they can be connected to PC's on each end and with the right software such as ([D-rats](#)), users can then keyboard message similar to other systems.



MESSAGING ON OTHER DEVICES: . The goal here is to encourage the development of applications for all typical wireless devices that will enable them to exchange text-messages with any other ham radio operator by callsign addressing. This can tie in all user wireless devices into the global APRS system to greatly enhance communication in support of emergency and event communications. These applications can be simple for messaging



only, or can bring in full APRS map displays as well. See [how simple it is](#).

OLPC APRS INTERFACE: . Every laptop and palmtop held by ham radio operators needs a text-messaging interface to ham radio. For example, this interface for the OLPC (One-Laptop-Per-Child) laptop named the XO checks into the APRS system and can send and receive APRS text-messages and email whenever the OLPC is in WI-FI range. This activity was written by Jack Zielke, KG4GJY. See the [web page](#) for installation and operation. Again this November, the OLPC is being offered under the [buy-one-give-one-free](#) program at Amazon.com.

APRS Messages to Your Cellphone: . N3FLR Frank Rossi reports that he uses "YahooAlert" to send all of his APRS messages to his cell phone. First, [Find-U has RSS output capability](#) so he has his computer RSS Feed Reader watching his Feed From FindU, and [YahooAlert](#) also watching. After setting up Yahoo Alert for a pager, he uses his phone's text e-mail address such as xxxxxxxxxx@txt.att.net . Then you just need to know what your phone's "e-mail address" to "text address" is. You don't need mobile internet to do it this way, just text ability. That will work with a text pager also. . When FINDU sees a message to him on APRS it generates an RSS Feed that now **Yahoo-Alerts** is watching. YahooAlerts then forwards the RSS Message as Text to his cell phone. Although this is only one way communications, it still lets him receive his APRS messages. He also says that you can set up RSS feeds from FindU for weather alerts, or APRS users X amount of miles from you. You can make the miles anything you want. He has not tried that function yet.



APRS Messages to/from Your IPHONE: . NV6G, Greg announced his beta iPhone application and AB3Y, David Ponevac, has developed another application called [IBCNU](#) that not only provides APRS messaging, but position reporting as



well.

APRS on Windows-Mobile 5&6: . Lynn, KJ4ERJ, author of APRSISCE mentions that he has an APRS-IS client (beta) running for Windows Mobile 5 and 6 specifically tested on the AT&T Tilt and maybe the SmartPhone (Motorola Q, I believe)... See his mobile KJ4ERJ-12 on FINDU.COM or APRS.FI. This can bring APRS to every ham with these cell phone devices!



APRS EMAIL MESSAGES TO THE INTERNET: .

Any APRS station can send brief text-messages using email via APRS to any cell phone or Internet user. The technique is extremely simple. Just address your APRS message to one of the Email engines below and make the first word of the message be the intended email address followed by the message. This is



automatically picked off the APRS-Internet-System (APRS-IS) by the email engine and sent via conventional email. The sender receives an APRS ack for the message.

- **WU2Z Email Engine:** . . .The original APRS Email system. Send to "EMAIL"
- **AE5PL Email Engine:** . . Send to "EMAIL-2". . See [additional info](#).
- **VK3JFK Email Engine:** .Send to "SAMAIL". . See [details](#).
- **APRSlink on WLNK-1:** . Send to "WLNK-1" using the "SP" command ([See how](#))

WEB BROWSER TO APRS MESSAGING: .



There are a few methods for sending APRS messages from on-line APRS-Internet (APRS-IS) systems to APRS mobiles and handheld operators. . We hope that such systems implement the full APRS message mechanism to assure reliability and accountabliliy ([see issues](#)). Here are some systems:

- K4HG, Steve reports that *FINDU.COM now has web based messaging. . For example, this [entermsg.cgi](#) link will allow you to send a message from your browser to any APRS user.*
- NV6G, Greg reports that [www.openaprs.net](#) has full messaging support since August 08. . Just signup for an account (which is free), messaging is under the Tools window which is accessed from the right icon bar. OpenAPRS includes a "Friends List" that will display when OpenAPRS has detected one of your friends sending APRS messages to let you know when they are online.

