

The logo is a circular emblem with a red outer ring containing the text "EMERGENCY COMMUNICATIONS" at the top and "RURAL RADIO AMATEUR OPERATIONS" at the bottom, separated by two stars. The inner blue circle features a satellite, a laptop, a radio tower, and a lightning bolt. The text "A.C.S." is written in large yellow letters at the bottom of the inner circle.

Pinellas ACS Training

Introduction to Winlink

Part 1

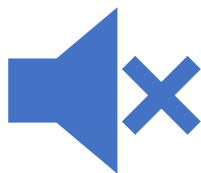
2/2/2022

Mike Drake

WA1RYQ



Zoom Settings



Mute – on/off

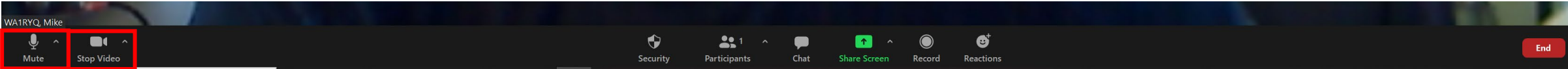


Video – on/off



Name – Call sign and First name

Right click on your current name



Meeting is being recorded



Agenda



- Introduction
- Winlink Overview and Installation
- Winlink Express Operation
- Digital Communications

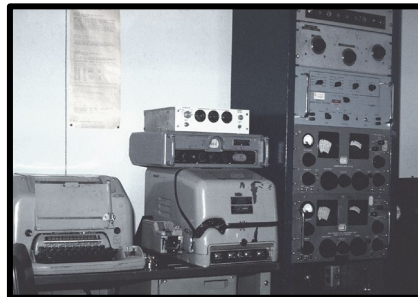


Introduction

Instructor



- Licensed since 1973
- Amateur Extra Class
- Army MARS
 - 1973 - 1975
- Navy MARS
 - 1977 – 1985
 - Adak Alaska, Augsburg West Germany, Pensacola FL
- University of Florida
- Retired – E-Systems/ECI – Raytheon
 - Systems Engineering – Communications, and Data Fusion Systems
- Training Officer – Pinellas ACS

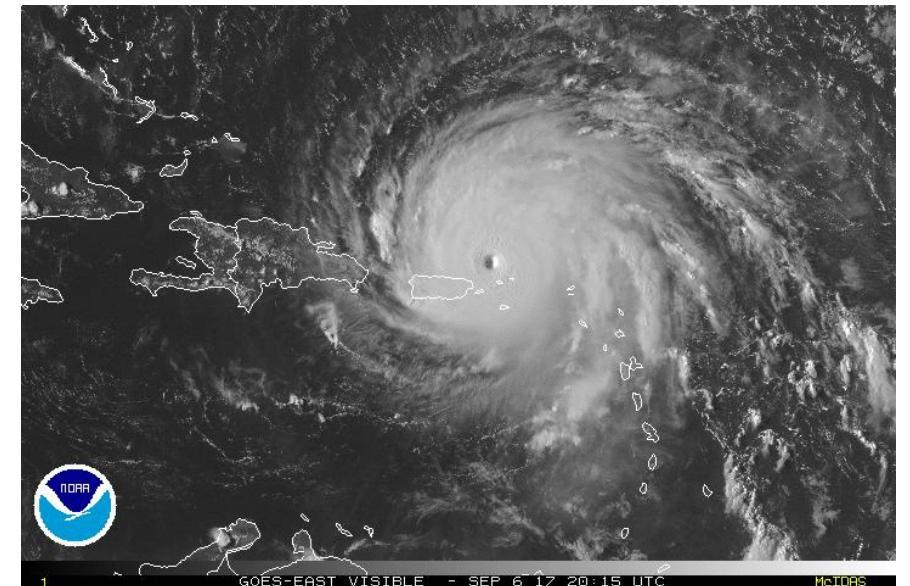




Introduction

PACS Training Objectives

- Support Pinellas ACS Mission
 - Augment Government communications during times of emergency when normal communication systems have sustained damaged, are being overtaxed, or backup radio operators are required.
 - Tropical Storms and Hurricanes
 - Non-Tropical Weather Events
 - Public Safety Communication Emergencies
 - Localized Emergencies
 - Regional / National Emergency



Hurricane Irma



Introduction

Winlink Training Objectives

- Develop minimum skills needed for digital deployments using Winlink
 - Set-up and configure a Winlink station
 - Create, send, and receive messages using Winlink Standard Template Forms
 - Internet
 - VHF/UHF radios
- Assumptions
 - No previous Winlink experience is required.
 - Computer with internet access
 - Technician, General, Advanced, or Amateur Extra class Federal Communication Commission (FCC) License.



Introduction

Pinellas County ACS/ARES® Winlink Training Plan

- Skills, Rationale, and Training Approach

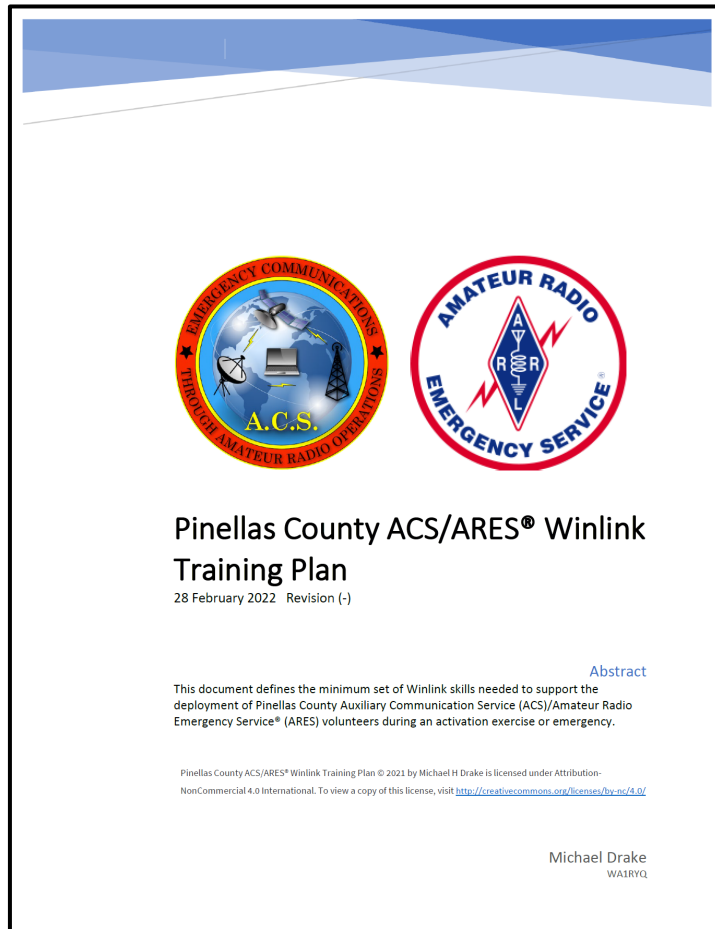
- Five Winlink Skills Sets Defined

- Basic Winlink VHF/UHF Communication Skills
 - Basic Winlink HF Communication Skills
 - Deployment Ready VHF/UHF Communication Skills
 - Deployment Ready HF Communication Skills
 - Advanced HF/VHF/UHF Communication Skills

- Web Site References

- Located on PACS Website:

- <https://www.pcacs.org/training/training-documents/winlink-training/>





Agenda



- Introduction
- Winlink Overview and Installation
- Winlink Express Operation
- Digital Communications



Winlink Overview

Description



“Winlink is a network of amateur radio and authorized government-licensed stations that provides worldwide radio email using radio pathways where the internet is not present. The system is built, operated and administered entirely by licensed “Ham” volunteers. It supports email with attachments, position reporting, weather and information bulletins, and is well-known for its role in interoperable emergency and disaster relief communications. It is capable of operating completely without the internet--automatically--using smart-network radio relays.”



Winlink Overview

Description

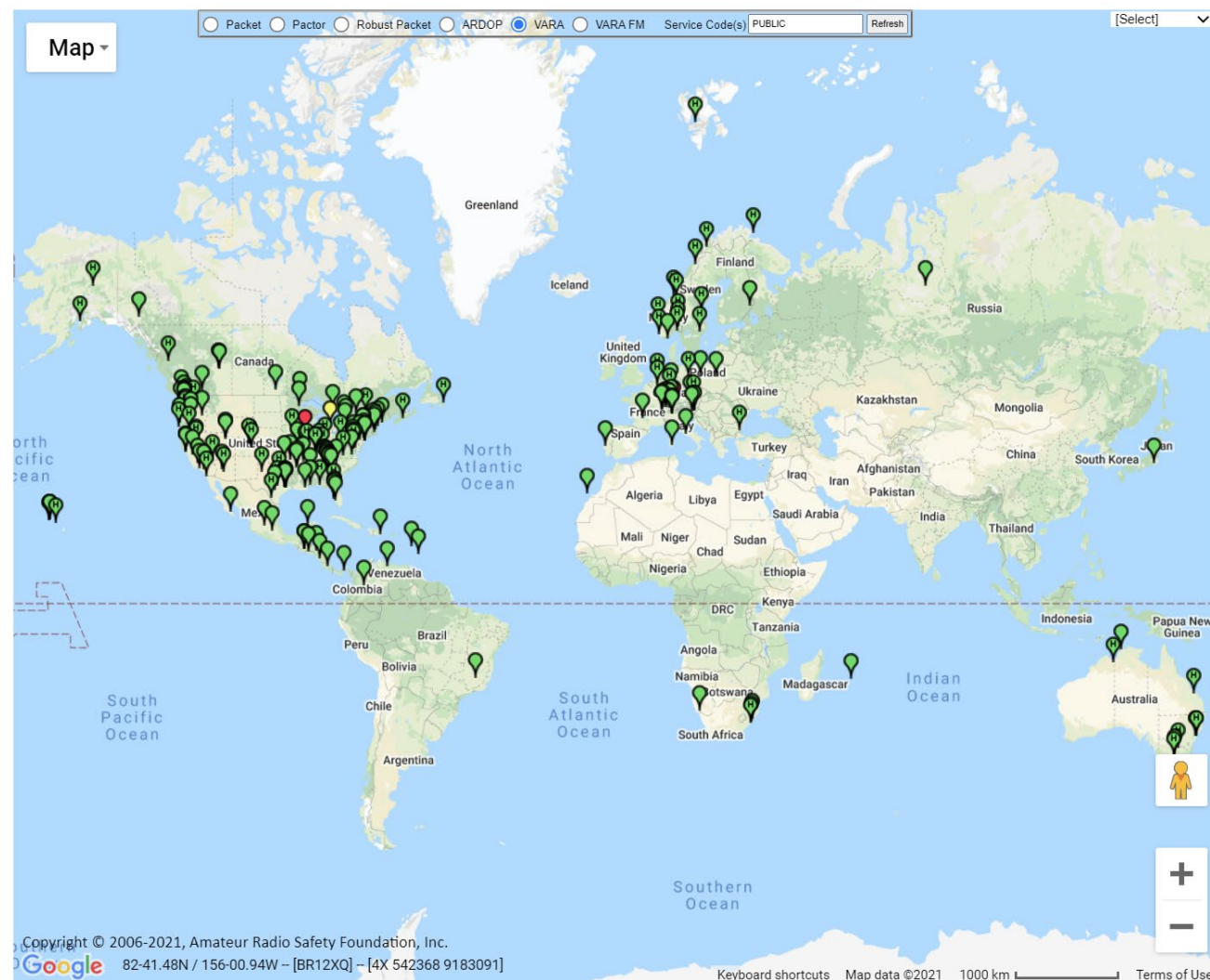


- Reliability, Accuracy and Flexibility
 - High reliability (99.99% availability for 15 years)
 - 100% accurate message transmissions.
 - Radio connection bridge to Internet e-mail
 - Radio-only store and forward without Internet
 - Peer-to-peer connections between radio end-users
- Interoperability: Connect different types of systems
 - Bridge different radio capabilities (VHF/UHF/HF)
 - Bridge protocols: Pactor, ARDOP, Packet, VARA FM, VARA HF
- Geographical dispersion and redundancy for reliability



