

KC3SMW-7 Packet Node

Phil-Mont Mobile Radio Club

Sept 14th, 2022

Inspiration

Inspirations for constructing a Packet Node

- Credit goes to DEPN, Glen N3MEL, Jim AJ3DI, & Ron NY3J
- Winlink Gateway - needs for the area.
- Easy On Boarding made by modern hardware and tutorials
- Spare parts lying around...

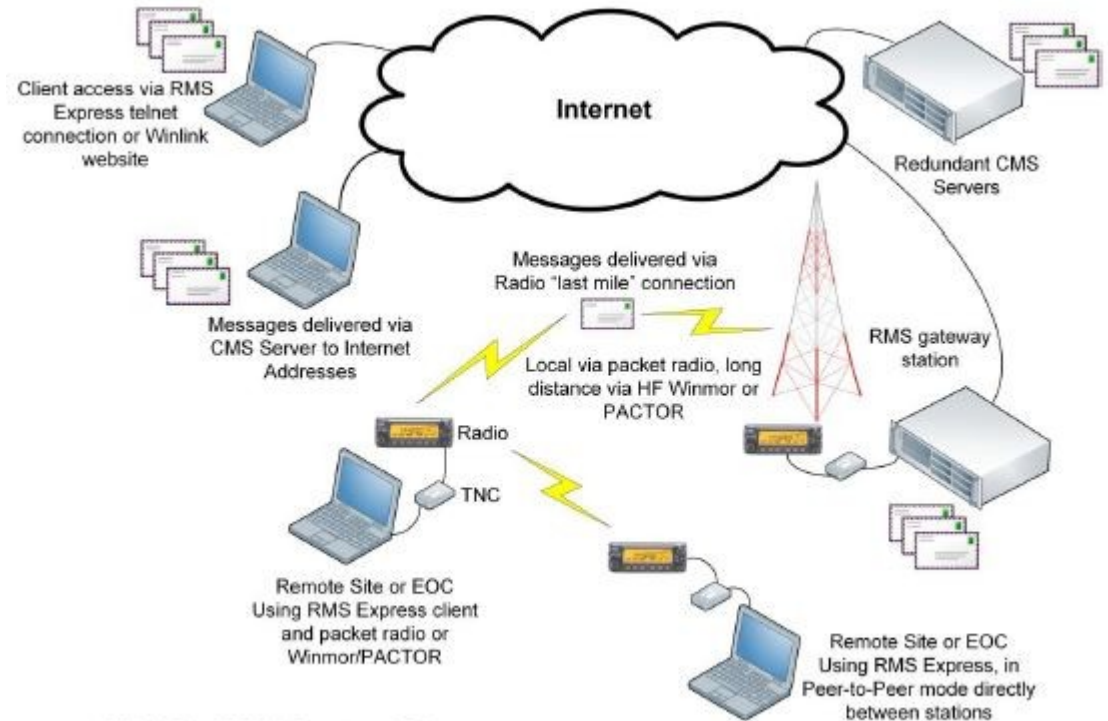
What is Packet

Packet radio blends radio and computer technologies together.

All you need besides your normal ham radio transceiver is a household computer and an interface between the two.

<https://newhams.info/2017/03/27/packet-radio/>

Examples of Packet are Winlink and APRS.

