

Michigan Section Digital Radio Group ("DRG")

"The Lupton Update"

What is the DRG and what is the Michigan AMPRnet?

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Topics we will cover:

- What is the "Digital Radio Group" (DRG) ?
- Who, What, Why, and How? Not necessarily in that order.
- The "Network" (Solving for x)
- Logging On, "Alphabet-Soup" and Online Help
- Network Extendibility (The "Familiar Interface")
- Remote Email via SMTP/POP3 (just like an ISP)
- District and County Frequencies
- Goals for 2007
- A Multitude of Web Links and Resources

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Why is the DRG?

- In August 2005 the Section Manager put out the request that a "Digital Radio Group" be formed.
- Dale asked that this group "examine existing system and networks, determine which are most appropriate to serve the needs of Michigan in terms of reliability, ease of use, redundancy, throughput, ease of implementation, potential for growth, likelihood of obsolescence, availability of equipment and software, interface to existing systems and networks and other requirements to be determined by the group. Recommend, and where appropriate, develop and/or integrate new systems and networks to serve those determined needs and national standards."

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Who is the DRG?

- Group is composed of 2 "Representatives" from each of the MSP Districts. The DEC gets first stab at assigning Representatives from his/her District, else the DRG will select interested and talented individuals.
- Additional members come from Section Staff, QMN, NTS.
- Meetings are closed, but Volunteers and Invited Guests who have something specific to contribute are asked to attend by invitation (keeps us "on track" with no newbie questions).
- Held our first meeting in Lansing on March 5th, 2005
- Holds Quarterly meetings at different venues all around the state.

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What is the DRG?

- It is a "Michigan Section Organization" formed to assist in establishing a well connected and dependable digital network throughout the state which **can** be used in an emergency. It is **not restricted** to that use only, but is intended to be in everyday Amateur use when no emergencies exist.
- The DRG supports all Digital modes including but not limited to: AX.25 "Packet", APRS, TCP/IP, NetROM/KAnet/X1J4, ROSE/Fpac, D-Star, P25, HSMW/WiFi, WinLink, PSK31, Amtor, and Pactor I/II/III.
- The bulk of our energy has been spent building out a TCP/IP-based AMPRnet linking most parts of the state.
- It is **NOT** a branch of the **ARES**, **RACES**, **ARPSC**, or **SkyWarn**. However the network is available for all their use when needed.

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What is the DRG? (cont'd)

- **Working Groups are created to support modes and protocols as dictated by their interest levels.**
- Provide training presentations at radio clubs and ARES/RACES/ARPSA meetings as well as to Served Agencies.
- Our Mantra this year is: **Educate & Integrate**
- **We need to get more people aware of what the DRG is doing in order to build and sustain critical mass**
- **The more people that use the network(s) daily the larger the pool of available trained personnel and available equipment that can be called upon in time of need.**

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How does this pertain to me?

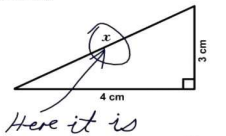
- DRG is building out a **TCP/IP** based **"AMPRnet"** (Amateur Packet Radio network) which is connected with the rest of the world.
- Uses the same "suite of protocols" used throughout the Internet (TCP, UDP, IP, ICMP, SMTP, POP3, Telnet, FTP, Finger, HTTP, etc.)
- This provides a "Familiar Interface" for users and **Served Agencies** to easily and directly interconnect.
- Interfaces with existing BBS systems such as MSYS and FBB.
- Interfaces with WinLink by providing built-in "TelPac" services.
- "Fully Meshed" backbone – where every node (called a "Hamgate") knows how to reach every other Hamgate directly.
- It takes people like **YOU** to make this all work!

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The "Network"

3. Find x.



PTZam.com

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Solving for the SM:

- reliability
- ease of use
- redundancy
- throughput
- ease of implementation
- potential for growth
- likelihood of obsolescence
- availability of equipment and software
- interface to existing systems

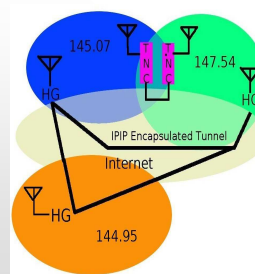
A Typical "Hamgate" Node

- Consists of a DOS (or Linux) PC.
- Is connected to the Internet using a **Static Publicly Reachable IP address**
- Runs the **JNOS** application software
- Has a "KISS" TNC attached to the serial port
- Can have one or more TNC/Radio ports, each on different bands and running at different speeds (1200, 9600, 128k), even HF and AmTOR
- Can be configured as a WinLink "TelPac" node
- Uses a special routing table (ENCAP.TXT) to reach every other Hamgate in the world, while NOT exposing the 44-net/AMPRnet to Internet hackers
- Each node is remotely manageable

