**** DRAFT DRAFT *** please send corrections

Version 1.8 July 9 1993 update since 1.6
KD6PAG found a bug in quoting recieved escape and end characters is sofktiss 1.6. The bug and the fix and patch are all correct, thanks for some great detective work.

Update phone number

Overview

This document tells you how to get your Mac on packet radio for less than $50. Some friends are working on a modem for less than $30.

Written by Aaron Wohl
6393 Penn Ave #303
Pittsburgh PA, 15206
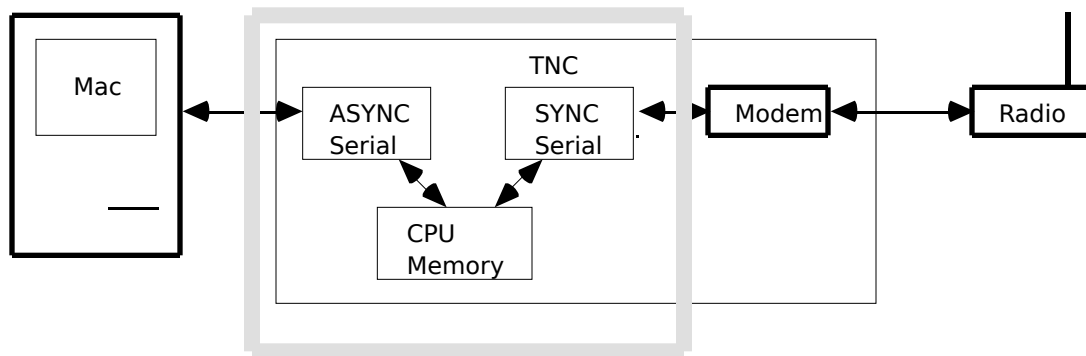**Phone 412-731-3691 (note: new phone)**
AppleLink: A0361 (seldom checked)
Internet: n3liw+@cmu.edu
Compuserv: 76516,2677 (note: new address)
Packet: n3liw@w2xo.wpa.usa.na

Diagram of a typical packet radio setup

We left out the redundant curcuitry in the
gray box to make poor mans packet

Things you need to get started

IP ADDRESS

You need an "IP" address. This is a 32 bit number issued by your local ip coordinator. It is expressed as 4 numbers separated by periods. It should look like 44.112.0.200.

My call sign is N3LIW so I sent a request to my coordinator: "My host is called n3liw I need one IP address. It is located in Pittsburgh PA".

I asked around to find the coordinator in my area. I have attached the current list of IP coordinators as Appendix 1.

HOST TABLE

There is a file that lists all the folks around you that also have ip addresses. It must have your ip address and hostname (call sign) at least. You can get this from your coordinator. It looks like this:

44.112.0.1 unix.n3cvl

44.112.0.2 w3vc

44.112.0.3 darth.wa3yoa

44.112.0.4 unix.w2xo

44.112.0.5 n3igw

44.112.0.6 wa3hgw

NET

This is the software than emulates a "normal" TNC. It is available from the internet on host akutaktak.andrew.cmu.edu via anonymous ftp in the /aw0g directory. On compuserve in the hamnet forum

library 9. MAC/Net expects a TNC in kiss mode, which is what Softkiss emulates.

Softkiss

This software emulates a really dumb TNC in kiss mode. It is available on the internet from host akutaktak.andrew.cmu.edu [128.2.35.1] in the /aw0g directory. It is also available on compuserv hamnet forum in library 9.

Software Compatibility Switch

If you are using a Mac fx or quadra (or newer har har) get the "software compatibility switch" control panel from compuserv Macintosh Developers sig library 8 (Apple System Tools) and is called FXSRSW.SIT.

MODEM

All of the above stuff is free. The modem you have build or buy.

Stas at A&A engineering sells BayCom kits based on the 7910 modem chip, the phone is 714 952 2114. I have been using two of his kits in development. This kit supports 300 baud for HF work [untested by n3liw].

