



Packet Operations End of Year Update - 2011



Santa Clara County ARES®/RACES
Last Updated 2011-Dec-8

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Why Packet Radio?

- It's fast
 - Yes, that's right. Fast.
 - 80+ messages sent/received, logged, acknowledged, printed in triplicate, perfectly legible, in < 2 hrs, with 0 errors, by 1 person!
- It's easy
 - Hardware: pre-built cables; straight-forward connections
 - Software: if you can use e-mail, you can use Outpost
 - Procedures: extensive documentation on website
- It's deployable
 - Virtually anywhere in the county and most of surrounding counties; no specialized radios or antennas required
- It fits our served agencies' needs
 - Preferable for long, complex, and/or high volume messages; explicit acknowledgements and tracking

Learning Objectives

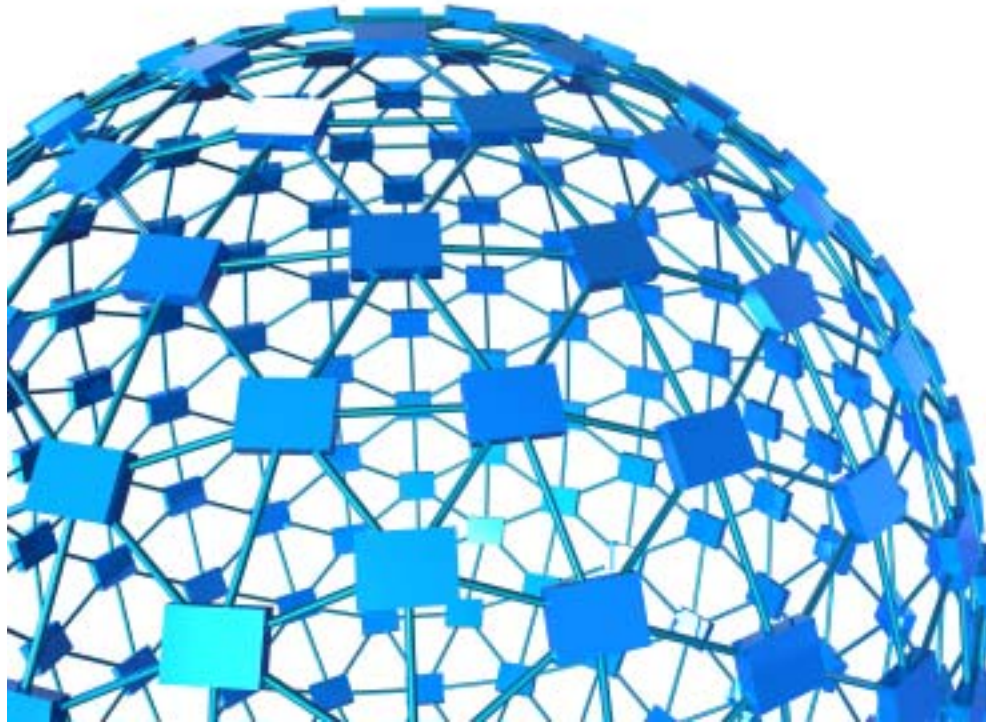
Our goal today is not to teach packet, but to highlight recent changes and reinforce certain key points.

By the end of the class, you will be able to:

- Describe the SCCo packet network structure
- Understand the use of primary & secondary BBSs
- Understand the use of tactical calls
- Properly address messages to users in the SCCo packet network
- Properly address messages to users outside the SCCo packet network