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Linking disperse networks



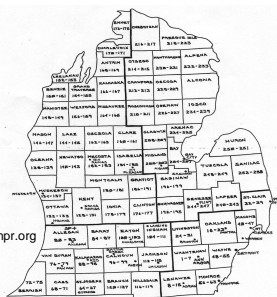
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- **IPIP Encapsulates** all 44-net packets inside another packet to send over the Internet to other Hamgates
- Protects our RF networks from non-Hams keying our transmitters
- Each Hamgate acts as the **Default Router** for its assigned subnets (Each County has its own subnet of IP addresses)
- Disperse networks can be easily linked together
- Routes can be easily modified to get around outages

County Subnet Assignments

- 44.0.0.0/8 = World
- 44.102/16 = Michigan
- 44.102.C.x = Counties
- 44.102.1.x = Washtenaw
- 44.102.226.x = Ogemaw
- 44.102.226.17 lupton.ampr.org
- 44.102.104.8 seoc.ampr.org
- 44.102.1.1hamgate.washtenaw.ampr.org
- 44.102.56.35 wa8efk.ampr.org

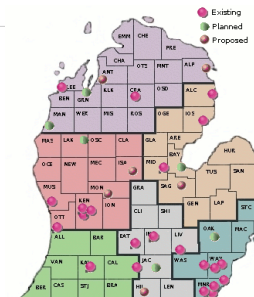


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Map of Production Hamgates

- HamGates allow disperse portions of the state network to be interlinked via the Internet using the TCP/IP protocols.
- NetROMX1.4 can be natively run across these links making them transparent to the End Users.
- Roughly 24 production Hamgates and "Key Stations" (EOC's, State EOC, Red Cross, Section Staff, Club Stations, etc.)
- Have roughly a dozen JNOS home stations or portable stations
- Approximately 10 more nodes will be coming online soon.
- Each node in the network is monitored and tested hourly



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[illegible]

- **Shown on the DRG website:**
- All the HamGates listed by District
- Clickable link that Telnet's you to that Hamgate (HIGHLY recommend using Putty and not telnet.exe!!!)
- Standardized naming conventions are used

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Logging on & Alphabet-Soup

- From your TNC do a: **connect <callsign>**
- From your PC do a: **Telnet Hamgate.<county>.mi-drg.org**
- You will get the logon banner followed by "Alphabet-Soup"
- Can then use : Telnet, Email, CONVerse, FTP, AX25 connects, etc.

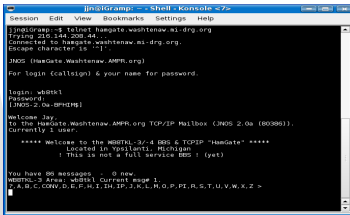
h <command>

t seoc

s wa6efk@wa6efk

conv

c 145.76 n8mwd



```
telnet@tnc>:~$ telnet Hamgate.mi-drg.org
Trying 145.76.208.100...
Connected to Hamgate.mi-drg.org.
Current connection is TTY.

HAMGATE (Hamgate.HamHam.AMPR.org)
For login (callsign) & your name for password:

login: wa6efk
Password:
[HAMGATE: 2.0a (SPH)EHE]

Welcome to the HamHam.AMPR.org TCP/IP Mailbox (HAMGATE 2.0a (800866)).
Currently in User:

***** Welcome to the HAMGATE 3.0 & BBS & TSPM "Hamgate" *****
This is not a full service BBS! (yet)

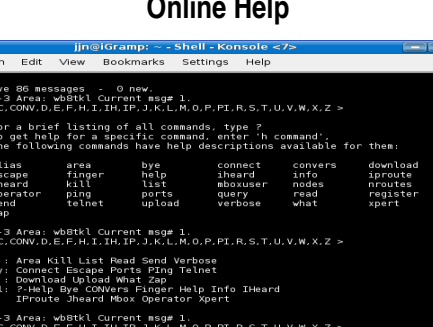
You have 00 messages. 0 new
HAMGATE > Read message Current page 1
A.D.C.:CONV.D.E.F.H.I.J.K.L.M.N.O.P.Q.R.S.T.U.V.W.X.Y.Z
A.D.C.:CONV.D.E.F.H.I.J.K.L.M.N.O.P.Q.R.S.T.U.V.W.X.Y.Z
```

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Online Help



```
jln@l0ramp: ~ - Shell - Konsole <7>

Session Edit View Bookmarks Settings Help

You have 86 messages - 0 new.
wBStkl -3 Area: wBStkl Current page 1.
? A,B,C,CONV,D,E,F,H,I,TH,IP,J,K,L,M,O,P,PI,R,S,T,U,V,W,X,Z =>
h

For a brief listing of all commands, type '?'
To get help for a specific command, enter 'h command'.
The following commands have help descriptions available for them:

alias      area      bye      connect  convers  download
escape     finger   list     lheard   info      iproute
jheard     kill     help     abouser  nodes     nroutes
operator   ping     ports    query    read      register
send       telnet   upload   verbose  what      xprt
zap

wBStkl -3 Area: wBStkl Current page 1.
? A,B,C,CONV,D,E,F,H,I,TH,IP,J,K,L,M,O,P,PI,R,S,T,U,V,W,X,Z =>

Mail : Area Kill List Read Send Verbose
Gateway: Connect Escape Ports Ping Telnet
File : Download Upload What Zap
General: ?-Help Bye CONVERS Finger Help Info lheard
        lproute jheard Mbox Operator Xprt

wBStkl -3 Area: wBStkl Current page 1.
? A,B,C,CONV,D,E,F,H,I,TH,IP,J,K,L,M,O,P,PI,R,S,T,U,V,W,X,Z =>
```