A quote from Dexter Francis: "Sigma Design Associates [Dexter Francis KD6CNT] has a modem specifically for the macintosh that should cost about $30. It comes with a HyperCard stack with useful tips on building and hooking up a modem. 408-733-8985 AppleLink: Francis4 Compuserv: 70611,1340 XXX"

I have been using a prototype of this modem. It is line powered which saves having an extra power cable. Softkiss supports the line powered option which is handy on a power book or portable.

John Olson at Tigertronics sells a little line powered modem model BayPac-2 built into a DB25 connector. The cost is $49. He is sent me one to hook up and try out. It is working well. There is a wireing diagram in the wireing section. Tigertronics can be reached at (503)474-6700.

The 1992 ARLL handbook has some planes for a modem on page 29-13 if you want to build one.

73 Magazine had an interesting article published in August 1991 'Poor Man's Packet' by F. Kevin Feeney WB2EMS and Andy Payne.

Installing The Hardware

Wiring

Radio

Sorry no help here, the modem kit probably came with some hints?

Power

Unless the modem is specially designed to be low power there isn't enough juice to steal power from the Mac. If you have such a modem set "line_power true" in Softkiss to leave the transmit drivers on even in receive mode to power your modem. Currently the default is line_power true. Comments? are most of you using line powered or externaly powered modems?

Macintosh

See Inside Mac Volume IV page 249.

See below the pinout for the A&A Baycom modem

There is no standard for Mac cable color codes, so when you get yours working telling a friend the colors won't help

The Softkiss software currently ignores the CTS (Mac pin2) signal. If your modem supplies it you can hook it up to be ready for a future version. Sigma's MacPacketModem provides this signal.

The Mac has two transmit data lines, ignore the TXD+(Mac pin6) signal and use the TXD-(Mac pin3) because that is closer to being RS232.

The Mac has two receive data lines, hook the RXD+(Mac pin8) to your circuit ground. Send data in RXD0 (Mac pin5)

The DTR (Mac pin 1) signal is used to key the transmitter. It is active high

Mac PIN 4 is ground.

Don't hook anything to the GPI (Mac pin 7)

Pinout for Sigma modem

The Sigma modem uses a mini db-8 which is the same thing used on a Laserwriter so you can use a standard cable.
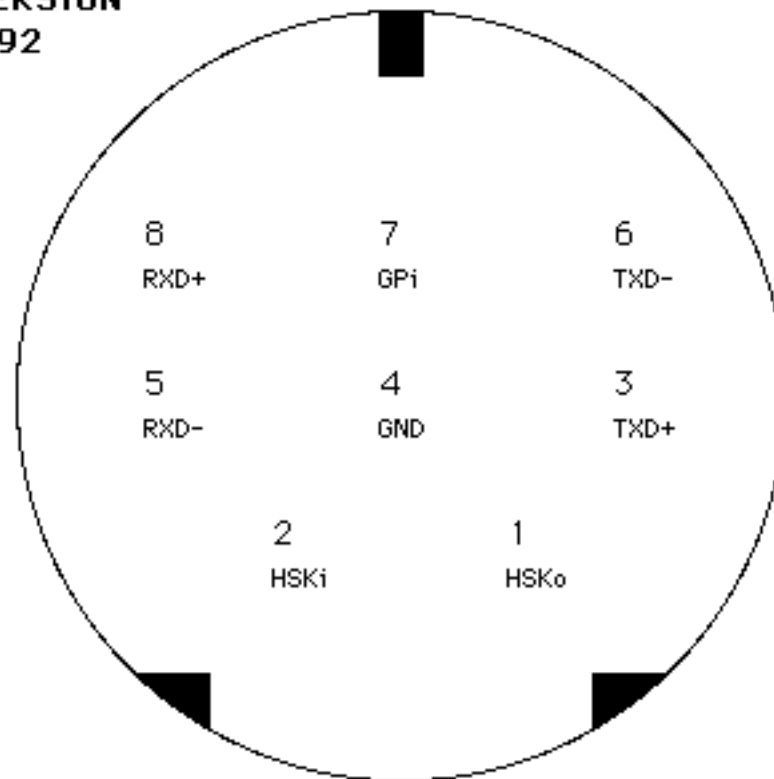