Winlink Overview

Stations Located Worldwide





Winlink Overview

Description

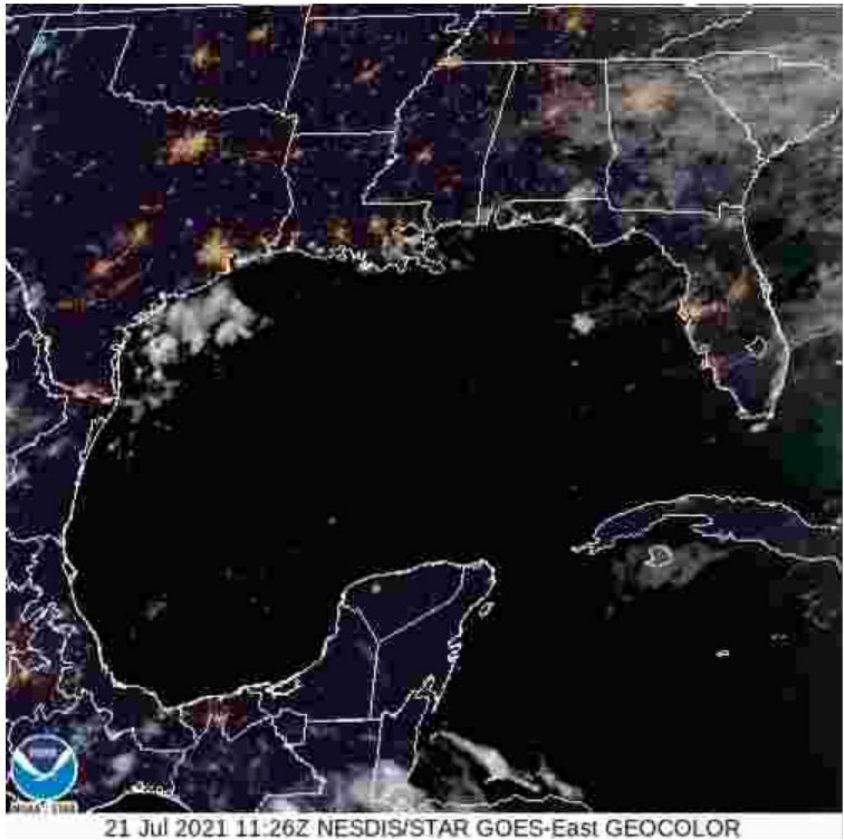
- Standard e-mail format with many features
 - Standard NIMS ICS Forms embedded within program
 - Binary file attachments (pictures, PDF, spreadsheets)
 - Automatic message compression/decompression
 - Whitelist used to control SPAM
- Time independence and frequency agility
- Stores messages for pickup at a later time
- Good operation at most power levels
- Not limited by station-to-station propagation
- Automatic message logging and ICS report generation



Winlink Overview

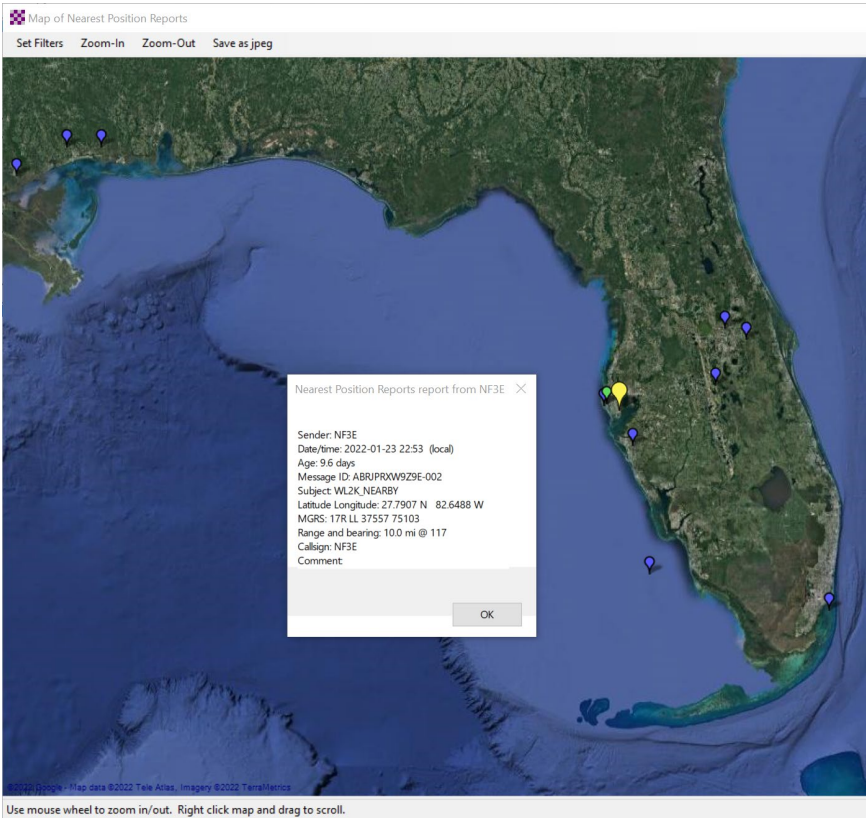
Description

Weather and Information Bulletins



2/2/2022

Position Reports





Winlink Overview

Description

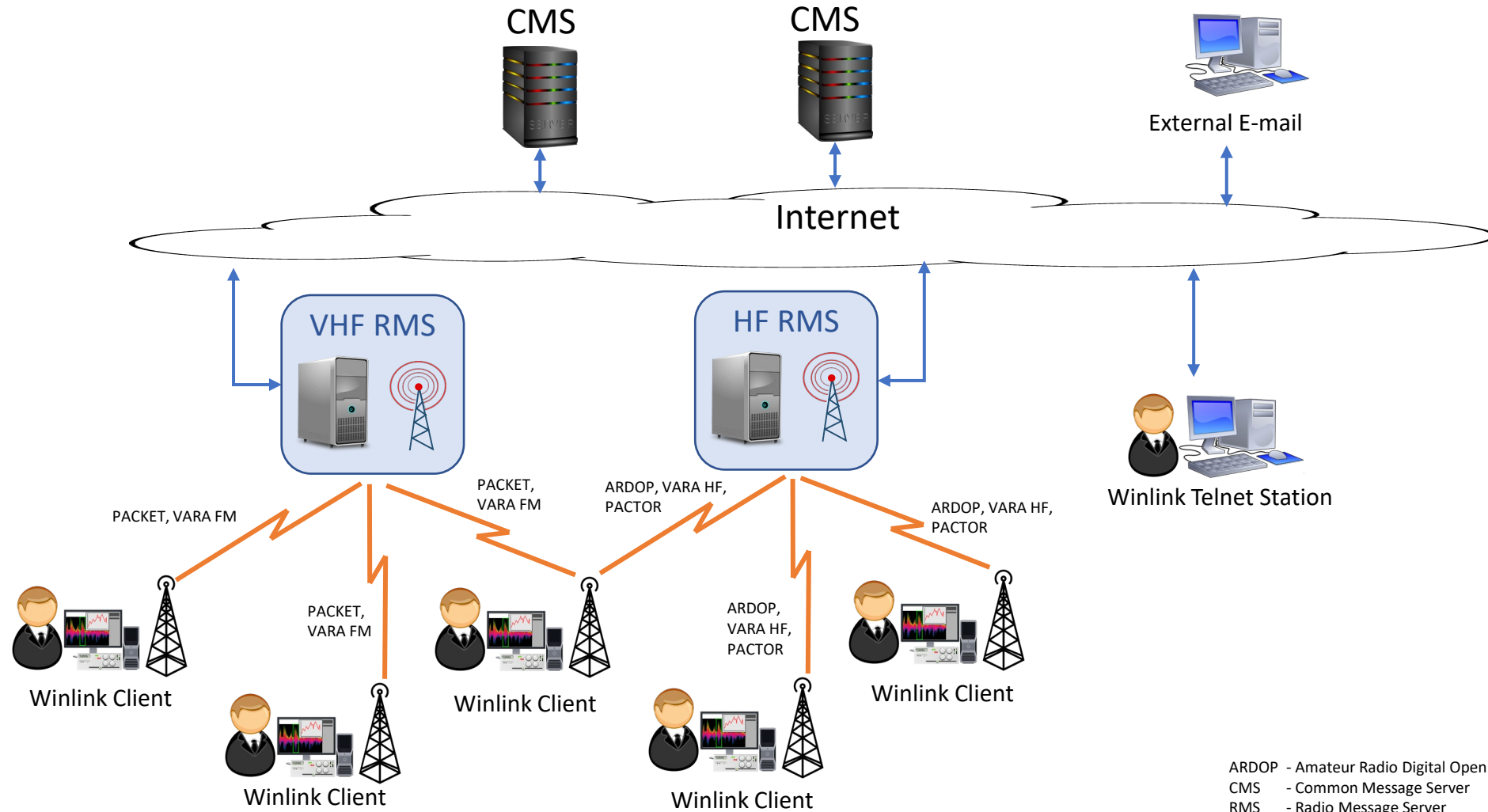


- Wide adoption by EmComm related agencies
 - Amateur Radio Emergency Services (ARRL ARES)
 - Military Auxiliary Radio System (DOD/MARS)
 - Radio Amateur Civil Emergency Services (RACES)
 - National American Red Cross (ARC)
 - Southern Baptist Disaster Relief
 - Salvation Army
 - US Coast Guard
 - SHARES
 - Many Federal, state and local government agencies, world-wide



Winlink Overview

System Architecture



ARDOP - Amateur Radio Digital Open Protocol
CMS - Common Message Server
RMS - Radio Message Server

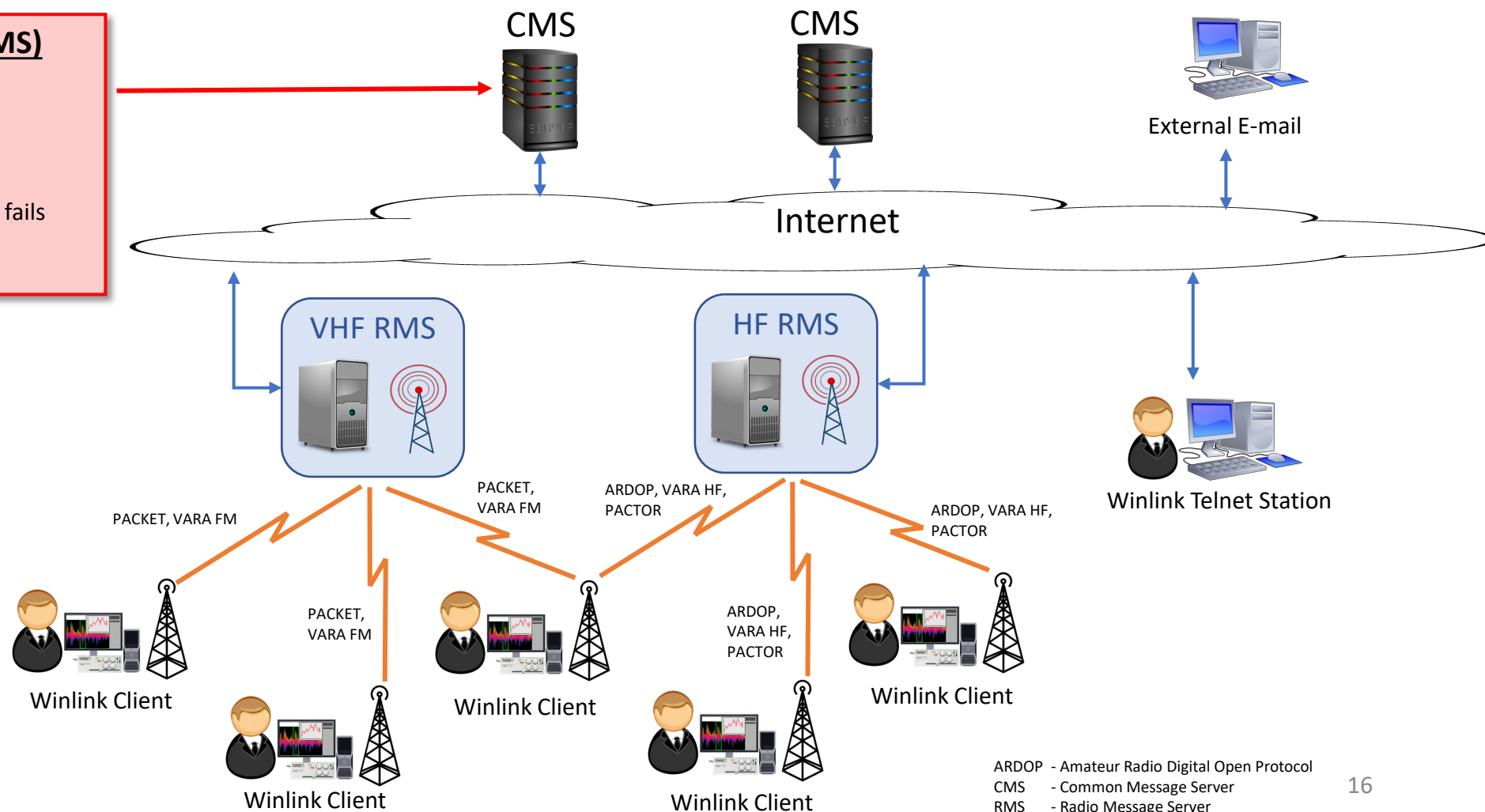


Winlink Overview

System Architecture

Common Message Server (CMS)

