

RACES Field Operations Course - Unit 7

Introduction to Packet Radio

*Our objective is to bring you from being
“data challenged” to “appliance user”
before the next disaster!*



145.730 Mhz
VDEN

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District 02

What is “Packet?”

After viewing this unit you should know:

- PACKET is reliable DIGITAL communication!
- WHY packet is used for “record” communications?
- WHAT types of data SHOULD be sent on packet?
- WHERE do you send it?
- HOW does it get there?
- BASICS of equipment and operating commands
- SOURCES to get more information on packet...

Packet Means Reliable Digital Communication!

This is WHY we use packet for EmCom:

- Reliability
 - Error Checking
- Wide-area coverage
 - Statewide and regional network
 - Ability to “broadcast” bulletins
 - Weather, situation updates, etc.
- Network, and Data Security >>

Why - Security?

(Continued)

- FCC prohibits "encryption" in amateur service.
 - Packet not "secure" in a "national security" sense, but "secure enough" for most public safety use
- Packet is less vulnerable to eavesdropping by anyone owning a handheld scanner
 - Digital data "bursts" heard as unintelligible noise!
 - Safer for sensitive information which must be sent "over the air" than using "clear text" voice or CW

What SHOULD go by packet?

- 1) Anything lengthy, technical, complex, slow or difficult to send accurately and efficiently by voice!
 - Logistics, medical, engineering data
 - Lengthy equipment and supply requests
 - VDEM local situation reports
 - Damage assessment
 - HAZMAT, or nuclear monitoring data
 - Any lengthy or detailed tasks, instructions, or personnel assignments

What SHOULD go by packet?

(continued)

- 2) Anything "sensitive" which cannot or should not be sent "in the clear"
 - All disaster personal information
 - H&W messages containing personal info
 - Medical examiner casualty reports
 - Fatalities - never by voice !
 - Evacuation lists, shelter logs
 - Most public safety or law enforcement info

WHERE do packet messages “go”



- **Into “VDEN”**
 - the Virginia Digital Emergency Network
- Backbone nodes
- Remote nodes (X1J4)
- BBSs – MSYS (your “On-ramp”)

HOW does VDEN work?

BBS Plan in Districts:

- Strategic Full Service BBS
 - Wide area coverage
 - Supplemented by Network nodes
- Users connect to their Local BBS
 - Use a node if you can't connect direct
- Let the BBS do the work (Store and Forward).



Function of ^{145.730 Mhz} **VDEN** network:

- Individual users on 145.73 connect @1200 baud to local BBS, either direct or via network node
- Accommodates temporary, portables / mobiles
 - Damage assessment, medical logistics
 - EMS council and airport drills, SETS
- Enables low power users to connect reliably
 - Shelter support, expedient stations
- BBS + Nodes provide reliability by redundancy!



Packet Primer:
How Do YOU connect?
“Nuts & Bolts” that you need to know:

- **Equipment Setup**
- **Basic Commands**

Equipment Needed:

- **TNC:**



(Terminal Node Controller)