Pinout for A&A Baycom modem

Mac Pinout	DB9 Pinout	Function
Mini DIN8	Baycom	

1	7	DTR push to talk
2	5	MAC CTS in unused
3	4	TXD- transmit data out -
4	5	Ground
5	8	RXD-
6	NC	TXD+ transmit data out+
7	NC	Not connected
8	5	RXD+ / Ground

NOTE: This is ***NOT*** a standard cable you can buy. I asked A&A and they may carry this cable made up in the future.

HOOKING A BAYCOM
MODEM TO A MACINT
FOR USE WITH SOFT
BY AARON WOHL N3I

8
RXD+

7
GPi

6
TXD-

5
RXD-

4
GND

3
TXD+

2
HSKi

1
HSKo

For macintosh softw
to use a baycom mod
Send a SASE to:
Aaron Wohl #303
Pittsburgh PA 15206
(412) 731-6159

This diagram has onl
been tested on the
Tigertronics BayPac
(503) 474-6700

MINI DIN 8 ON MAC
AS VIEWED FACEING REAR OF MAC

BAYCOM NAME	DB9	DB25	MAC PIN/ NAME
TXD	3	2	3/TXD+
RTS	7	4	1/HSKo
CTS	8	5	5/RXD-
GND	5	7	4/GND
DTR	4	20	6/TXD-

NOTE: The mac pin 8/RXD+ must be connected to ground (mac pin 4)
If the cable you are using has 2/HSK or 7/GPi these wires should
be connected to ground (mac pin4) also.
If the cable has an unsheilded wire for earth ground connect this to
signal ground (mac pin4).

BAYCOM TXD is used to draw power from the host. Mac TXD+ is transmit data.
Softkiss sends continious data so there is power for. BAYCOM RTS is used to
keu the transmiter. BAYCOM DTR is data out of the mac into the baucom. BAYCOM

Starting Softkiss

Hook up the modem as described above to either Mac port but not yet to the radio(it might key up due to the last terminal emulation program leaving DTR on).

Get whatever might be using the port on the Mac to stop using it. If you are connecting to the printer port be sure that AppleTalk is turned off.

If you are using a Mac fx or quadra you need to set the serial ports to compatibility mode.

Place the SoftKiss control panel in the System Folder (system 6) or Control panel folder (system 7) and reboot.

Bring up the SoftKiss control panel and select "KISS mode TNC" for the port you want to use for a radio.
Possible Problems

If the control panel says the port is busy, maybe it is (is appletalk off if you are using port b?)

If it says that there is "no scc chip" then you have an fx, quadra, or newer and need to follow the compatibility section above.

Hook up the radio, something is wrong if it keys up right now...

Using Net

You did get the host table and ip address talked about above in the steal this stuff section right?

Put the hosts.net file in the same directory as the NET/Mac application. It must have at least your own ip address and hostname (call sign) listed. Sample minimal file:

44.112.0.200   n3xyz

Now the fun part [sic]. There is this file called "autoexec.net" you need to put the same information in it in ten different ways and set some strange settings, so be patient.

Copy the file Autoexec.TEMPLATE and name the copy Autoexec.net

Replace all occurrences of my_callsign with your actual in lower case.

Replace the one occurrence of IPADDRESS with your actual ip address. Afterwards that line should look like:ip addr [44.112.0.200]

Search for the string QST-0 (that is a zero at the end). On this line it kind of looks like a call sign but the last two bytes are zero. So you need to change the second number which is 112 where I live to be the second number from your ip address.

Search for the line hostfile "boot:macnet:Hosts.net", this needs to name Hosts.net file. I don't think it likes spaces much so you may need to rename a directory if it has them.