- Winlink Email Server
- Redundant Locations
- Hosted by Amazon Web Services (AWS)
- Realtime Backups between servers
- Automatic switchover is primary Server fails

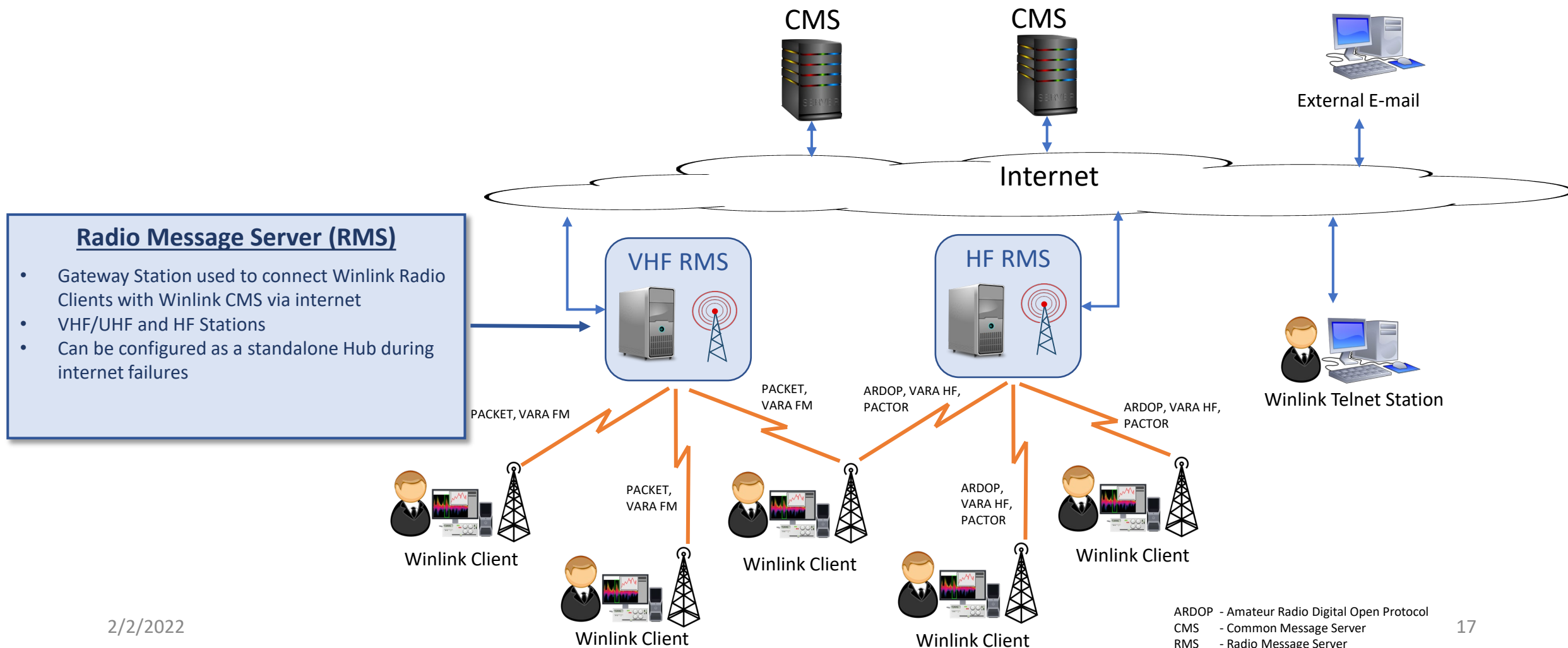


ARDOP - Amateur Radio Digital Open Protocol
CMS - Common Message Server
RMS - Radio Message Server



Winlink Overview

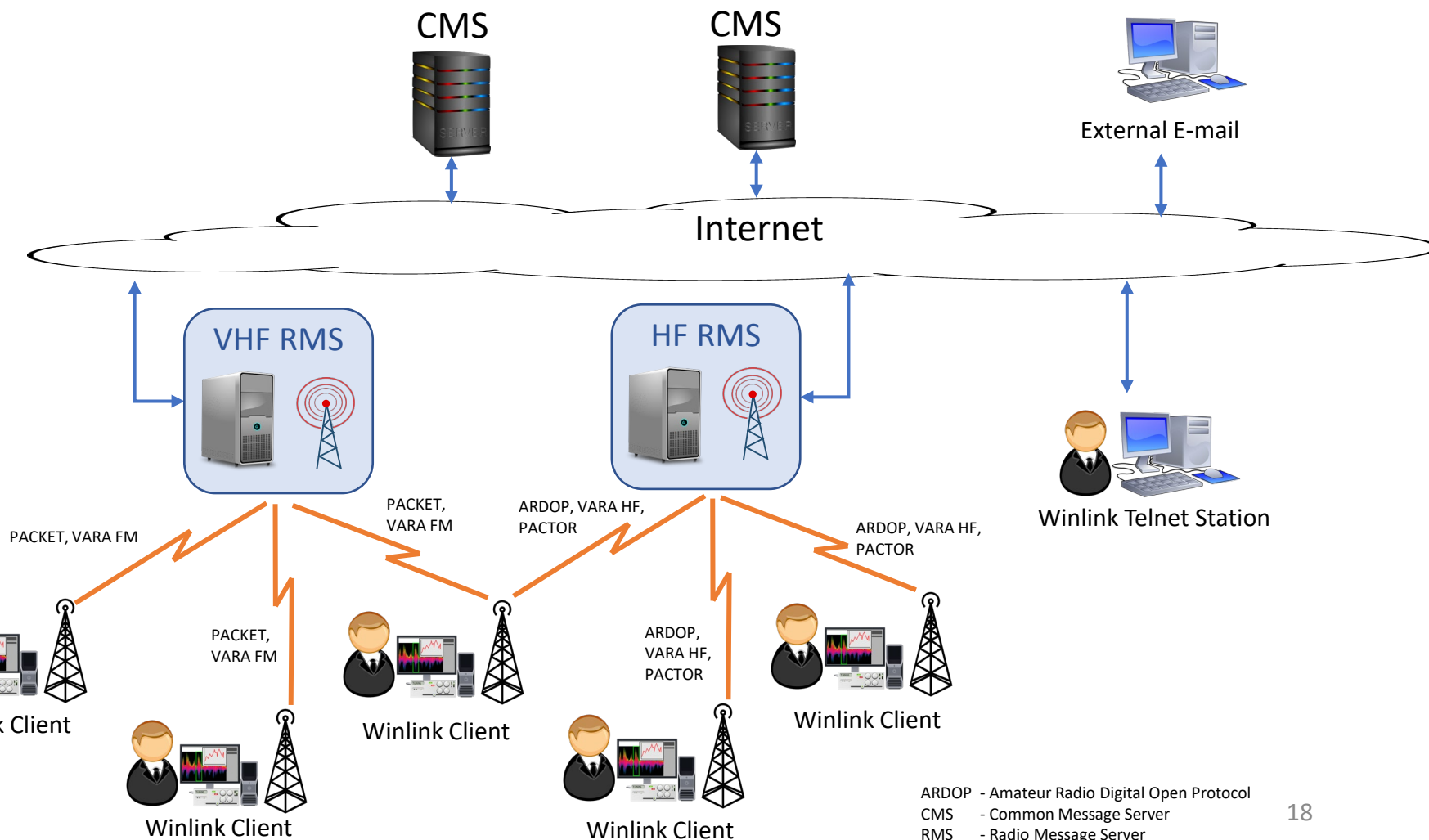
System Architecture





Winlink Overview

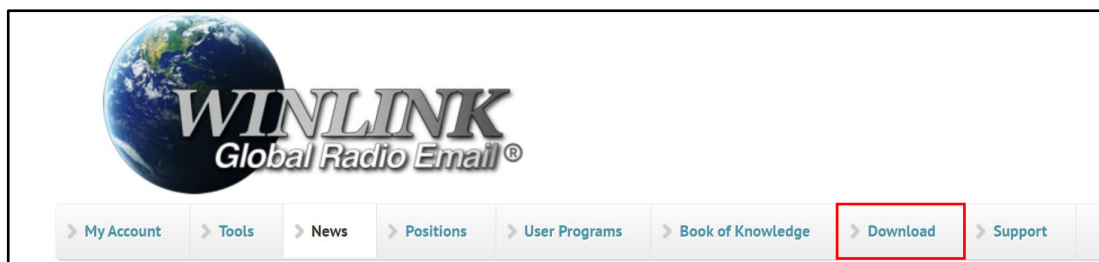
System Architecture



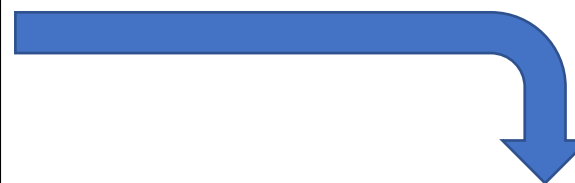


Winlink Express Installation Program Download

- Go to Winlink Web site and Download software



<https://www.winlink.org/>



downloads.winlink.org - /

12/22/2021	1:07 PM	<dir> Sysop Programs
1/18/2022	5:39 PM	<dir> User Programs



downloads.winlink.org - /User Programs/

[\[To Parent Directory\]](#)

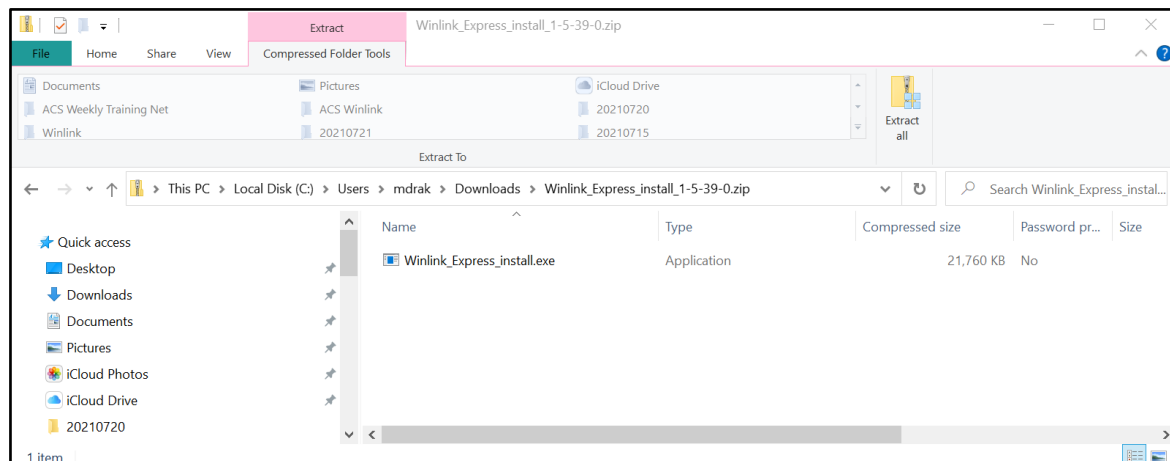
5/21/2018	5:55 PM	626	Latest VARA Modem download site.rtf
7/19/2018	5:23 AM	1846835	Paclink_install_4-3-11-0.zip
5/21/2018	5:55 PM	1132	README_Software_Install_Instructions.txt
11/20/2020	8:22 AM	847697	RMS_Link_Test_install_2-0-24-0.zip
5/21/2018	5:55 PM	12176	SCS_PTC-IIUsb_and_end_of_PTC-IIusb_Iipro_IIex.pdf
1/18/2022	5:40 PM	37766770	Winlink_Express_install_1-6-0-0.zip