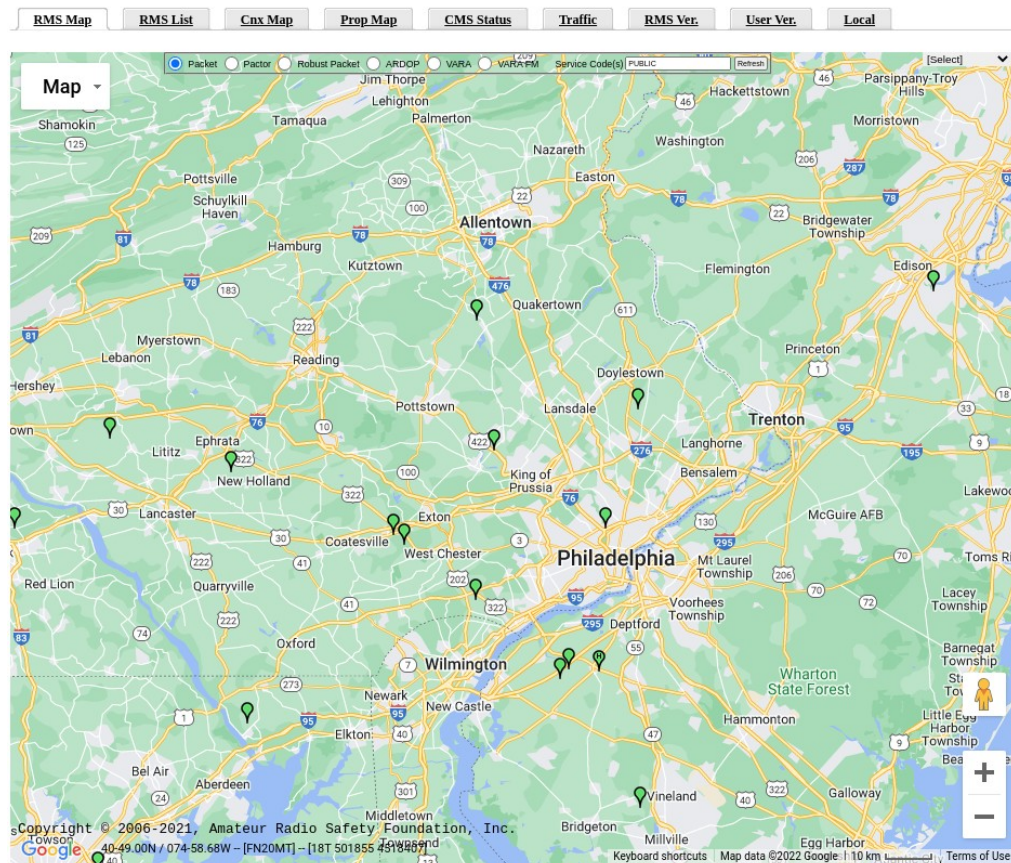


Winlink 2000 System Diagram

Local Winlink Gateways

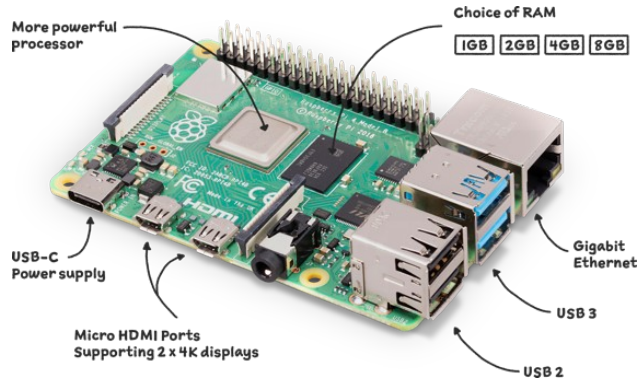
Stations in FN20

K2GE-10	FN20TL	145.050 MHz	Sayreville, NJ, USA
KC3SMW-10	FN20KF	145.610 MHz	Warminster, PA, USA
K3FZT-10	FN20JA	145.670 MHz	Philadelphia, PA, USA
AA3E-10	FN20GD	145.050 MHz	Quakertown, PA, USA
WA3WLH-10	FN20FJ	145.010 MHz	East Greenville, PA, USA



Hardware

Raspberry Pi4 4gb Ram
32GB SDCard



Signalink



Anytone 578 VHF/UHF Radio



Additional hardware: Diamond x300 antenna, power supply, and coax

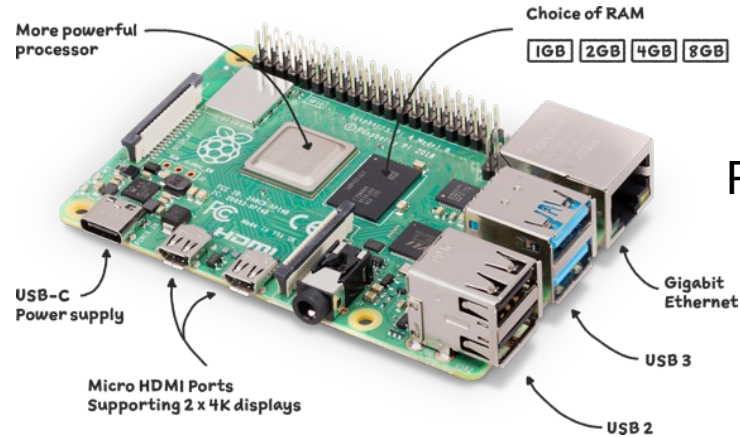
Raspberry Pi

The Raspberry Pi is usually a low cost, credit-card sized full-fledge computer, running a version Debian Linux called Raspbian.

Packet Software is **LinBPQ**

Other things A Pi can do:

- DMR/DSTAR/FUSION Hotspot
- Allstar Node
- Nextcloud Server (personal dropbox)
- Many other hacker/makers projects



Raspberry Pi 4



Raspberry Pi Zero

Signalink and Radio



The Signalink USB is a sound card interface that provides the necessary hardware to operate virtually all sound card digital and voice modes, but it does NOT provide the "CAT" (Computer Assisted Tuning) hardware needed to control the radio.

In short connects your computer to your radio for digital communications thru VOX type connection to trigger the PTT.



The Anytone AT-578 UV III Pro tri-band radio operates on 2 meters, 220 MHz and 400 MHz in both FM and DM.

For the purposes of the Packet Node, only uses 2m and one channel. Maybe overkill for this purpose but it was what I had on hand not being used for something.

LinBPQ

LINBPQ is a Linux version of the BPQ32 Node, with BBS and Chat Server components. An APRS Mapping and Messaging application is available as a separate program. Although all testing was done on Linux systems (Raspberry PI running Raspbian and a PC running Ubuntu) it should work on other Unix systems.

LINBPQ normally runs as a console application but can be run as a daemon.

Management is via a Web Browser.

Web Browser Management

BPQ32 BBS KC3SMW

[Status](#) [Configuration](#) [Users](#) [Messages](#) [Forwarding](#) [Welcome Msgs & Prompts](#) [Housekeeping](#) [WP Update](#) [Node Menu](#)

[AJ3DI](#)
[KA3VSP](#)
[KC3SMW](#)
[N3MEL](#)
[N9PMO](#)
[NS2B](#)
[NY3J](#)
[PMRC](#)
[RK3KPK](#)
[RMS](#)
[WARC](#)

Update User AJ3DI

<input checked="" type="checkbox"/> BBS	<input checked="" type="checkbox"/> Permit Email
<input type="checkbox"/> PMS	<input checked="" type="checkbox"/> RMS Express User
<input type="checkbox"/> SYSOP	<input checked="" type="checkbox"/> Poll RMS
<input type="checkbox"/> Expert	For SSID's <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
<input type="checkbox"/> Excluded	<input type="checkbox"/> Hold Messages
<input type="checkbox"/> Include SYSOP msgs in LM	<input type="checkbox"/> Don't add @winlink.org
<input checked="" type="checkbox"/> Allow Sending Bulls	<input type="checkbox"/> NTS MPS
<input type="checkbox"/> Redirect to RMS	
<input type="checkbox"/> Send APRS Mail For to SSID	