Search for "attach asy 1 a" if you are using the modem port you are all set. If you are using the printer port change the a to be yielding: attach asy 1 b

Now, finally run the net program, leaving Softkiss running.

If net hangs at startup it is usually because the port (modem or printer) is not running Softkiss and doesn't have anything attached to it, check your configuration

If net give some error messages at startup check your autoexec.net

To monitor packets and see if everything is setup ok. Give net the command "trace ax0 111" this opens a window and shows all the packets going by. When you are done quit net and restart it as it seems to drop connections when the trace window is open.

To connect to my favorite bbs (w2xo) I use:

c ax0 w2xo

There is built in help in net and a sub directory with more documentation.

Overall the system needs work and is under construction.

When it doesn't transmit

To make adjustments to Softkiss you need to do:

Run any terminal emulator program such as Red Ryder, White Knight, Mac Terminal, Kermit and select the same port you picked in the control panel.

You will get the modem> prompt or printer> prompt depending on which port you are using. The help command will give a list of commands and their usage.   Typical command sequence

online false

-- make changes

online true

Changes are not saved yet (sorry)

Times are in microseconds

To have finer control for high speed radios Softkiss thinks of time in microseconds. Most TNCs measure time in milliseconds but express it in milliseconds/10. You thought you would never need to use that stuff from the exams on micro->milli right?

An example, my kam [Kantronics All Mode, a common TNC] manual says the default time for txdelay is "30". But it internally multiples by 10, it has a default txdelay of 300 milliseconds. To convert to microseconds for Softkiss add three zeros to yield 300000

tx_delay

This is the delay for your transmitter to key up, squelch to break on the receiver and the receiving end to synchronize. The default is 300000 microseconds (which is 3 tenths of a second). If it is too short it won't work. If it too long it wastes air time.

Once you have things working you can make this number smaller till it breaks and back off a little.

If you are using a tx_delay as small as possible, then it makes a difference how the other end is set up. If they using a "DCD detector" to run open squelch then when you switch to talk to someone else you would need to up the time.

Ask around to see what folks in your area are using for your kind of radio.

tail_delay

After Softkiss transmits all of your data to the serial chip it waits while the SCC hardware transmits the final data byte to the radio then the checksum and a closing flag. This time is how long it waits. This time does not vary according to your radio, or the radio at the other end.

Softkiss should figure it out itself but it doesn't yet.

tail_delay defaults to 50000 microseconds.

If it is too small the receiving end won't understand your packet.

It it is too big you waste air time.

If you are using 300 baud on HF 50000 wont be enough, it needs to be large enough for about 4 characters. I haven't tried it but 150000 should be enough for 300 baud.

Fairness, xmit_dwait, xmit_slottime, xmit_persist

Softkiss tries to transmit when nobody else is transmitting so that it doesn't interfere. So does everyone else. These parameters (xmit_dwait xmit_slottime, xmit_persist) teach Softkiss the rules that the hams in your area use to play fair in transmitting.

If Softkiss is too wimpy it will not transmit because it is being to deferential and everyone else will go.

If Softkiss is too aggressive it will transmit on top of other people and not give them a chance.

Ask around your area to find what hams are using for dwait, slottime and persist.

dwait

This is how long to wait to give digipeaters a chance to go first. It not used in my area anymore since slottime and persist where invented so I set it to zero. Again, remember times are in microseconds (see time section above)

xmit_persist

When Softkiss wants to transmit it plays dice. It takes out it's 1000 sided die and rolls it. If the number it rolls is bigger than what you picked for xmit_persist it goes to sleep for xmit_slottime then tries again. Being a computer it's die is labeled from 0 to 999.

My kam defaults to 63 for persist but it is 63 on a 256 sided die which gives it about a 25% chance of transmitting when it wants to. The same chance would be 'xmit_persist 250' to SoftKiss.