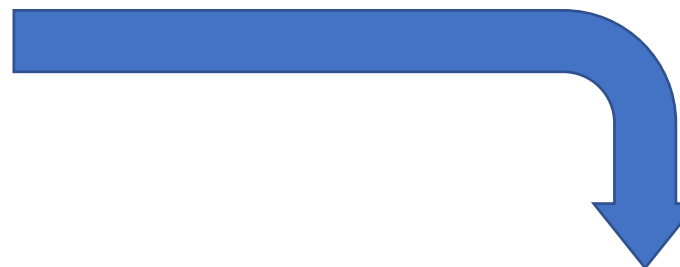


Winlink Express Installation

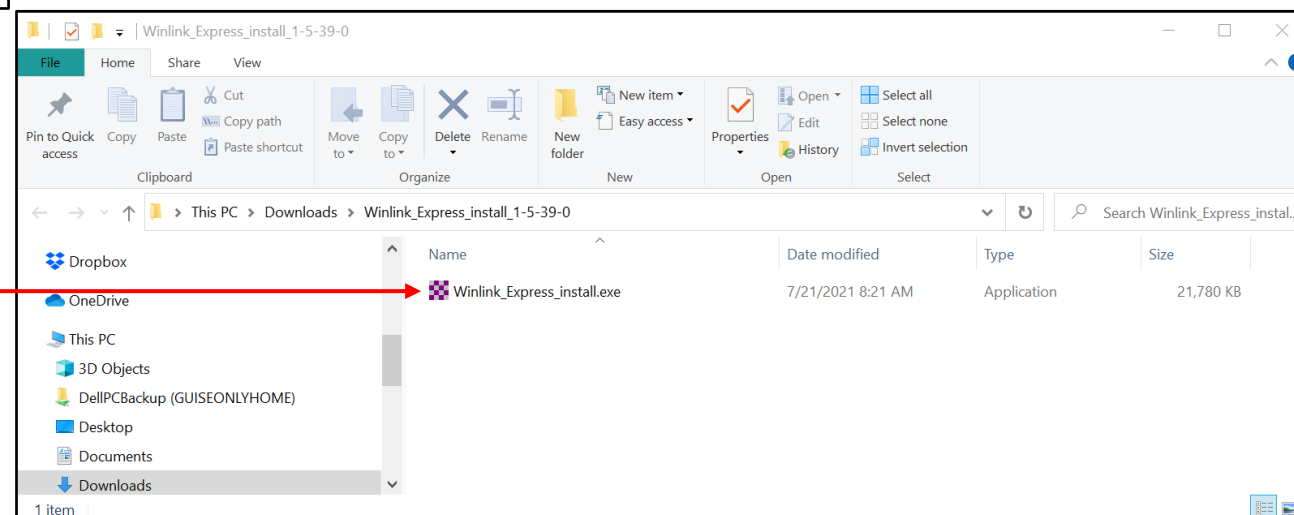
Program Download



Unzip the Downloaded File



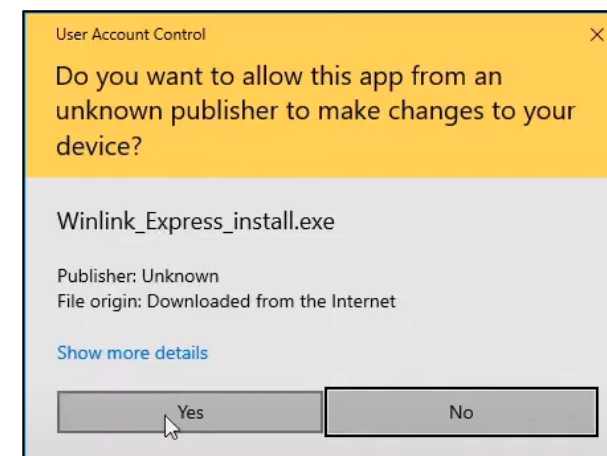
Run the file





Winlink Express Installation

- Warning Pop-up may be displayed
 - Safe if file has been downloaded from Winlink.org
- Follow directions and install in default locations
- Recommend Desktop shortcut
- Run Winlink





Winlink Express Installation Account Set-up

Required Fields

- My Callsign
- My Password (Case Sensitive)
- Password Recovery e-mail
- My Grid Square
- Service Codes

Optional Fields

- Contact Information
- Program Options
- Registration Key

Winlink Express Properties

Call Signs

My Callsign: My Password:
(Case sensitive) ☐ Show password

Callsign suffix (optional): (Used for country code)

Password recovery e-mail:
(Non-Winlink e-mail address where lost password will be sent when requested)

Auxiliary Callsigns and Tactical Addresses

My Grid Square: Lat/Lon to Grid Square

Winlink Express registration key:

Service Codes

(Use PUBLIC for ham call signs. Separate multiple service codes by spaces.)
If you change service codes, you must update the list of channels.

Contact Information (Optional)

Name:
Street address 1:
Street address 2:
City:
State/Province:
Country:
Postal code:
Web Site URL (optional):
Phone number:
Non-Winlink e-mail:

Additional information (optional):

Recalculate HF path quality if SFI changes more than:

Keep logs for weeks. Keep deleted messages for days.

☒ Display list of pending incoming messages prior to download
☒ Warn about connections to stations holding messages
☒ Allow diagnostic information to be sent to the Winlink Development Team
☒ Automatically install field-test (beta) versions of Winlink Express

Click the Update Button

Winlink Account must be created within the Winlink Program



Winlink Express Installation Registration



- Registration to your callsign is voluntary
- Supports Winlink system and all ARSFI projects
- Program will periodically display a registration reminder screen.
 - You can click a button to be reminded later and continue use the program without registering.
- If you register your callsign (Approximately \$24)
 - You will receive a hexadecimal key linked to your call sign
 - Enter key on the setup screen
 - Once your registration key has been entered, the registration reminder will not display.

Winlink Express Registration

Winlink Express is made possible through the Amateur Radio Safety Foundation Inc. Your registration of Winlink Express and support for the ARSF makes the Winlink system possible. Registering Winlink Express also registers your callsign to use the Winmor TNC.

Registration Site URL (click):
<http://www.arsfi.org/express.aspx>

Enter Registration Key

Call Sign: WA1RYQ

Registration Key:



Agenda



- Winlink Overview and Installation
- Winlink Express Operation
- Digital Communications



Winlink Express Operation

Create and Send a Message via Telnet

Winlink Express 1.5.39.0 - WA1RYQ

WA1RYQ Settings Message Attachments Move To: Saved Items Delete Open Session: Telnet Winlink Logs Help

New Message (points to the envelope icon in the toolbar)

Reply to Message (points to the reply icon in the toolbar)

No active session...

System Folders

- Inbox (20 unread)
- Read Items (72)
- Outbox (0)
- Sent Items (56)
- Saved Items (0)
- Deleted Items (36)
- Drafts (1)
- Inbox

Personal Folders

- 2021-ARC-EXERCISE (9)

Global Folders

Contacts

- ARC_SOUTHEAST & CARIBBEAN
- BOB_HUGHES
- BRIAN_D_WRIGHT
- BRUCE_C_KREUTZER
- CLAYTON_PARROTT
- DAVE_BYRUM
- DOUG_WILLIAMS
- ED_MORGAN
- GARRY
- GERRY_POLLACK
- JIM_WEDLAKE
- JULIE_CHALHOUB
- KEVIN_A_WALKER
- LARRY_RUEGGER

Date/Time	Message ID	Size	Source	Sender	Recipient	Subject
2021/07/21 11:42	G7P1GIU0CS03	16074	SYSTEM	SERVICE	WA1RYQ	INQUIRY - https://cdn.star.nesdis.noaa.gov/GOES16/ABI/SECTOR/cgl/GEOCOLOR/600x60
2021/07/21 11:39	2LSKX311UN93	13523	SYSTEM	SERVICE	WA1RYQ	INQUIRY - https://cdn.star.nesdis.noaa.gov/GOES16/ABI/SECTOR/gm/GEOCOLOR/500x500
2021/07/21 11:39	GAIXNBNU7YSI	2080	SYSTEM	SERVICE	WA1RYQ	INQUIRY - http://www.celestrak.com/NORAD/elements/noaa.txt
2021/07/21 11:37	800J5JDAXN6S	1419	SYSTEM	SERVICE	WA1RYQ	INQUIRY - https://tgftp.nws.noaa.gov/data/raw/fp/fpus62.kmfl.sft.mfl.txt

Message ID: G7P1GIU0CS03
Date: 2021/07/21 11:42
From: SERVICE
To: WA1RYQ
Source: SYSTEM
Downloaded-from: Telnet:cms.Winlink.org
Subject: INQUIRY - <https://cdn.star.nesdis.noaa.gov/GOES16/ABI/SECTOR/cgl/GEOCOLOR/600x60>
Resource URL: <https://cdn.star.nesdis.noaa.gov/GOES16/ABI/SECTOR/cgl/GEOCOLOR/600x60.jpg>
Inquiry ID: GLCURIR.GIF
Attachment: 600x600.jpg
Note: The image file was very large as requested and has been altered to allow processing.

Thanks for using Winlink, an Amateur Radio Safety Foundation sponsored project. For information about Winlink or to manage your Winlink account please visit: <https://www.winlink.org>

For information on how you can help support Winlink and other Amateur Radio Safety Foundation projects please visit: <https://www.arsfi.org>



Winlink Express Operation

Create and Send a Message via Telnet

Enter a new message

Close Select Template ICS 213 Winlink Check-in Attachments **Post to Outbox** Spell Check Save in Drafts

From: WA1RYQ Send as: Winlink Message ☒ Request message receipt Set Defaults

To: KJ4RUS

Cc: WA1RYQ@ARRL.NET

Subject: Testing my new Winlink Account

Attach:

Good Afternoon Clayton! Just testing my new Winlink Account. Please let me know if you receive this message.

Thanks!

Enter a callsign or
internet Email Address

Enter a message Subject

Enter your message

Once the message is complete,
Click the Update Button

CAUTION

- Message content must conform to FCC Part 97 Rules!
 - Message Content – No Privacy
 - Third Party Traffic
 - Business Content
 - Obscene Content
 - Encryption



Winlink Express Operation

Create and Send a Message via Telnet

Winlink Express 1.6.0.4 - WA1RYQ

WA1RYQ Settings Message Attachments Move To: Saved Items Delete Open Session

No active session...

System Folders

- Inbox (9 unread)
- Read Items (91)
- Outbox (1)
- Sent Items (201)
- Saved Items (0)
- Deleted Items (205)
- Drafts (3)

Personal Folders

- 2021-ARC-EXERCISE (9)
- 20211202 PACS Winlink (36)
- 20211215 PACS Winlink (39)
- 20220105 PACS Winlink (26)
- 20220119 PACS Training (1)
- FL Winlink Net (11)

Global Folders

Contacts

- ARC SOUTHEAST & CARIBBEAN
- BOB_HUGHES
- BRIAN_D_WRIGHT
- BRUCE_C_KREUTZER
- CHRISTINE_E_DUEZ
- CLAYTON_PARROTT
- DAVE_BYRUM
- ED_MORGAN
- GARRY_L_POTTS
- GERRY_POLLACK
- JIM_WEDLAKE
- JULIE_CHALHOUB
- KEVIN_A_WALKER
- LARRY RUEGGER

Date/Time Message ID Size

2022/01/28 15:32	ABRJPRXW9Z9E	1
2022/01/28 15:30	L0S6LCKCSD4Q	1
2022/01/25 16:18	G2X2QGGH07GK	1
2022/01/23 06:50	328797R5O4BU	1

Message ID: ABRJPRXW9Z9E
Date: 2022/01/28 15:32
From: SERVICE
To: WA1RYQ
Source: SYSTEM
Downloaded-from: RMS:KJ4RUS-10
Subject: INQUIRY: WL2K_NEARBY

List of users nearby WA1RYQ
Position: 27-50.44N 082-49.70W posted at:
(NOTE: All dates in UTC, distance in nautical miles)

Winlink 2000 Nearby Mobile Users
(Only the latest report for each call within the past 10 days is listed.)