<http://www.aprs.org/aprs-messaging.html>

THE BASIC HARDWARE

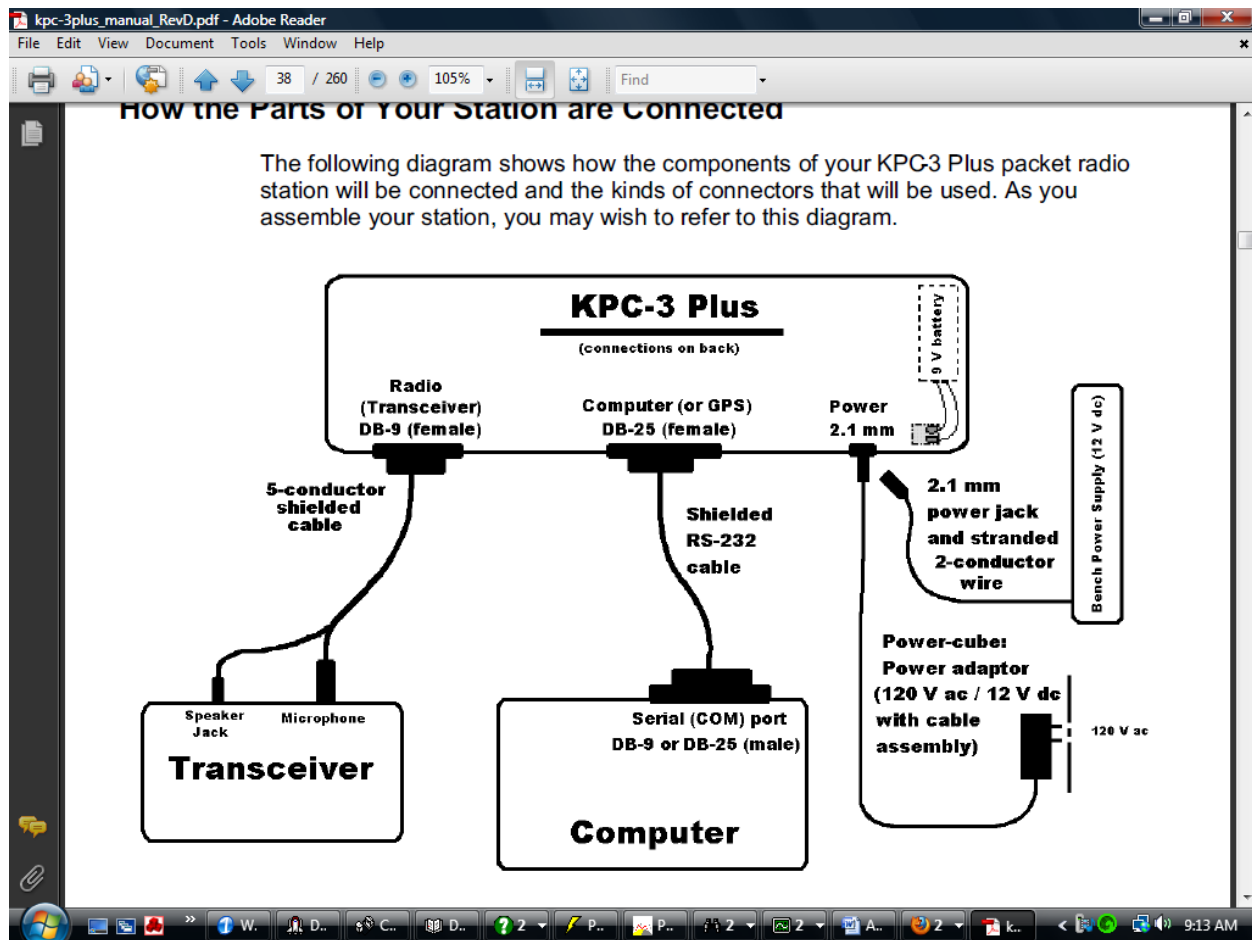
2M FM Transceiver – 144.39 MHz – and Antenna

Audio in / out / PTT with cable to –

TNC – such as Kantronics KPC-3 or KPC-3 Plus

<http://www.kantronics.com/products/kpc3.html>

Computer / terminal



The minimum serial connection between the TNC and Computer using software flow control (XON/XOFF) and max rate of 9600 baud is as follows:

KPC-3 ---- Computer

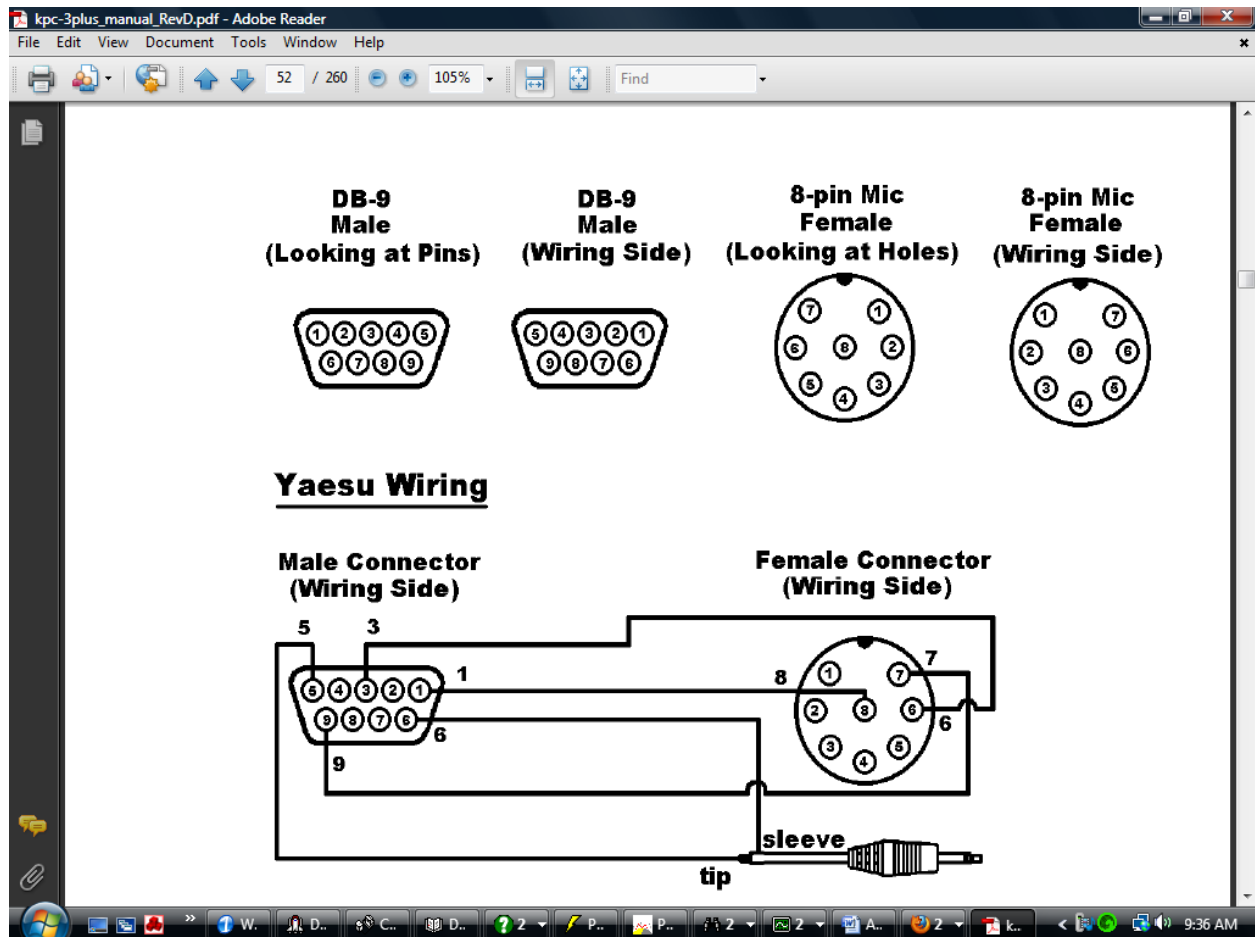
2 ←-----→ 3 TXD

3 ←-----→ 2 RXD

7 ←-----→ 7 SG

Note: Some terminal programs may require DSR and RTS / CTS jumpers or connections. For data speeds faster than 9600 between TNC and Computer, Hardware flow control is required.

Example – TNC to Radio connections



TNC – minimum setup

Install/run terminal program on computer after making serial connection with TNC.

Turn on TNC and run Autobaud program.

Set Callsign.

See <http://www.aprs.org/kpc3/kpc3+WIDEn.txt> for compliant settings for APRS.

Sources:

<http://www.aprs.org/> - WB4APR, Bob Bruinga

<http://www.findu.com/> - K4HG, STEVEN S DIMSE

<http://aprs.fi/> - OH7LZB, HEIKKI HANNIKAINEN

<http://www.kantronics.com/>