If it xmit_persist number is too small everyone else will go and you wont take a shot at it.

If it is too small you will jump in and not give everyone else a chance.

xmit_slottime

If die roll above for xmit_persist says to take a nap this is how long to sleep for. It defaults to 90000 microseconds which is 90 milliseconds. Ask around what folks in your area are using. Again, see the section on time above a kam setting of 90 is 90000 to Softkiss.
Future Softkiss Wish List

• Interface to Virtuoso to have a better user interface than macnet
• AppleTalk (printing, AppleShare) over radio
• MacTCP (apple's TCP system)
• AfterDark packet monitoring module
• A built in connect command in SoftKiss

Appendix 1

AMPRNet IP address coordinators as of 15 January 1992

44.002	Bob Meyer	K6RTV	Calif: Sacramento
44.004	Douglas Thom	N6OYU	Calif: Silicon Valley - San Francisco
44.006	Don Jacob	WB5EKU	Calif: Santa Barbara/Ventura
44.008	Brian Kantor	WB6CYT	Calif: San Diego
44.010	Terry Neal	AA6TN	Calif: Orange County
44.012	Steven King	KD7RO	Eastern Washington,Idaho
44.014	John Shalamskas	KJ9U	Hawaii & Pacific Islands
44.016	Jeff Angus	WA6FWI	Calif: Los Angeles - S F Valley
44.017	Dana Myers	KK6JQ	Calif: Antelope Valley/Kern County
44.018	Geoffrey Joy	KE6QH	Calif: San Bernardino & Riverside
44.020	Fred Schneider	K0YUM	Colorado: Northeast
44.022	John Stannard	KL7JL	Alaska
44.024	Dennis Goodwin	KB7DZ	Washington state: Western (Puget Sound)
44.026	Ron Henderson	WA7TAS	Oregon
44.028	Don Adkins	KD5QN	Texas: Dallas
44.030	J Gary Bender	WS5N	New Mexico
44.032	Bdale Garbee	N3EUA	Colorado: Southeast
44.034	Jeff Pierce	WD4NMQ	Tennesee
44.036	Doug Drye	KD4NC	Georgia
44.038	Mike Abbott	N4QXV	South Carolina
44.040	Jeff Jacobsen	WA7MBL	Utah
44.042	Phil Akers	WA4DDE	Mississippi
44.044	Ed Thorne	WB1FEM	Massachusetts: western
44.046	William Simmons	WB0ROT	Missouri
44.048	Jacques Kubley	KA9FJS	Indiana

44.050	Ron Breitwisch	KC0OX	Iowa
44.052	Gary Grebus	K8LT	New Hampshire
44.054	Ralph Stetson	KD1R	Vermont
44.056	Don Hughes	KA1MF	Eastern Mass
44.058	Rich Clemens	KB8AOB	West Virginia
44.060	Howard Leadmon	WB3FFV	Maryland
44.062	Jim Dearras	WA4ONG	Virginia (not DC)
44.064	Dave Trulli	NN2Z	New Jersey: northern
44.065	Bob Applegate	WA2ZZX	New Jersey: southern
44.066	John DeGood	NU3E	Delaware
44.068	Bob Foxworth	K2EUH	New York: Long Island
44.069	Paul Gerwitz	WA2WPI	New York: upstate
44.070	Gary Sanders	N8EMR	Ohio
44.072	Ken Stritzel	WA9AEK	Chicago - North Ill.
44.074	James Curran	KA4OJN	North Carolina (east)
44.075	Charles Layno	WB4WOR	North Carolina (west)
44.076	Kurt Freiberger	WB5BBW	Texas: south
44.077	Rod Huckabay	KA5EJX	Texas: west
44.078	Joe Buswell	K5JB	Oklahoma
44.080	John Gayman	WA3WBU	Pennsylvania: eastern
44.082	Steven Elwood	N7GXP	Montana
44.084	Bob Ludtke	K9MWM	Colorado: Western
44.086	Reid Fletcher	WB7CJO	Wyoming
44.088	Jon Bloom	KE3Z	Connecticut
44.090	Mike Nickolaus	NF0N	Nebraska
44.092	Pat Davis	KD9UU	Wisconsin, upper peninsula Michigan
44.094	Gary Sharp	WD0HEB	Minnesota
44.096	Don Bennett	K4NGC	District of Columbia
44.098	Garry Paxinos	(waiting)	Florida
44.100	Ken Adkisson	WB4FAY	Alabama
44.102	Jeff King	WB8WKA	Michigan (lower peninsula)
44.104	Charles Greene	W1CG	Rhode Island
44.106	Tyler Barnett	N4TY	Kentucky
44.108	James Dugal	N5KNX	Louisiana
44.110	Richard Duncan	WD5B	Arkansas
44.112	Bob Hoffman	N3CVL	Pennsylvania: western
44.114	Steven Elwood	N7GXP	N&S Dakota
44.116	Tom Kloos	WS7S	Oregon: NW&Portland,Vancouver WA
44.118	Jon Andrews	WA2YVL	Maine
44.120	unassigned		
44.122	Dale Puckett	K0HYD	Kansas