CALL	Dist(nm @ DegT)	POSITION	REPORTED	COMMENT
WA1RYQ	0.0 @ 000	27-50.44N 082-49.70W	2022/01/28 15:28	Test of GPS Position Report capability.
NF3E	10.0 @ 107	27-47.44N 082-38.93W	2022/01/24 03:53	
W3ATR	31.0 @ 144	27-25.20N 082-29.40W	2022/01/19 18:27	
WP4OH	71.0 @ 079	28-03.18N 081-30.61W	2022/01/27 03:30	PRDOGS kp4dog@gmail.com
N4BUT	89.5 @ 057	28-38.29N 081-23.89W	2022/01/19 20:27	
KA9ZRZ	98.0 @ 065	28-31.45N 081-08.71W	2022/01/27 19:12	
AG0K	110.1 @ 165	26-04.25N 082-17.04W	2022/01/27 00:42	QTH LOCATION WX 54f CLOUDY
K04RHC	192.5 @ 132	25-40.93N 080-10.16W	2022/01/24 13:38	
KK4ZFT	285.6 @ 351	32-32.54N 083-41.11W	2022/01/22 21:44	
WK4PCH	289.1 @ 349	32-34.44N 083-52.23W	2022/01/20 15:55	Posting position report for Peach County EOC. GPS not working in this building.
WY4X	289.4 @ 349	32-34.45N 083-54.00W	2022/01/23 15:46	
WV5Q	349.5 @ 299	30-30.27N 088-45.79W	2022/01/19 23:16	WV5Q DON VANCELEAVE JACKSON MS HF FACTOR 3
KC4WSK	361.3 @ 015	33-37.98N 080-54.64W	2022/01/22 13:02	I am here.
AE5MI	368.3 @ 297	30-30.31N 089-09.75W	2022/01/27 01:38	
K4LLE	375.0 @ 011	33-57.70N 081-21.08W	2022/01/25 13:15	Vara FM P2P Digipeater Station on air most of the time. Gilbert SC 145.530 high
antenna 97'				
K4OFV	381.5 @ 348	34-03.17N 084-24.63W	2022/01/26 16:33	
W1GTT	387.3 @ 012	34-09.31N 081-15.59W	2022/01/27 02:12	"A diversity of modes is essential to an effective EMCOMM system!"

Recipient Subject

WA1RYQ	INQUIRY: WL2K_NEARBY
WA1RYQ	Duplicate Position Report
WA1RYQ	MICHAEL, FL WL Net Report for 1/25/22 + No Name Change
AA1AO...	Call For Check-Ins - YCARES Winlink Net - Jan 23, 2022 - Session 191

One Message in the Outbox

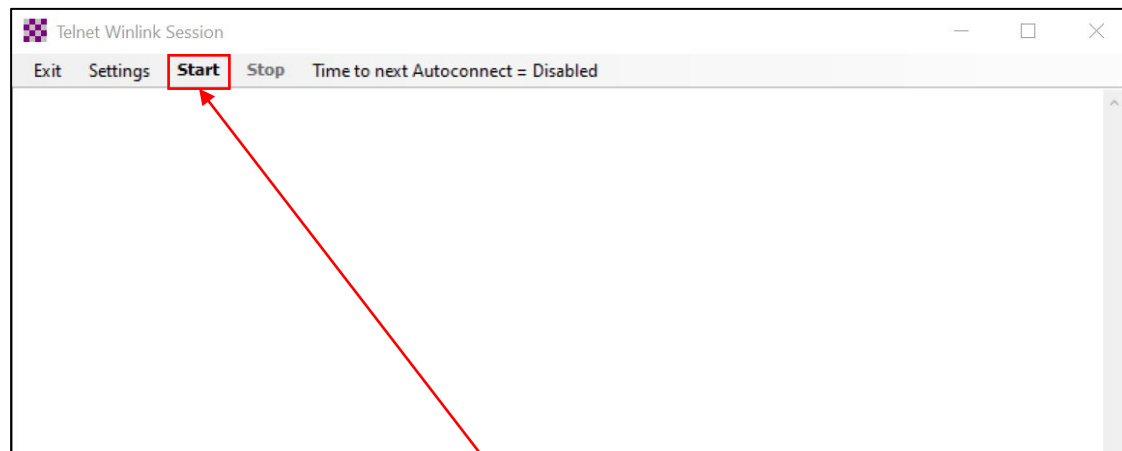
Step 1: Winlink Session Type
Select "Telnet Winlink"

Step 2: Open Winlink Session

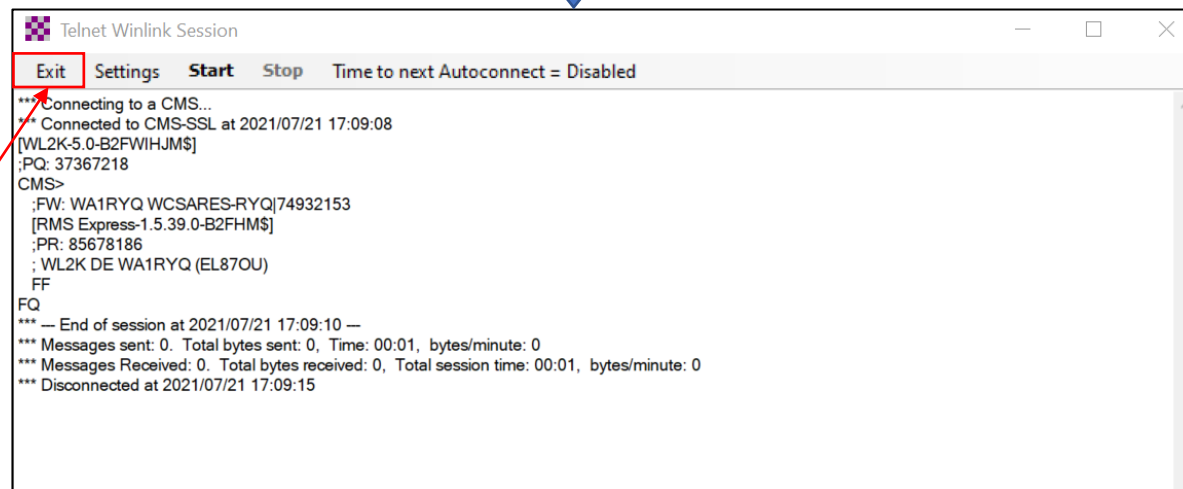


Winlink Express Operation

Create and Send a Message via Telnet



Step 3: Depress the **Start** Button



Step 4: Depress the **Exit** Button

Message has been Sent!



Agenda

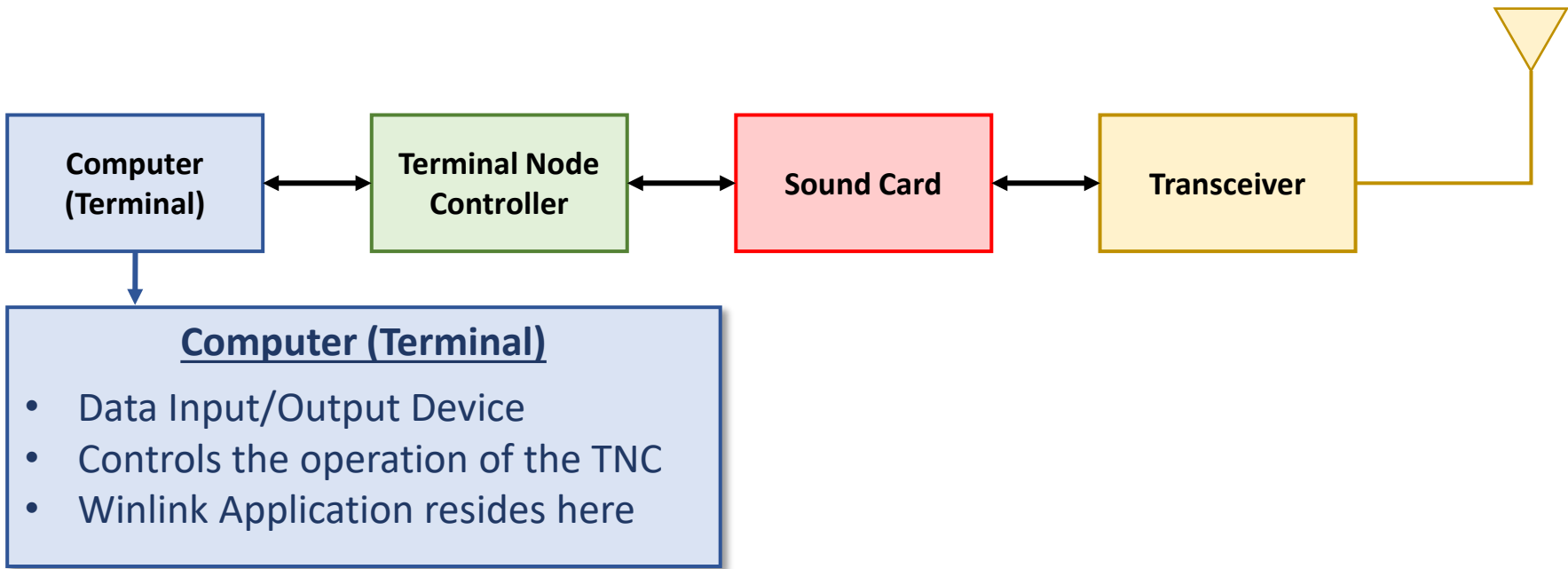


- Winlink Overview and Installation
- Winlink Express Operation
- Digital Communications