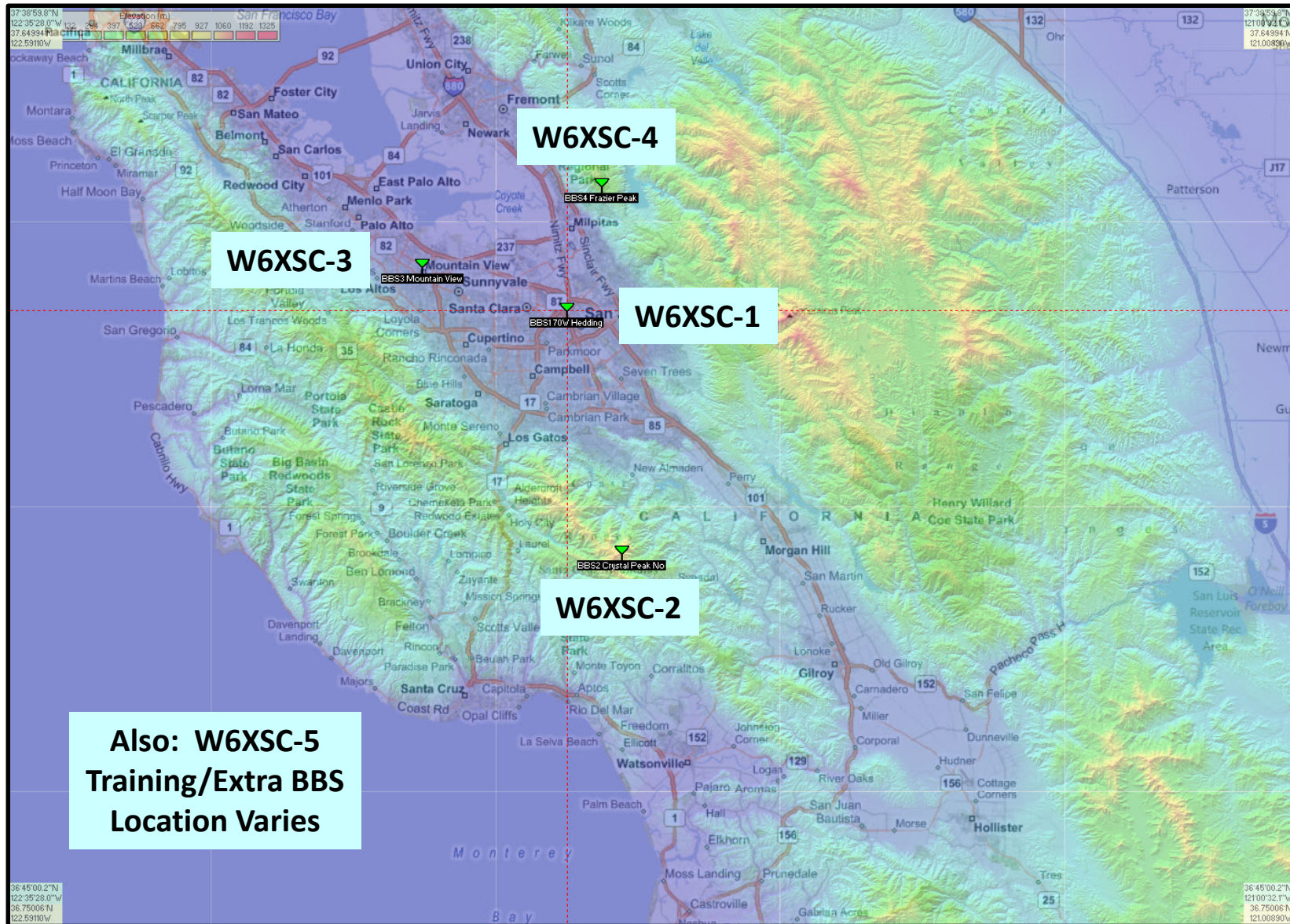
Agenda

- Network Structure
- Primary and Secondary BBSs
- Tactical Call Signs
- Packet Message Addressing
- New Gateway Features