Connects In	1	Msgs in	0	Rejects In	0
Connects Out	1	Msgs Out	0	Rejects Out	0
Bytes In	0	Last Connect	01-Aug 20:40Z		
Bytes Out	0	Last Listed	77		

Name

Password CMS Pass

QTH ZIP

Home BBS

```
; Written by BPQConfigGen

SIMPLE
NODECALL=KC3SMW-7
NODEALIAS=SMW
LOCATOR=FN20Kf
MAPCOMMENT=Chengmania BPQ Node<BR> Warminster, Bucks County, EPA
FULL_CTEXT=1
IDINTERVAL=0
BTINTERVAL=10

NODE=1
BBS=1
HIDENODES=0
AUTOSAVE=1
SAVEMH=1
ENABLEADIFLOG=0
LogL4Connects=0

INFOMSG:
Welcome to the Chengmanian Node. Located in Warmisnter, Bucks County, this node is available to all
amateur operators. Please feel free to explore the BBS and Chat features and leave me a message on
the BBS. Thanks - KC3SMW.
```

Having the web browser management feature makes it super easy to update, configure, and manage users without having to constantly connect directly to the RPi

Other Software Requirements

Direwolf

Dire Wolf is a modern software replacement for the old 1980's style TNC built with special hardware.

AX.25

a protocol used extensively by radio amateurs. The Linux AX.25 protocol family permits access to these protocols via the standard networking socket metaphor.

In short allows two way communication from the radio while listening to Direwolf.

A Windows equivalent would be SoundmodemTNC, although my understanding is that Direwolf is much more robust.

On-boarding Made Easy

KM4ACK has tutorials and pre-made scripts to automagically setup:

- Winlink Gateway
- BBS
- Chat

His additional software does:

- Linux Pat Winlink connection
- FLDigi softwares
- FT8
- JS8Call
- APRS
- Many other Raspberry Pi based Ham Radio software



Note about a Node

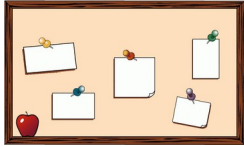
Even though KM4ACK seems to have all the software I would suggest.

- 1) If you are going to do a packet node, DO NOT load other software.
- 2) KM4ACK does a great job with his Rpi images and a nice GUI interface for the end user. I would suggest starting with a vanilla Rpi install and run his script to setup the software.

Resources

- KM4ACK
 - Github <https://github.com/km4ack>
 - Youtube Tutorials: <https://www.youtube.com/c/KM4ACK>
 - Search Youtube for “winlink gateway raspberry pi” for this specific tutorial
- LinBPQ
 - <https://www.cantab.net/users/john.wiseman/Documents/index.html>
 - <https://packet-radio.net/bpq32/>
 - <https://groups.io/g/bpq32>

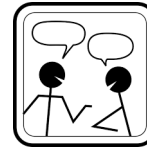
KC3SMW-7 Features



Bulletin Board System(BBS) with a curated feed of information from all over the world, with Mail-for beaconing: When a user leaves a message for another user on the BBS the node will beacon a “Mail for: callsign” on 145.610 via W3SK



RF Chat or Packet Chat



Winlink Gateway

Is a connected node to
N3MEL-7 – Downingtown PA
KA3VSP-7 – New Castle DE
NS2B-7 – Penfield NY
N9PMO-2 - Racine WI
PE1RRR-7 - Neatherlands



How to Connect

Frequency: 145.610

NODE using Easyterm – Connect – Call to: KC3SMW-7, and/or Digipeaters: W3SK

NODE using Linpac type “:c KC3SMW-7” or “:c KC3SMW-7 via W3SK”

Once attached you'll get a welcome message with options.

Common commands are

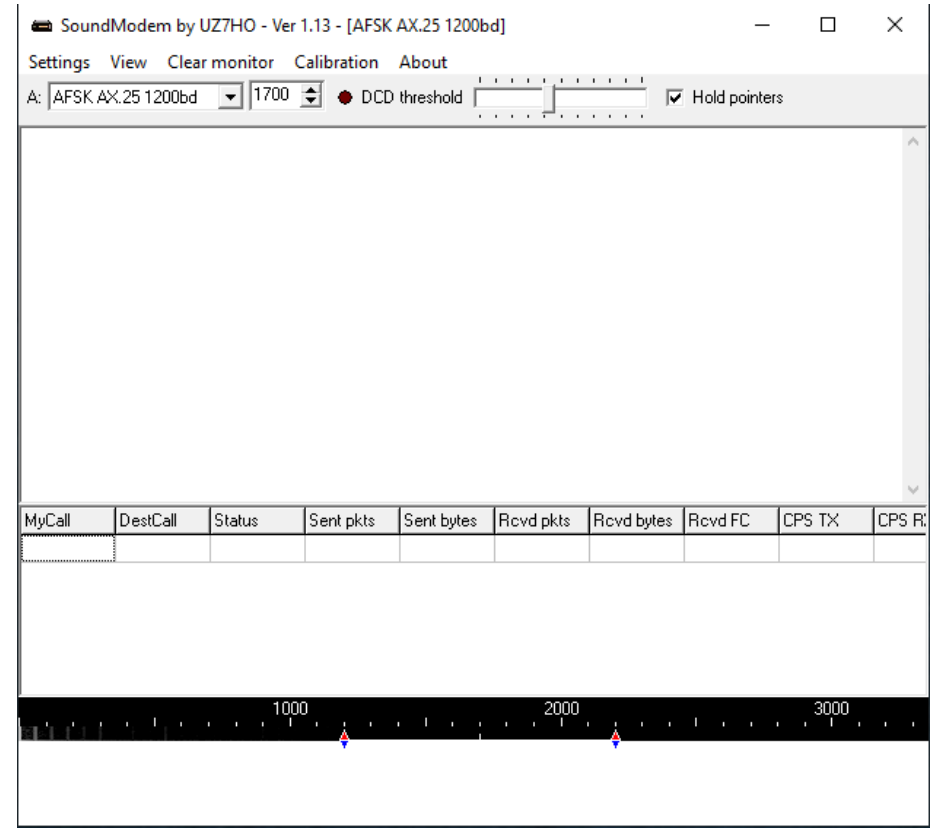
- BBS for the Bulletin Board System
- CHAT for the chat
- RMS Winlink RMS command line system