Digital Communications

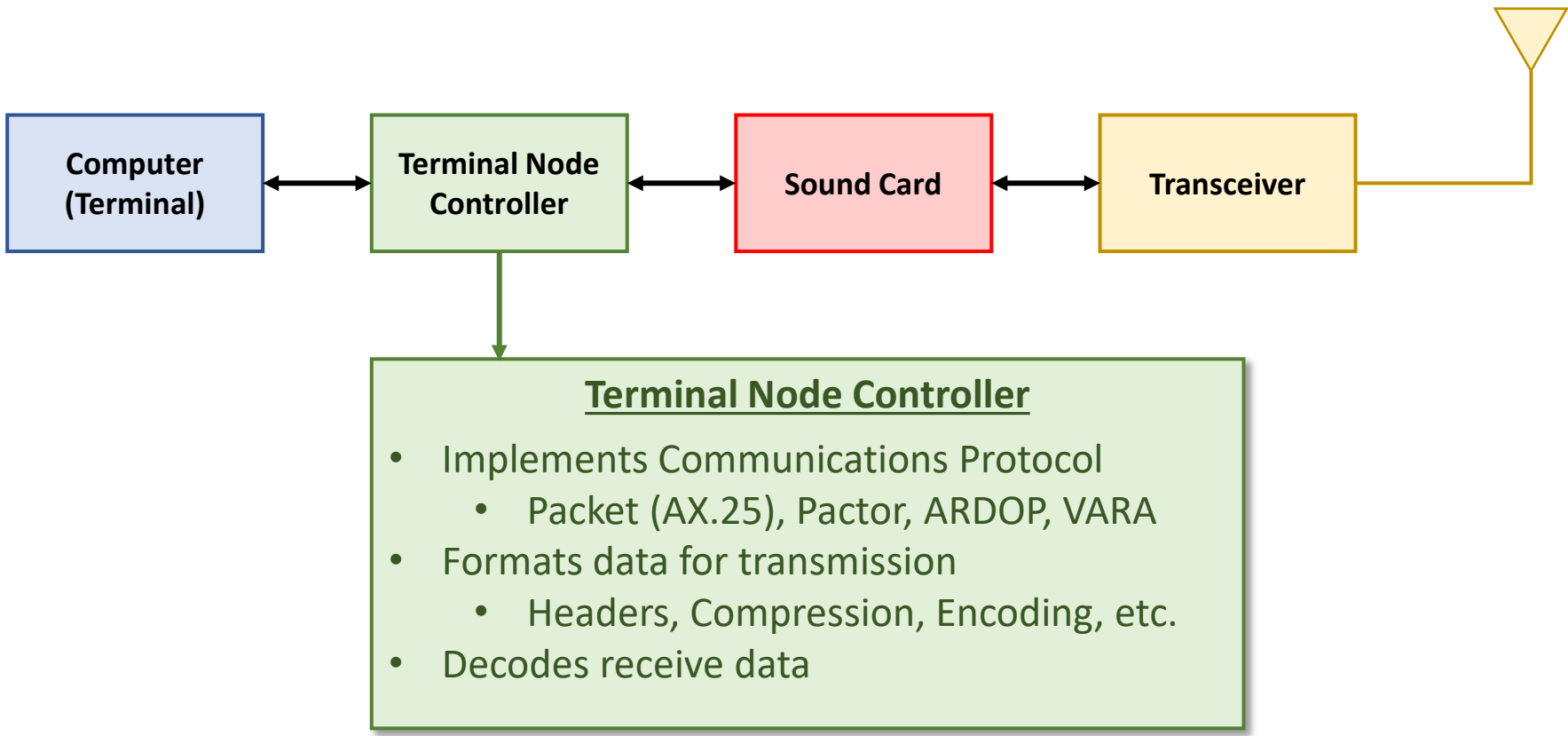
Functional Description





Digital Communications

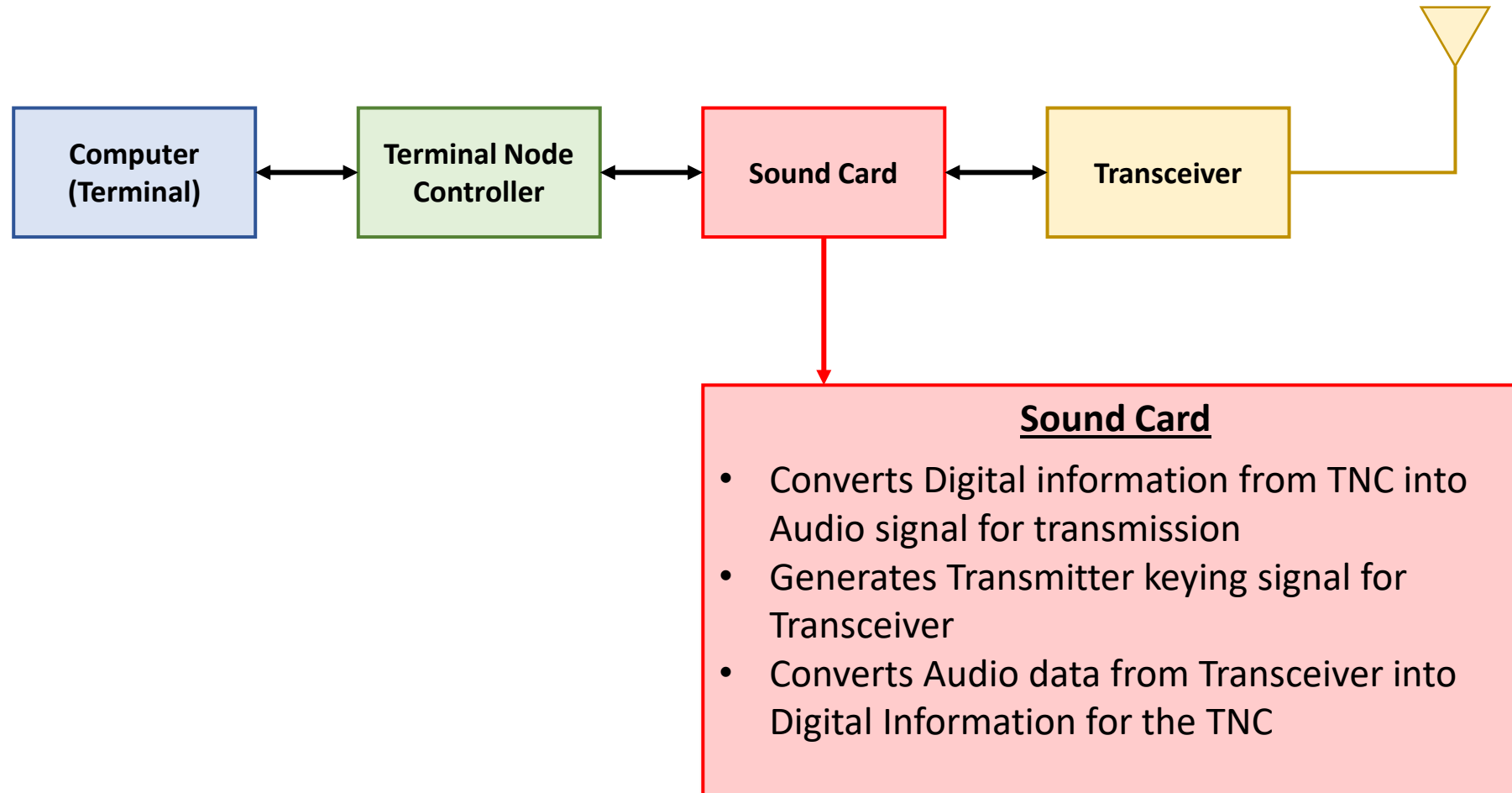
Functional Description





Digital Communications

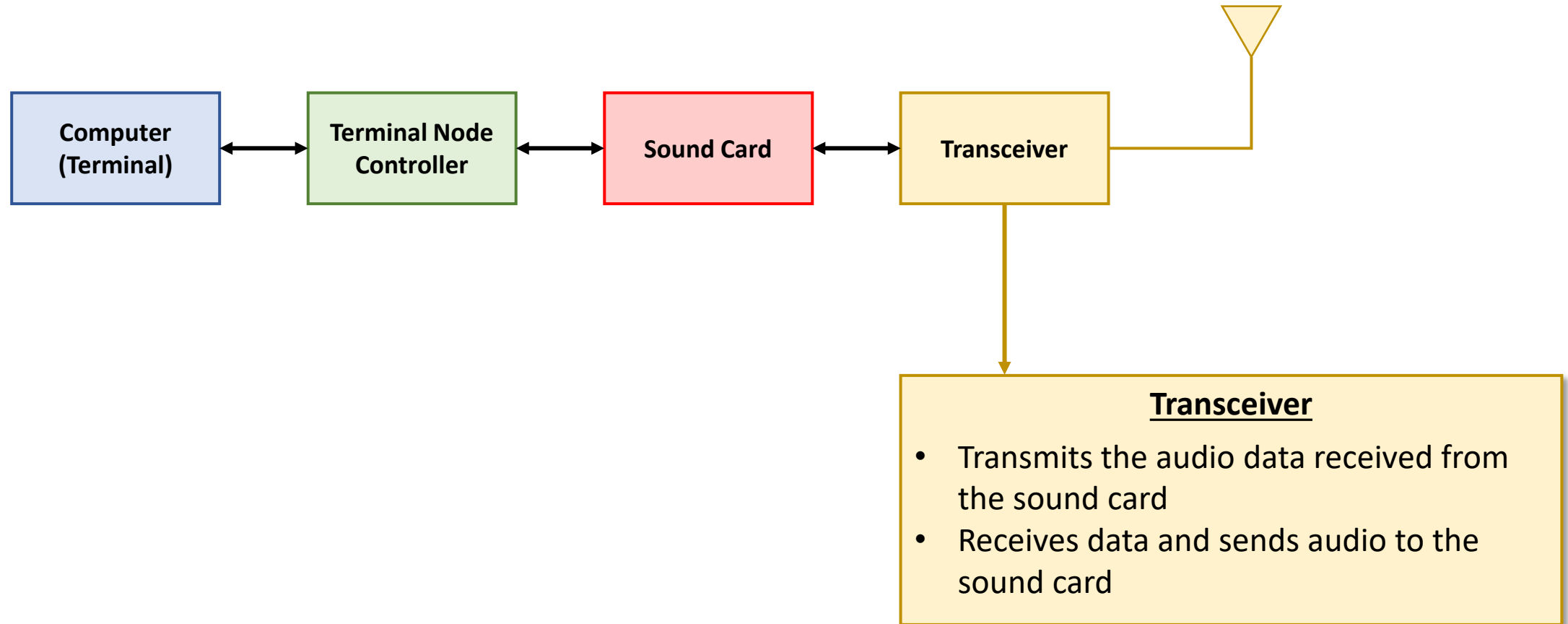
Functional Description





Digital Communications

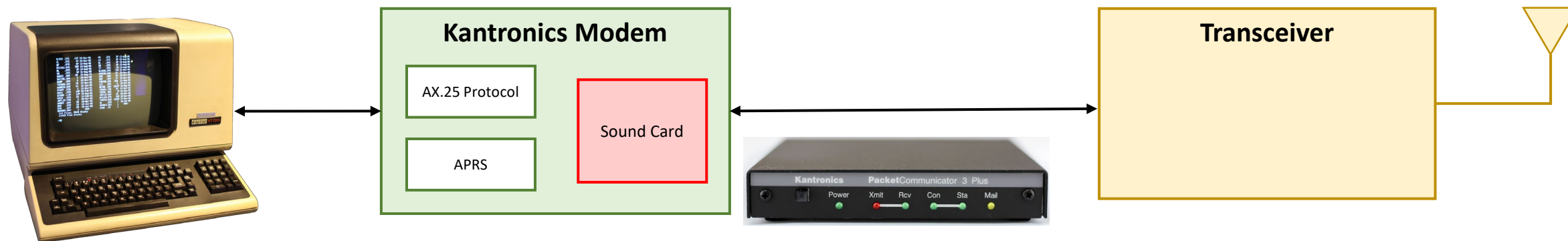
Functional Description





Digital Communications

Functional Description – Development History

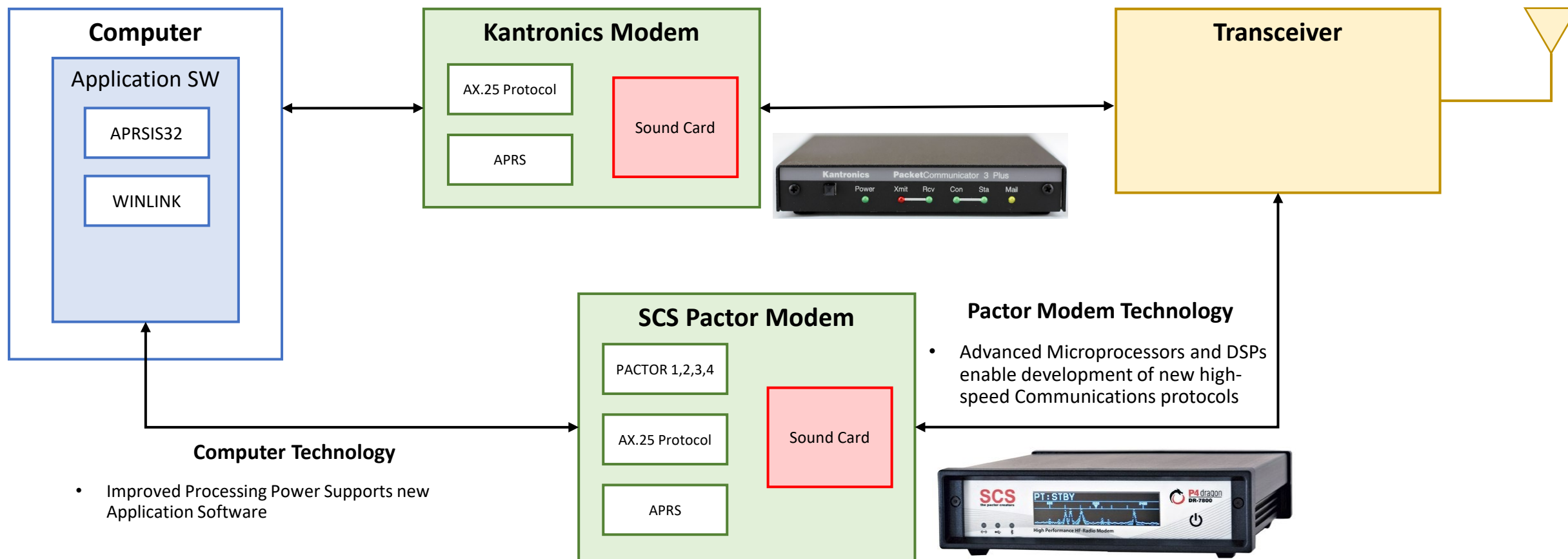


- Dumb Terminal / Microcomputer
 - Input and display unit
 - No application-based computing capability
 - Command line control of TNC
- Terminal Node Controller
 - Dedicated Hardware
 - Manages all aspects of Packet data exchange
 - Packet Assembler/Disassembler