- **Computer Terminal:**



- **Radio:**



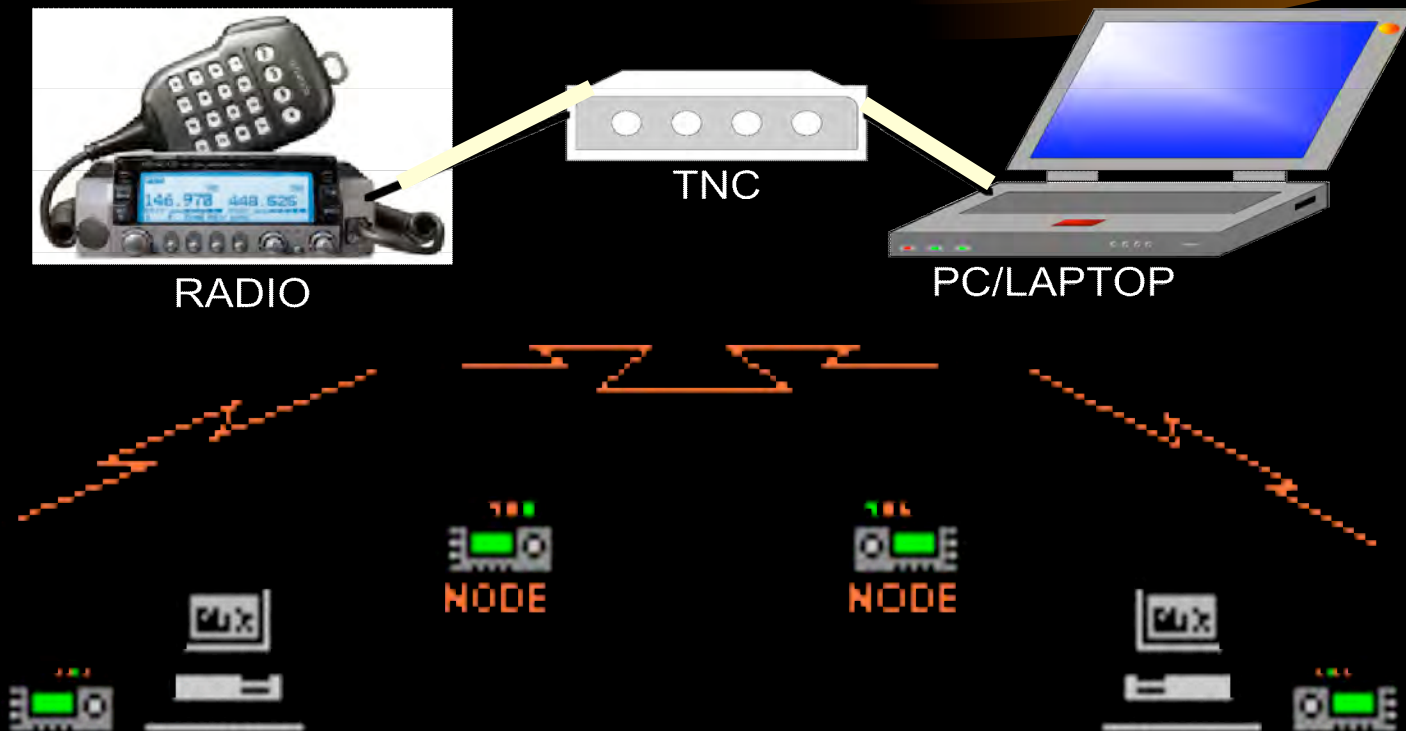
- **Interface Cable(s):**

- Radio to TNC
- TNC to computer



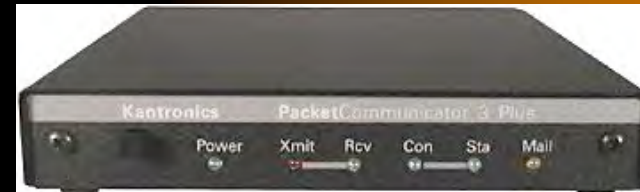
Typical Digital Setup

This is not "rocket science!"



TNC:

- **Kantronics KPC3:**



- **MFJ 1270/78:**



- **Baycom:**



- **And there are also others that “work”**



Computer Terminal

- **ANY PC / MAC with RS232 Port**
- **Any lap-top or palm-top is fine**
- **Any “luggable” PC is fine**
- **Either DOS or Windows is fine**
- **Older 286 or higher processor is fine**
- **Portable / mobile should run on 13.8V DC**
- **TNC has the “brains”**
- **Terminal Emulator Software**
 - **(Hyperterm, Pacterm, ARESpack, etc)**

Radio and Radio Interface:

- Any 2m (1200baud) or 70cm (9600baud) radio
 - Any Handheld / Mobile / Base, or
 - Dedicated data radio optional:
- Interface cables:
 - Homebrew (www.packetradio.com), or
 - Store Bought (www.mfjenterprises.com/index.htm)
 - Follow manufacturers schematics!
- Microphone to TNC switch is very handy
 - if you don't have separate voice / data radios....



Ok, now what?

Tune : 145.73 MHz (1200 baud)
 primary for users
 446.075 MHz (1200 baud backbone)

LISTEN!: (Monitor!) Every 10-30min
 BBS stations will beacon.

Cmd: Connect

Basic Commands (Node)

BBS Connect to the **bulletin board**.

B<ye> Disconnect from the BBS

C# **Connect on port # to call**
unnecessary for known nodes)

C<onnect> to **"alias" or call** (known nodes)

H<elp> Help

I<nfo> Basic Info *about the node*

K<Node> Lists K-Nodes that are known

J<ustheard> What has been heard recently
(limited output)

More Basic Commands (Node)

N	Lists known network nodes
N call	Info about a specific node
P<orts>	Port numbers of node and PBBS
R<outes>	To nodes that can connected to directly
R call	Routes from a particular node
T<alk>	Page the Sysop
U<ers>	Info on users/node connected to the node.