SoundmodemTNC

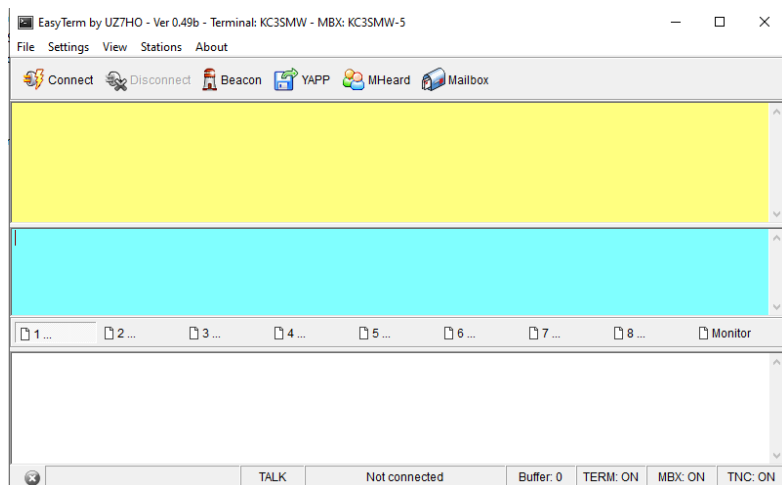
Connecting to Winlink or a Node

An easy way in Windows is through

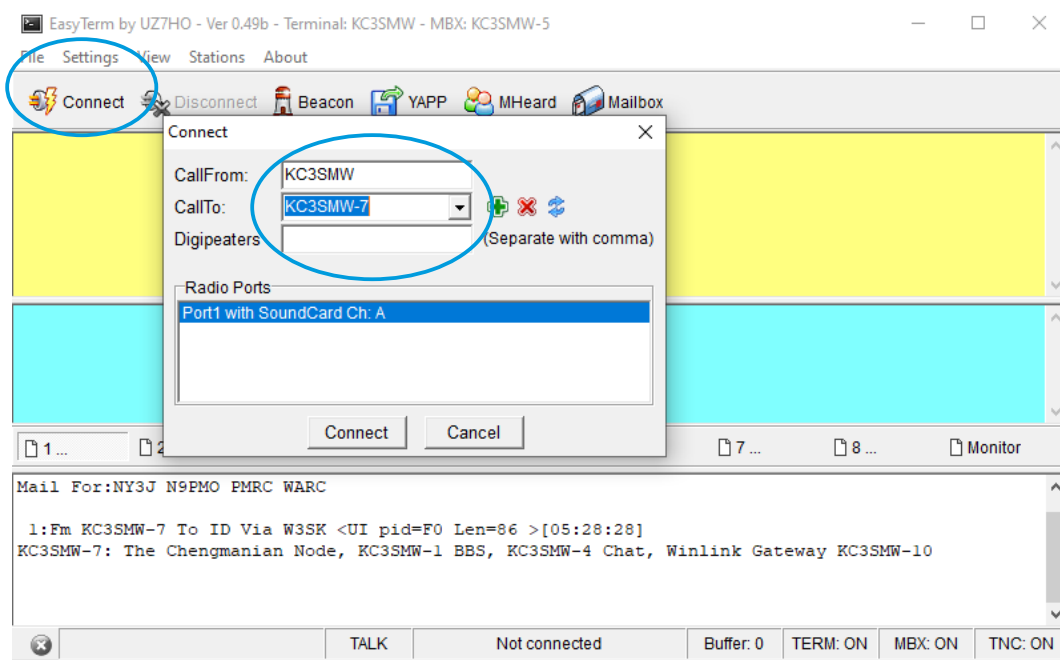
SoundmodemTNC



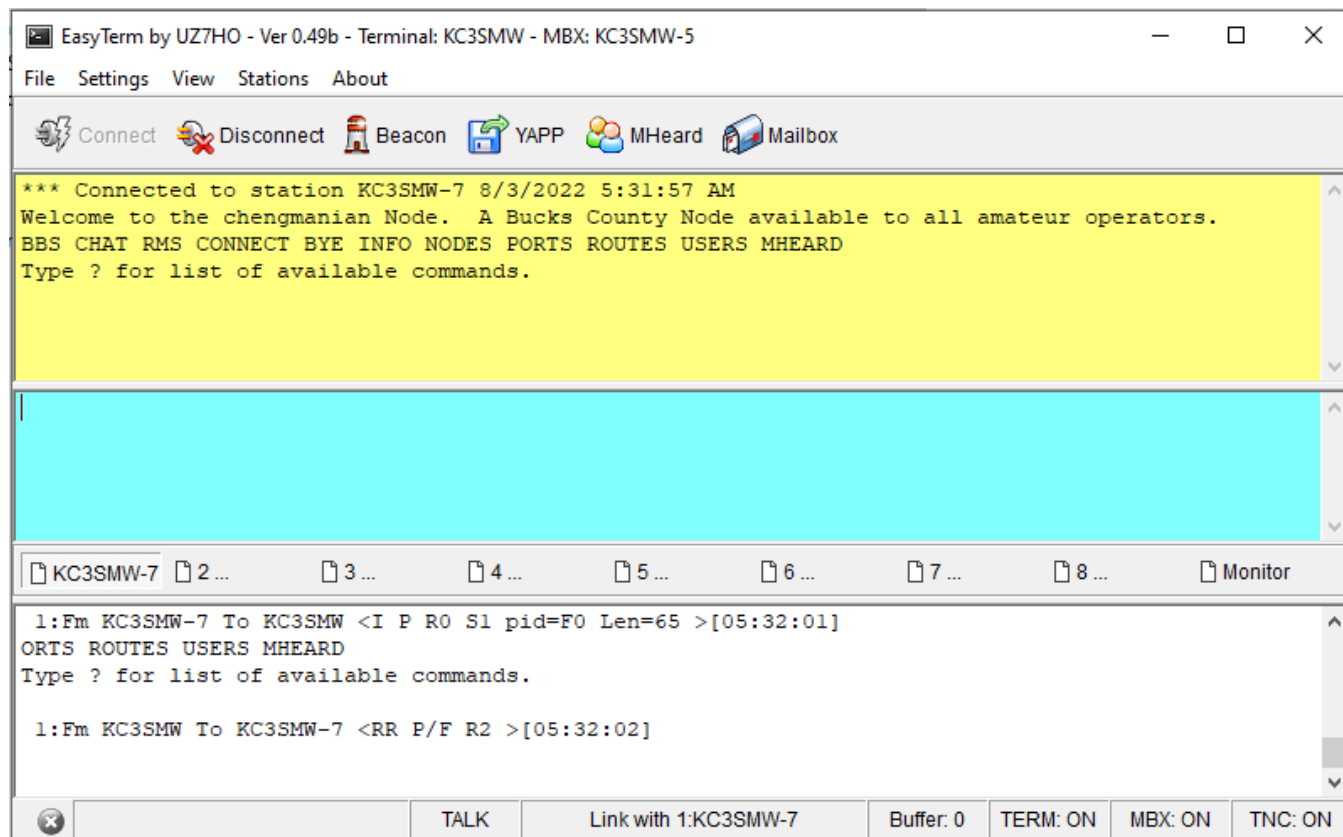
EasyTerm



CallFrom : YourCallSign
CallTo: KC3SMW-7
Digipeater: W3SK