Digital Communications

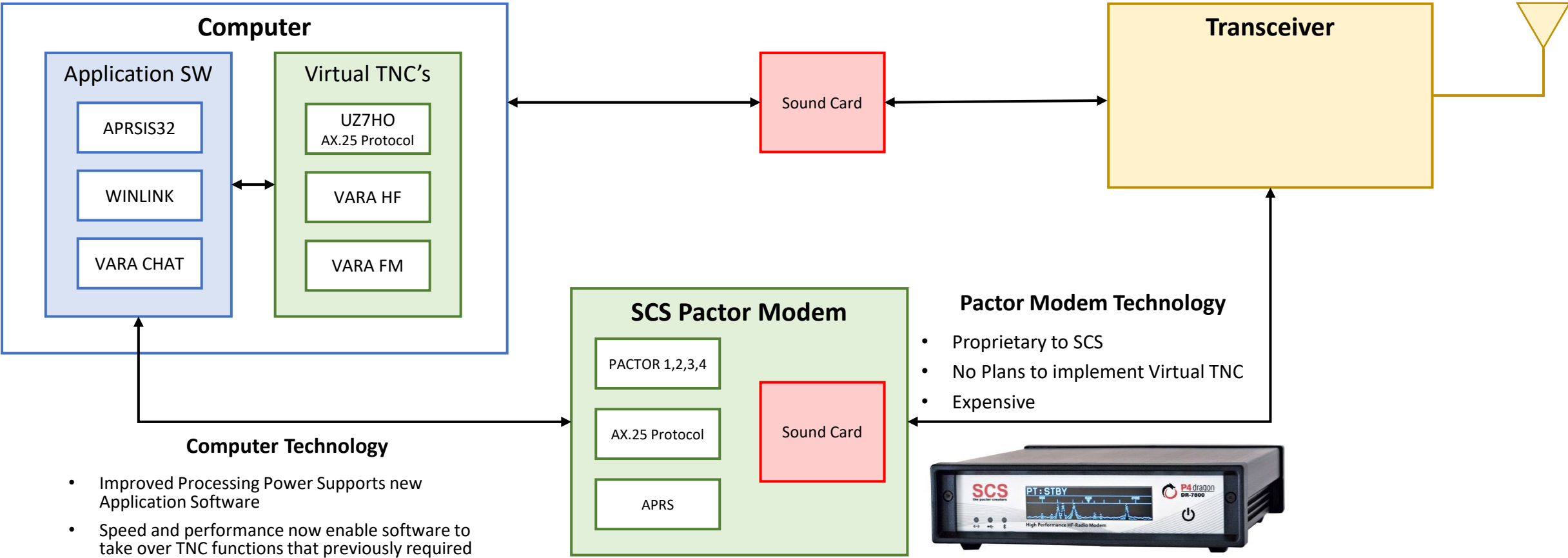
Functional Description – Development History





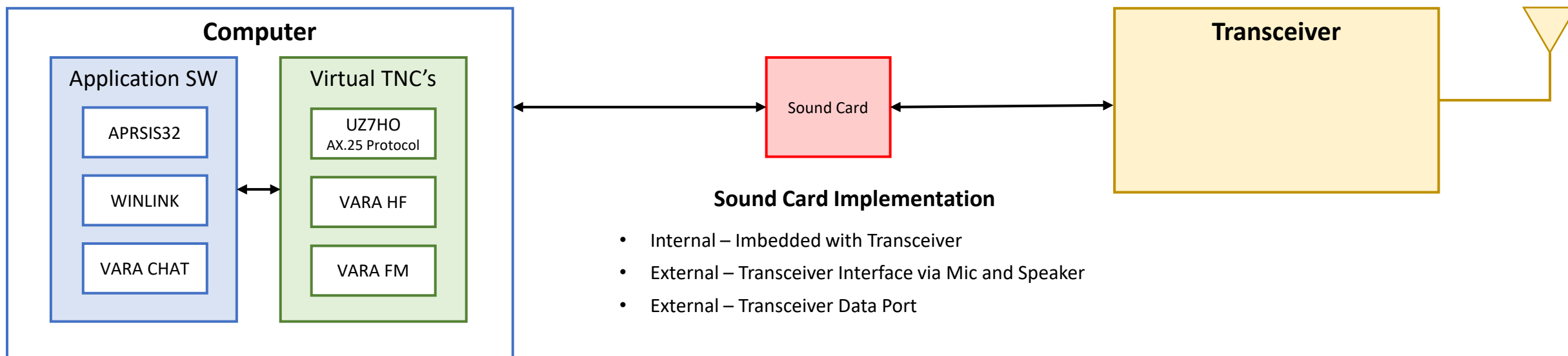
Digital Communications

Functional Description – Development History





Digital Communications Implementation

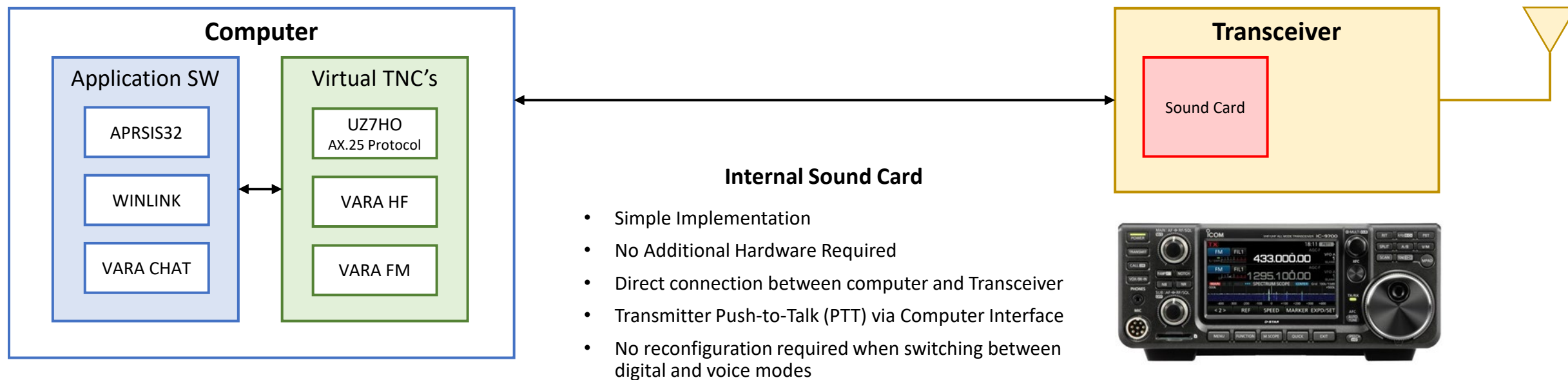


Computer Technology

- Improved Processing Power Supports new Application Software
- Speed and performance now enable software to take over TNC functions that previously required dedicated hardware
- Virtual TNCs – Low or no cost to user

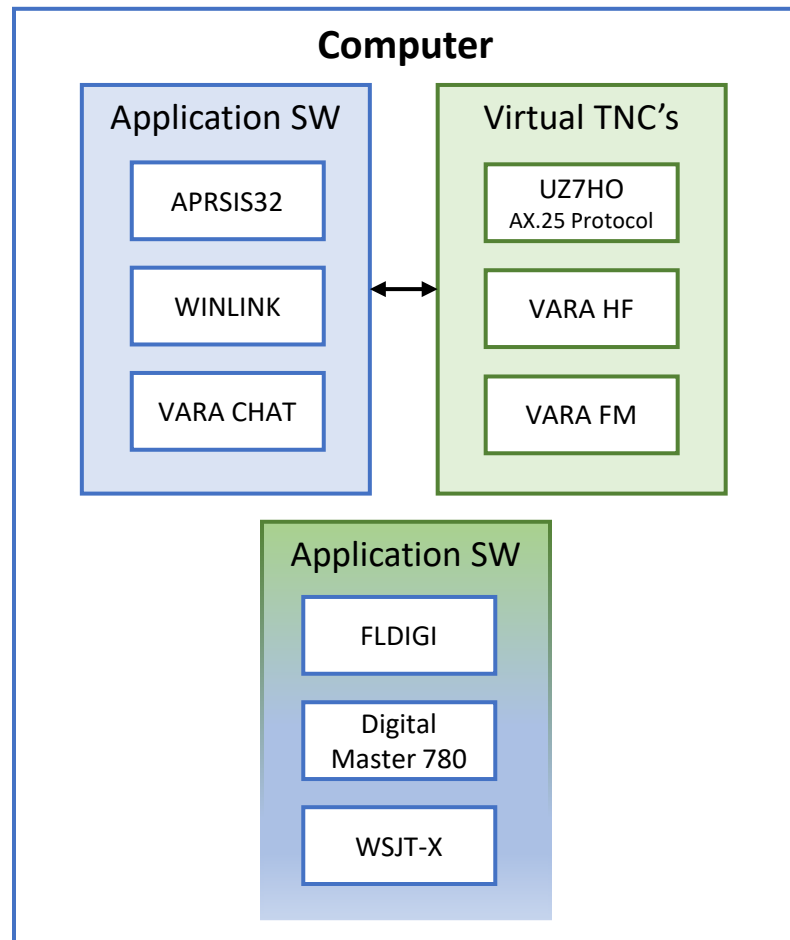


Digital Communications Implementation – Internal Sound Card





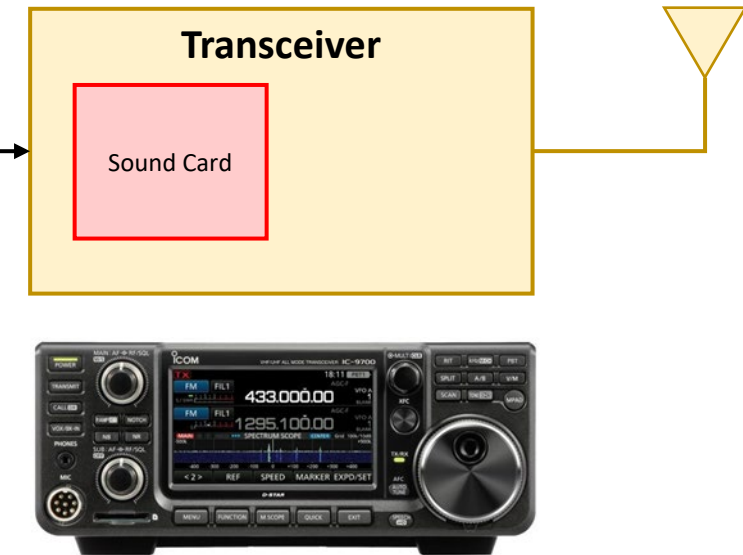
Digital Communications Implementation – Internal Sound Card



Internal Sound Card

- Simple Implementation
- No Additional Hardware Required
- Direct connection between computer and Transceiver
- Transmitter Push-to-Talk (PTT) via Computer Interface
- No reconfiguration required when switching between digital and voice modes

BPSK31, MT63, RTTY, Olivia,
Contestia, FT4, FT8, JT65, WSPR, etc.





Digital Communications

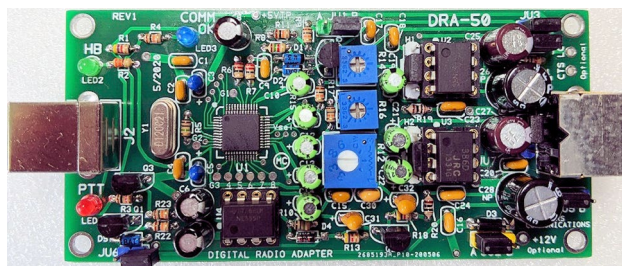
Implementation – External Sound Cards

Many Options Available



Tigertronics Signalink™ USB

- Transformer Isolation
- Easy to Configure
- Hardware and Radio Cable Less than \$150
- Connects to Radio Data Port or Mic/Speaker
- Newer Design Support VARA Wide



Masters Communications

- DRA Series (DRA-50 Shown)
- Purchased as a kit or prebuilt and tested
- Kit and Case \$70; Assembled, Tested, with Case \$100
- Wide Audio Range support VARA Wide
- HeartBeat monitor to prevent stuck PTT
- Best suited for connection to radio data port