Basic Commands (BBS)

MSYS BBS USER COMMANDS:

A - Abort **P** - Path to station
B - Bye **PC** - Call Sign Server
C - Conference **R** - Read message
D - Download **S** - Send Message
G - Search file **T** - Talk to SYSOP
H - Help **U** - Urrent users
I - Information **V** - Version
J - Calls heard **W** - What files
K - Kill message **X** - EXpert-Mode
L - List Messages **Y** - YAPP Command
LC - List Categories **?x** - About command
M - Message of the day
N - ENter name/qth ***** - Comment line

BBS Commands

(Continued)

A (**A**abort) command to the BBS, can be used to **abort output** from most BBS commands, like Download, List and Read.

B (**B**ye) command **disconnects** from a BBS.

C (**C**onference) command enters the user into the **Conference**.

H (**H**elp) command gives short description of the available commands.

*For more information about a particular BBS command, type **?x** where **x** is the letter of the command.*

BBS Commands

(Continued)

- JH** lists **stations recently heard** on the various ports and stations that recently connected.
- M** Used to display the **Message of the day**.
- N** Used to **register your name**.
- NQ** Used to **register your qth**.
- NZ** Used to **register your zip-code**.
- NH** Used to **register your home BBS**.
- U** Lists **current users of the BBS**, plus the number of active messages and users and what they are doing.

BBS Commands

(Continued)

- X** Toggles / displays the new Expert status.
- XC** Toggles automatic display of MSG categories when you connect to the BBS and are using non-expert mode. New user default is ON.
- XF** Sets "fast" mode, means that multiple lines are placed in packets for some commands.
Is **faster for users with good paths**
- XS** Sets "slow" mode, one line per packet as the default. **Best for users with poor paths** or competing on busy channels!).
- XR** Toggles automatic asking if you want to reply to a MSG after you read it. Useful if you get a lot of personal mail.
New-user default is OFF.

BBS Commands

(MAIL - Reading)

R Read active messages in the BBS.

Variations of the R command:

R # # ... Reads given message numbers

Ex: R 12734 11521

RM Read Mine (Read YOUR messages)

R [**cat**]Read messages in a given
TO" field.

More Variations of R command:

- R>** [call] Reads MSG's with a given "TO" field
- R<** [call] Reads MSG's from given call using
- R@** [call] Reads MSG's with given @BBS
- RP** Read Preview. Does a normal read operation but does not mark the message as having been read so it will still show if you do a LU or List Unread command.

BBS Commands

(MAIL - Writing)

S send, Format: Sx to call @BBS \$BID#
Where x is message type
(P=private, B=bulletin, T=traffic)

Variations of the S command:

SP call @ BBS.haddr SP K8EIW @ WB8BII
Send a private message

ST zip code @ NTSst ST 44070 @ NTSOH
Send NTS traffic message

SB category @ route SB NEED @ ALLOH
Send a bulletin

SR MSG# SR 12723 or SR 12723.
Send reply to originating station.

BBS Commands (MAIL - NTS)

ST - Send Traffic

Example:

ST KD5CTJ@NTSVA

ENTER SUBJECT: CITY, STATE 703-XXX

ENTER TEXT:

1 R G W1WWW 10 PROVIDENCE, RI JAN 10

ERIK WERNER/KD5CTJ

ADDRESS:

PHONE:

BT (=)

THIS IS A TEST MESSAGE
FOR KD5CTJ TO SHOW PACKET

BT (=)

SIGNATURE

/EX

BBS Commands

(MAIL -Listing)

- L** - List by message headers selected.
The following formats are available:
- L** - List messages since you last disconnected
(disconnect by using **B** command)
- LB** - List bulletins (*all!!* use with care!)
- LC** - List Categories ("TO" fields)
- LM** - List Mine, list messages to or from you
- LN** - List messages Not read or forwarded
- LT** - List NTS Traffic messages
- LL** # List the last # messages Example: LL 10

More (MAIL -Listing)

LU Lists unread messages to you

L< callsign List messages **from callsign**

L> callsign List messages **to callsign**

L@ callsign List messages being sent to BBS call

L # List messages **>=** given number
Example: L 827

L # # List messages from # to #
Example: L 50 75

L"string" Lists messages with given
string in title

Need More Information?

Packet Resources on the Web:

<http://www.packetradio.com>

<http://www.racesva.org>

<http://www.tapr.org>

Kd5ctj@arri.net



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Any Questions?

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