EasyTerm Connected



What are the other numbers?

KC3SMW-7 :Main Node

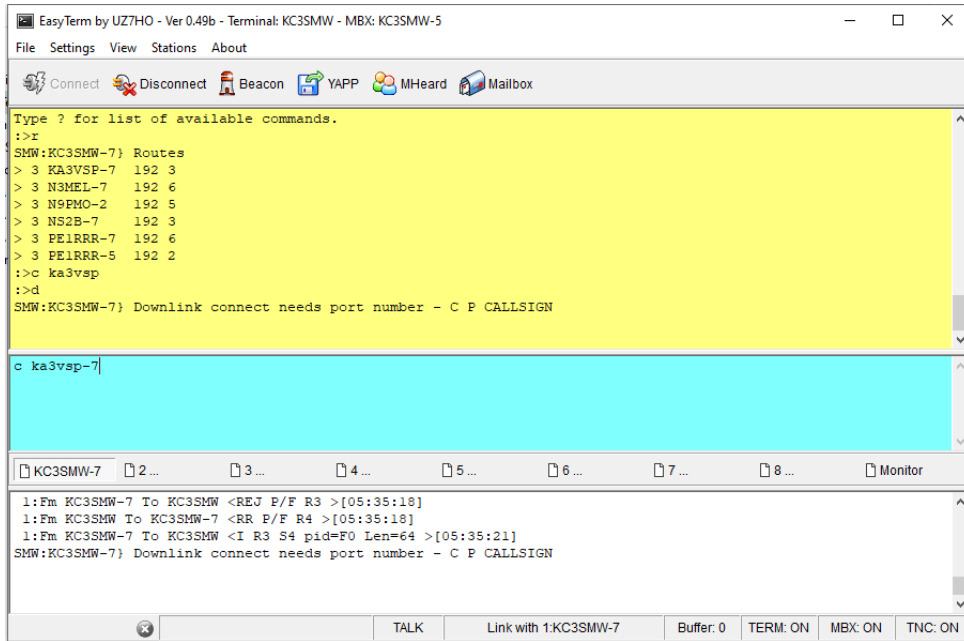
KC3SMW-1 :BBS

KC3SMW-2 :Chat

KC3SMW-10: RMS or Winlink Gateway

You can access the BBS or chat directly, and skip the node, in your terminal program, by connecting directly to KC3SMW-1 or KC3SMW-2.