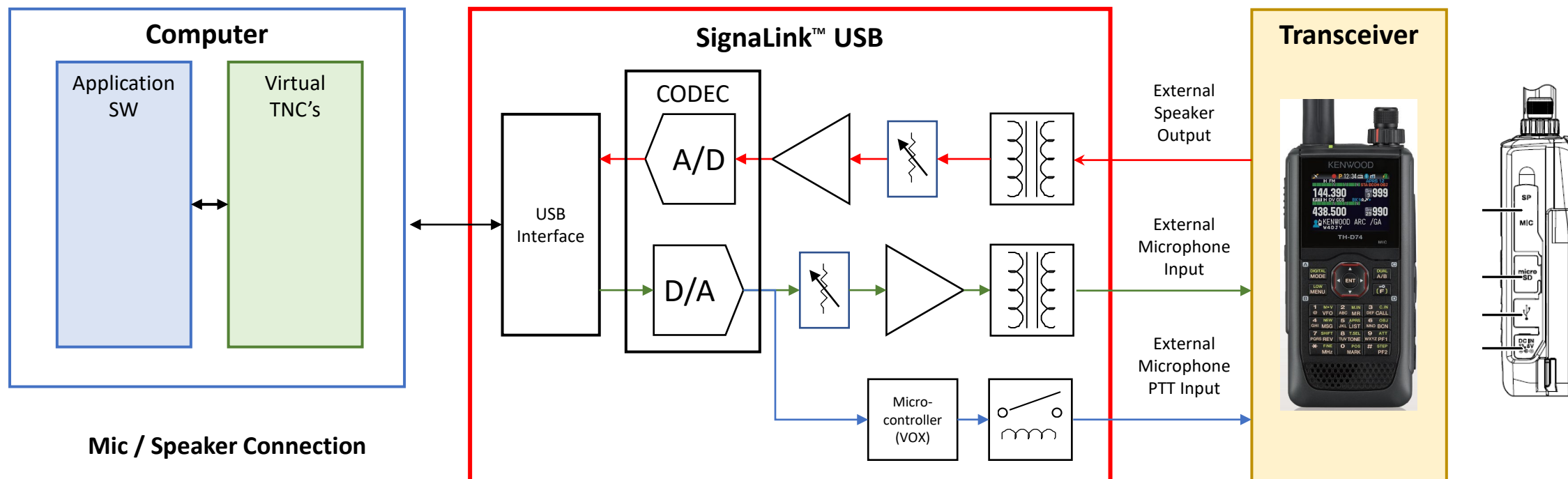
Repeater Builder RIM-Lite V2

- Hardware approximately \$60
- Connects to Radio Data Port or Mic/Speaker
- Newer Design Support VARA Wide



Digital Communications

Implementation – External – Mic and Speaker Connection



Mic / Speaker Connection

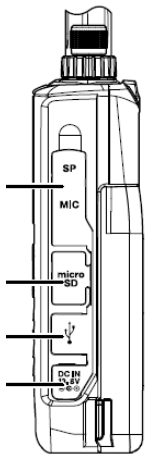
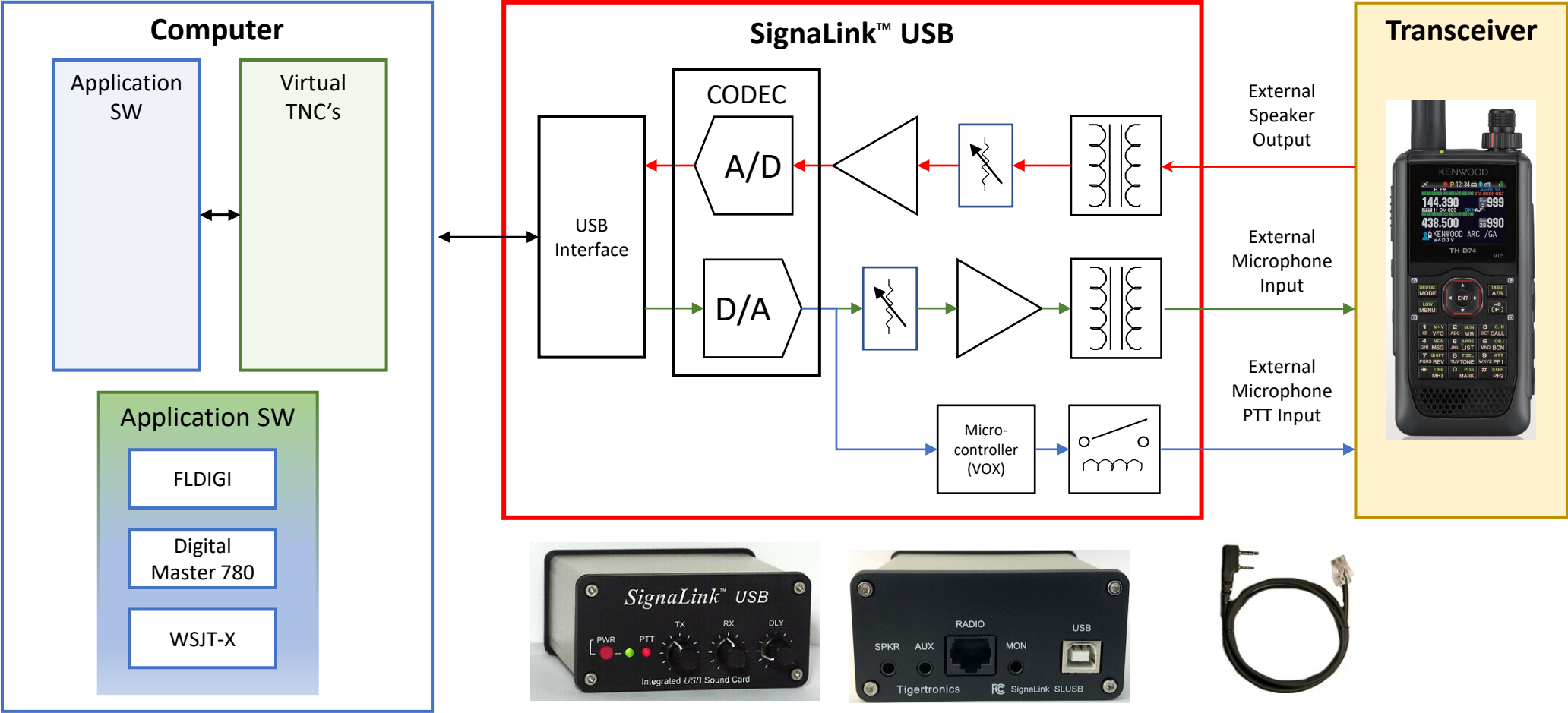
- Straight Forward Implementation
- Disadvantage
 - Cable reconfiguration required when transitioning between voice and digital modes.
 - Support for VARA Narrow only





Digital Communications

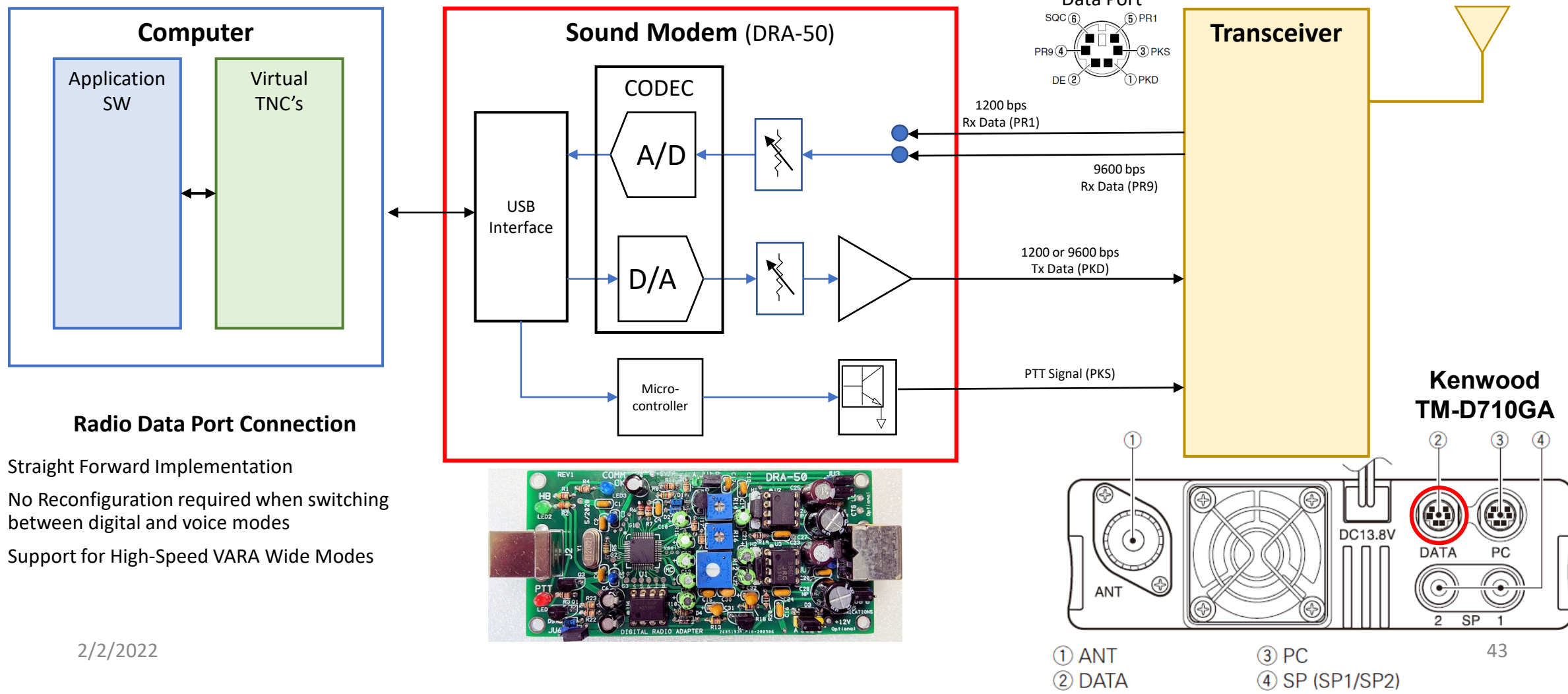
Implementation – External – Mic and Speaker Connection





Digital Communications

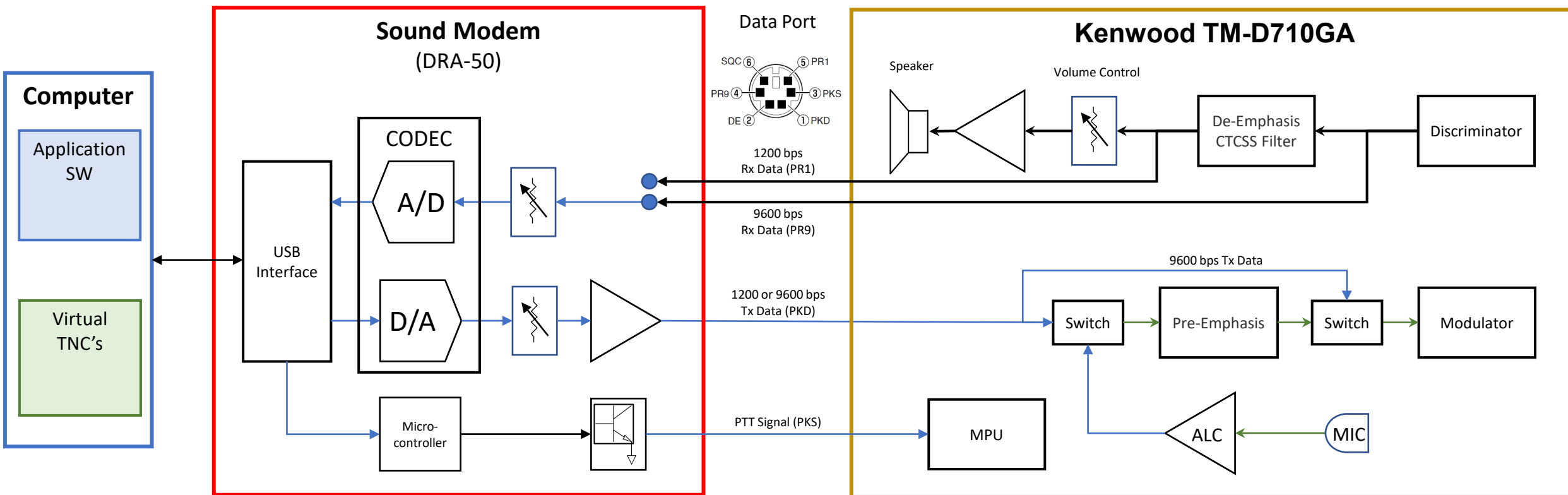
Implementation – External – Radio Data Port





Digital Communications

Functional Description – External Sound Card



A/D - Analog to Digital Converter
 ALC - Automatic Level Control
 BPS - Bits per second
 CODEC - Coder-Decode
 CTCSS - Continuous Tone Coded Squelch Sys

D/A - Digital to Analog Converter
 MPU - Microprocessor Unit
 PTT - Push to Talk
 TNC - Terminal Control Unit
 USB - Universal Serial Bus



Conclusion

Next Training Session



- Description of Winlink RF Protocols
 - Packet, ARDOP, VARA
- Installation and Configuration of Virtual TNC Software
 - Packet (UZ7HO)
 - VARA FM
 - VARA HF
 - VARA Chat