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44.124     David Dodell            WB7TPY     Arizona
44.125     Earl Petersen           KF7TI Nevada
44.126     Karl Wagner             KP4QG       Puerto Rico
#
# 44.128 is reserved for testing.  Do not use for operational networks.
# You may safely assume that any packets with 44.128 addresses are
bogons
# unless you are using them for some sort of testing
#
44.128     TEST
#
# International subnet coordinators by country
#
44.129     Japan         JG1SLY      Tak Kushida, JH3XCU Joly Kanbayashi
44.130     Germany        DL4TA       Ralf D Kloth
44.131     United Kingdom  G6PWY      Chris ?
44.132     Indonesia  YB1BG       Robby Soebiakto
44.133     Spain         EA4DQX     Jose Antonio Garcia.  Madrid. (EA4DQX @
EA4DQX)
44.134     Italy         I2KFX
44.135     Canada         VE3GYQ     David Toth
44.136     Australia  VK2ZXQ     John Tanner
44.137     Holland        PA0GRI     Gerard Van Der Grinten
44.138     Israel        4X6OJ       Ofer Lapid
44.139     Finland        OH1MQK     Matti Aarnio
44.140     Sweden         SM0RGV     Anders Klemets
44.141     Norway         LA4JL Per Eotang
44.142     Switzerland HB9CAT      Marco Zollinger
44.143     Austria        OE1KDA      Krzysztof Dabrowski
44.144     Belgium        ON7LE
44.145     Denmark        OZ1EUI
44.146     Phillipines  DU1UJ       Eddie Manolo
44.147     New Zealand
44.148     Ecuador        HC5K Ted
44.149     Hong Kong  VS6EL
44.150     Yugoslavia  YU3FK       Iztok Saje
44.151     France         FC1BQP      Pierre-Francois Monet
44.152     Venezuela  OA4KO/YV5 Luis Suarez
44.153     Argentina  LU7ABF      Pedro Converso
44.154     Greece         SV1IW       Manos
44.155     Ireland        EI9GLPaul Healy
44.156     Hungary        HA5DI       Markus Bela
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44.157	Chile	CE6EZB	Raul Burgos
44.158	Portugal	CT1DIA	Artur Gomes
44.159	Thailand	HS1JC	Kunchit Charmaraman
44.160	South Africa	ZS6BHD	John
44.161	Luxembourg	LX1YZ	Erny Tontlinger
44.162	Cyprus	5B4TX	C. Costis
44.163	Central America	TI3DJT	Chuck Hast
44.164	Surinam	PZ2AC	Otto Morroy
44.165	Poland	SP5WCA	Andrzej K. Brandt
44.166	Korea	HL9TG	Gary ?
44.193	Outer Space-AMSAT	W3IWI	Tom Clark