A Connected Node



```
EasyTerm by UZ7HO - Ver 0.49b - Terminal: KC3SMW - MBX: KC3SMW-5
File Settings View Stations About
[Connect] [Disconnect] [Beacon] [YAPP] [MHeard] [Mailbox]

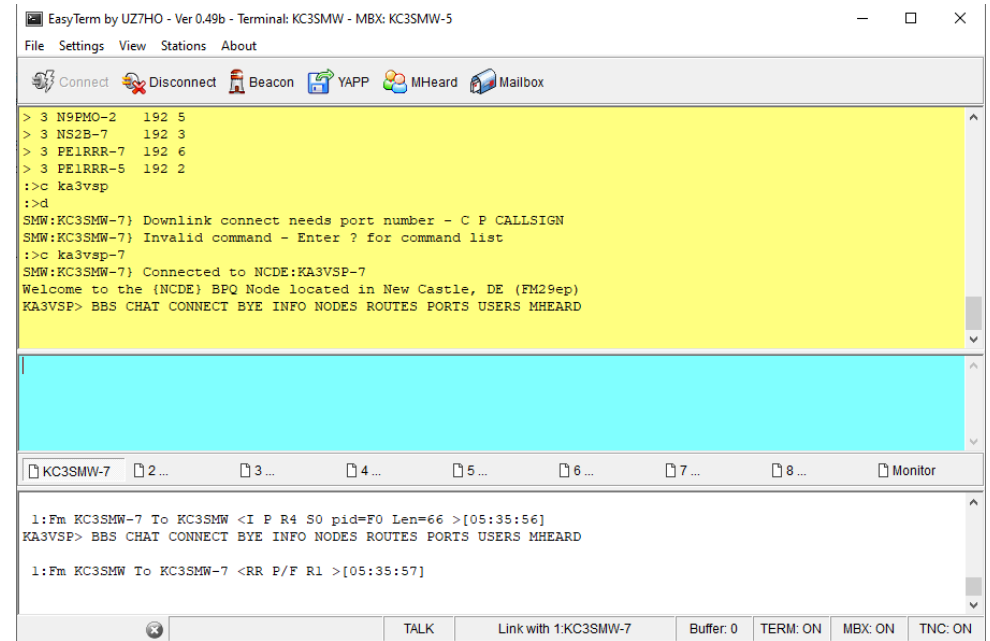
Type ? for list of available commands.
:>r
SMW:KC3SMW-7} Routes
> 3 KA3VSP-7 192 3
> 3 N3MEL-7 192 6
> 3 N9PMO-2 192 5
> 3 NS2B-7 192 3
> 3 PE1RRR-7 192 6
> 3 PE1RRR-5 192 2
:>c ka3vsp
:>d
SMW:KC3SMW-7} Downlink connect needs port number - C P CALLSIGN

c ka3vsp-7
```

KC3SMW-7 2... 3... 4... 5... 6... 7... 8... Monitor

1:Fm KC3SMW-7 To KC3SMW <REJ P/F R3 >[05:35:18]
1:Fm KC3SMW To KC3SMW-7 <RR P/F R4 >[05:35:18]
1:Fm KC3SMW-7 To KC3SMW <I R3 S4 pid=F0 Len=64 >[05:35:21]
SMW:KC3SMW-7} Downlink connect needs port number - C P CALLSIGN

TALK Link with 1:KC3SMW-7 Buffer: 0 TERM: ON MBX: ON TNC: ON



```
EasyTerm by UZ7HO - Ver 0.49b - Terminal: KC3SMW - MBX: KC3SMW-5
File Settings View Stations About
[Connect] [Disconnect] [Beacon] [YAPP] [MHeard] [Mailbox]

> 3 N9PMO-2 192 5
> 3 NS2B-7 192 3
> 3 PE1RRR-7 192 6
> 3 PE1RRR-5 192 2
:>c ka3vsp
:>d
SMW:KC3SMW-7} Downlink connect needs port number - C P CALLSIGN
SMW:KC3SMW-7} Invalid command - Enter ? for command list
:>c ka3vsp-7
SMW:KC3SMW-7} Connected to NCDE:KA3VSP-7
Welcome to the (NCDE) BPQ Node located in New Castle, DE (FM29ep)
KA3VSP> BBS CHAT CONNECT BYE INFO NODES ROUTES PORTS USERS MHEARD

1:Fm KC3SMW-7 To KC3SMW <I P R4 S0 pid=F0 Len=66 >[05:35:56]
KA3VSP> BBS CHAT CONNECT BYE INFO NODES ROUTES PORTS USERS MHEARD

1:Fm KC3SMW To KC3SMW-7 <RR P/F R1 >[05:35:57]
```

KC3SMW-7 2... 3... 4... 5... 6... 7... 8... Monitor

1:Fm KC3SMW-7 To KC3SMW <I P R4 S0 pid=F0 Len=66 >[05:35:56]
KA3VSP> BBS CHAT CONNECT BYE INFO NODES ROUTES PORTS USERS MHEARD
1:Fm KC3SMW To KC3SMW-7 <RR P/F R1 >[05:35:57]

TALK Link with 1:KC3SMW-7 Buffer: 0 TERM: ON MBX: ON TNC: ON

Being a connected node, you can check the routes table and connect to other nodes using command 'c callsign-#'
For example: c ka3vsp-7