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Sending E-Mail

- send wa8efk@wa8efk.ampr.org
- send wb8tkl@hamgate.washtenaw.ampr.org
- send wc8eoc@SEOC
- Even our “fearless leader” can do it:

Ok so here I am at a coffee shop, connected via wireless 802.11 to the net, running VPN, connected remotely to my home computer, connected via Ethernet to the JNOS computer and creating this message...just to do it.

What fun.

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NTS Digital (NTSD)

- NTSD = The passing of formal Radiogram traffic via digital means or over digital networks.
- 'st <zip|net>@NTSMI.ampr.org'
- 48198@NTSMI -or- semin@NTSMI
- thru@NTSMI
- A Net Liaison checks mailbox for any traffic destined for his/her net and takes it to the next net session.
- Ohio Section adopting (copying) our plan :)

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Yes, we even have Web access

- <http://wb8rcr.ampr.org>
serves up a simple text-based website
- Serves up Alpena, Detroit, Grand Rapids, and Marquette NWS Weather Radar images (~4k)
- As well as Propagation reports



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Extending the Network

- Extending via RF
- Use JNOS nodes as Home Stations
- Use JNOS nodes as Portable Stations
- Here we used wb8tkl.ampr.org as portable station at the ARROW/UofM club Field Day

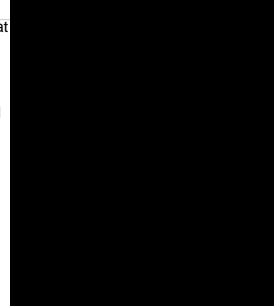


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Extending via WiFi

- Off the shelf products let us extend the network using that "Familiar Interface"
- Can use HSMM (Chan 1-6)
- Just need a JNOS node and an "AP" to support multiple workstations
- Field Day?
- Search & Rescue?
- Hazmat spill?
- Lupton Outing?

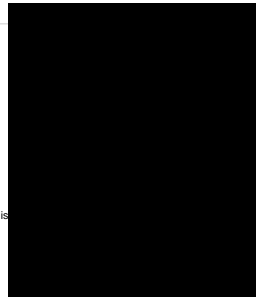


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Extend via Ethernet

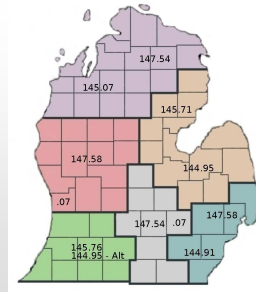
- JNOS box can now be run "Headless"
- Use your home ethernet LAN or the LAN at a Served Agency.
- Can Telnet from any machine to the JNOS box to gain access to the RF network
- Can point your browser to Websites on the AMPRnet network (when the host is properly configured with an AMPRnet address)
- Can POP your email off the JNOS box using standard protocols (just like you would from your ISP)



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Local Access Frequencies by District



- This proposal is a first attempt to move away from a single collision domain, and towards a network based on "Gateway" nodes. This positions us to more easily implement a "backbone" connecting the Gateway nodes.
- First published in Oct '05, a few stations are already appearing on the new frequencies:
- D7 has a JNOS node on 145.07 in Manistee
- D6 has a HamGate active on 147.58
- D2 has a HamGate active on 144.91

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Goals for 2007:

- Implement a push toward "Education and Integration"
- More use of D-Star technology (on 1.2 GHz @ 128kbps)
- More use of HSMM & WiFi
- More up-to-date & Improved Network Maps
- Deploy more HamGates, NetROM/X1J4 nodes, and Multi-ported nodes, for better long-haul linking
- Continue migration to Multi-Layered networks and the use of District/Regional "Local Access" frequencies
- Link up Full-Service BBS's and improve Mail Forwarding
- Begin developing District "Standard Operating procedures"
- Get more Clubs involved!!!!
- Improve NTSD traffic handling

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A Multitude of Web Links and Resources:

- www.MI-DRG.org <--- Yeah, well, that's about it. Do you REALLY need more?
- MI-AMPRNET@lugwash.org MajorDomo list - To join send an Email Subscription Request to Majordomo@lugwash.org with the following in the body of the message: subscribe MI-AMPRNET
- Weekly (Sat/Sun @8pm CH-41) CONVerse nets

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Thank You for your Participation!!!

- By: Jay Nugent WB8TKL
 - Internet: jn@nuge.com wb8tkl@arrl.net
 - AMPRnet: wb8tkl@hamgate.washtenaw.ampr.org
 - LandLine: (734)484-5105
-
- Completely produced using Open Source software:
 - "Open Office – Presentation" on Kubuntu Linux
 - "In a world without fences, who needs Gates!"

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