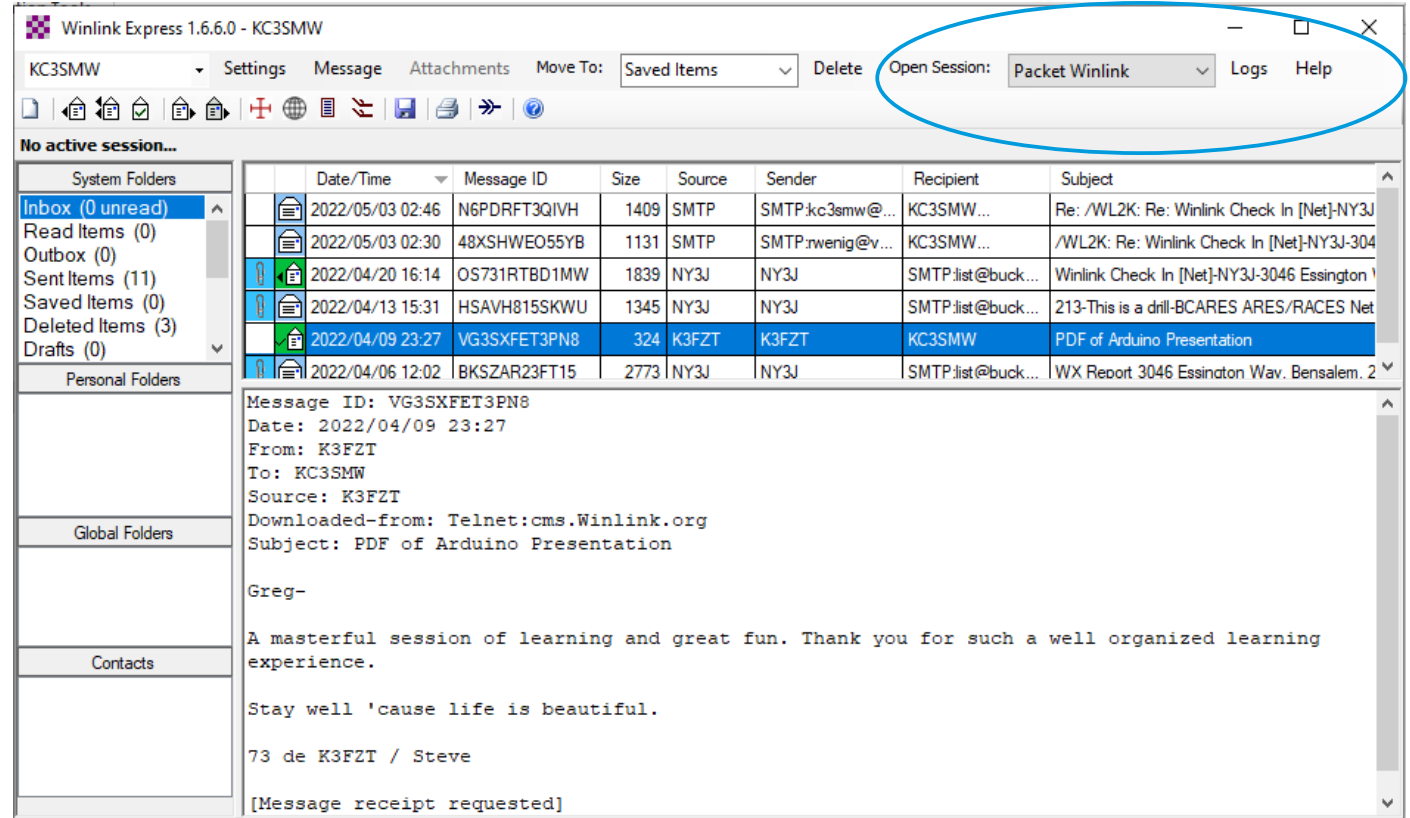
Winlink

In Windows- start your soundmodemTNC and Winlink Express.

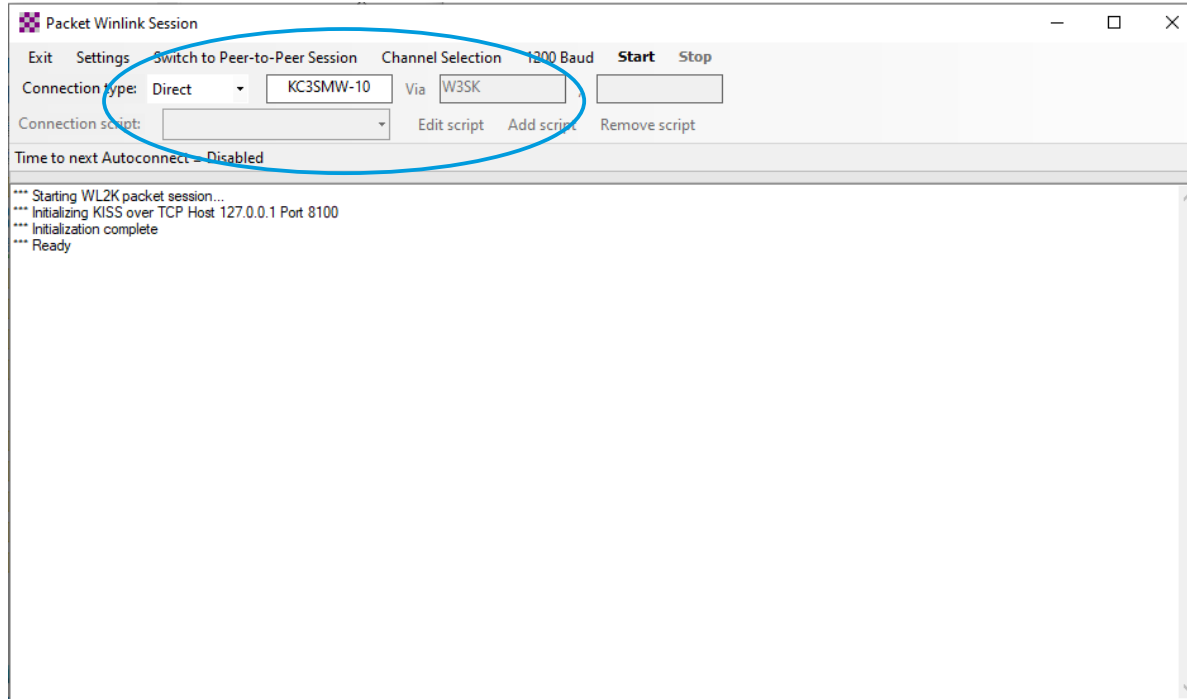
Prepare your mail.

Once ready to send and receive

Next to “Open Session” select ‘Packet Winlink’ and click “Open Session”.



PacketSession (Winlink)



Connection Type will be 'Direct' or 'Digipeater' (the Digipeater option will allow you use the via W3SK digipeater option)

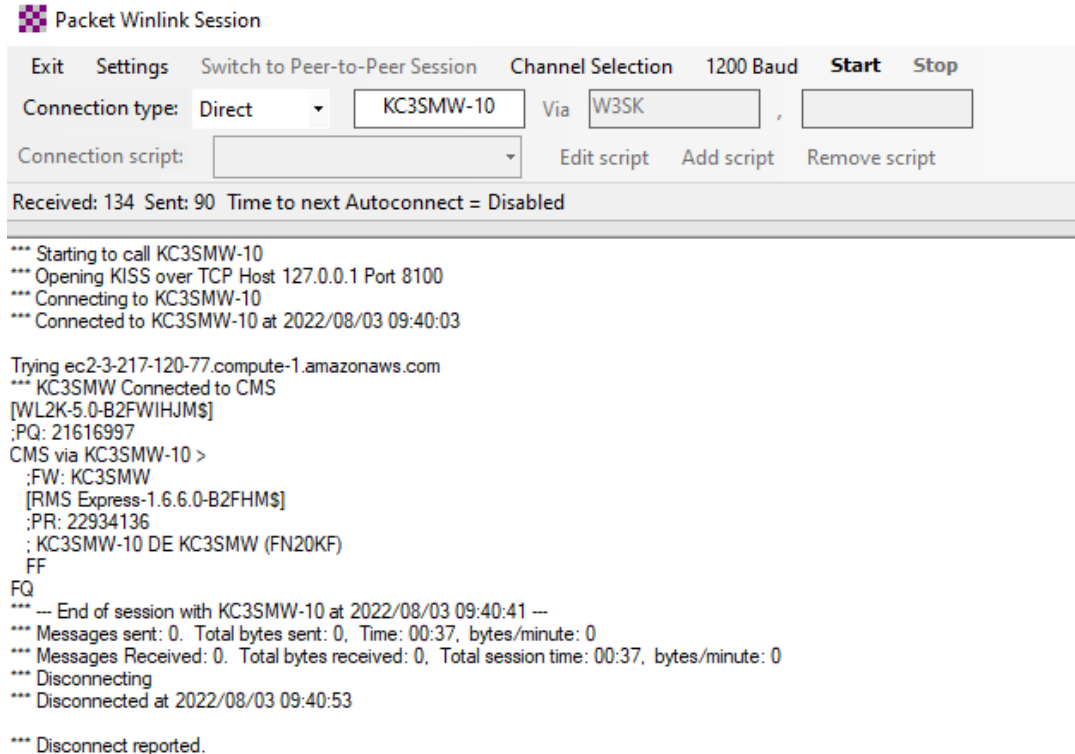
KC3SWM-10 direct or "via" W3SK, will connect you to your Winlink email.

Click Start

Winlink Email Checked

Once started the radios will send packets back and forth and your terminal will display similar info.

Once the “disconnect reported.” line appears you can close the Packet Winlink Session dialog window and read your incoming mail.



The screenshot shows the 'Packet Winlink Session' dialog box. At the top, there are buttons for 'Exit', 'Settings', 'Switch to Peer-to-Peer Session', 'Channel Selection', '1200 Baud', 'Start', and 'Stop'. Below these, the 'Connection type' is set to 'Direct' with a dropdown arrow. Next to it is a text box containing 'KC3SMW-10'. To the right, 'Via' is followed by a text box containing 'W3SK'. Below this, 'Connection script:' is followed by a dropdown arrow. To the right of the dropdown are three buttons: 'Edit script', 'Add script', and 'Remove script'. A status bar at the top of the terminal area shows 'Received: 134 Sent: 90 Time to next Autoconnect = Disabled'. The terminal window displays the following log:

```
*** Starting to call KC3SMW-10
*** Opening KISS over TCP Host 127.0.0.1 Port 8100
*** Connecting to KC3SMW-10
*** Connected to KC3SMW-10 at 2022/08/03 09:40:03

Trying ec2-3-217-120-77.compute-1.amazonaws.com
*** KC3SMW Connected to CMS
[WL2K-5.0-B2FWIHJM$]
;PQ: 21616997
CMS via KC3SMW-10 >
;FW: KC3SMW
[RMS Express-1.6.6.0-B2FHM$]
;PR: 22934136
; KC3SMW-10 DE KC3SMW (FN20KF)
FF
FQ
*** --- End of session with KC3SMW-10 at 2022/08/03 09:40:41 ---
*** Messages sent: 0. Total bytes sent: 0, Time: 00:37, bytes/minute: 0
*** Messages Received: 0. Total bytes received: 0, Total session time: 00:37, bytes/minute: 0
*** Disconnecting
*** Disconnected at 2022/08/03 09:40:53

*** Disconnect reported.
```

Demonstration