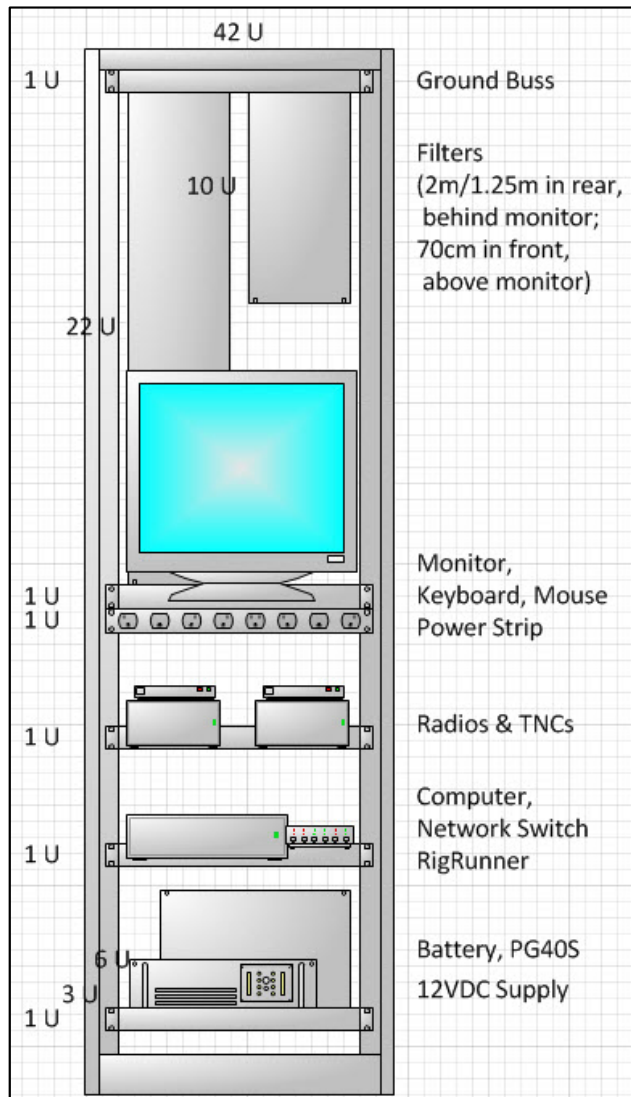


W6XSC NETWORK STRUCTURE

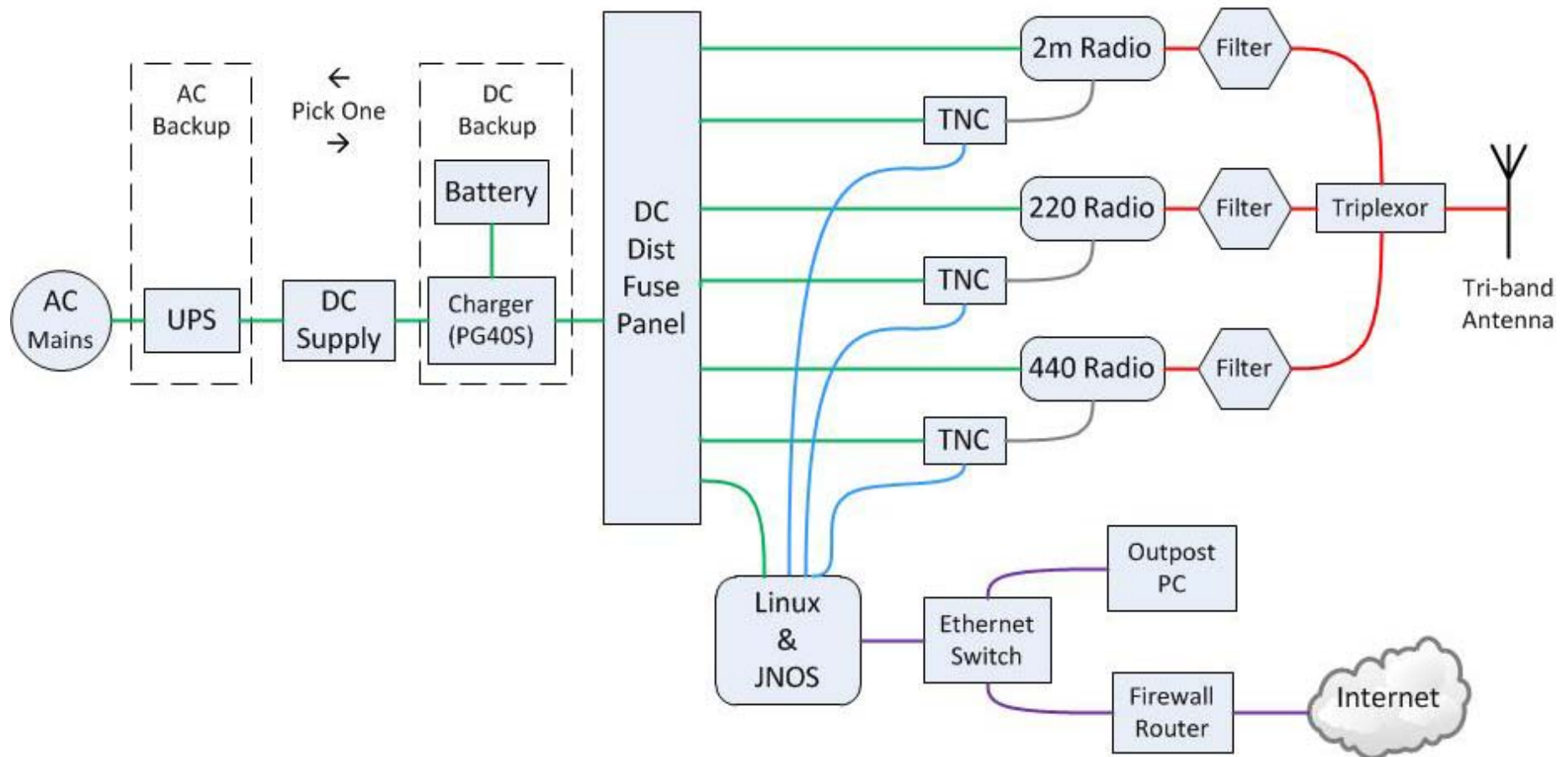
W6XSC BBS Locations



BBS Physical Installation



Block Diagram: Typical W6XSC BBS



W6XSC Connectivity/Frequencies

- 144 MHz - access
 - User access; typically individuals, some EOCs
- 220 MHz - access
 - User access; typically EOCs, some individuals
 - Future: add forwarding to traditional BBS network
- 440 MHz - forwarding
 - Forwarding between BBSs, no user access
 - Each BBS can reach all other BBSs directly
- 5.8 GHz (unlicensed)
 - Remote access for management/maintenance
 - Future: use for forwarding between BBSs
- Internet
 - Internet gateway functions currently located at Crystal Peak

W6XSC BBS Operational Concepts

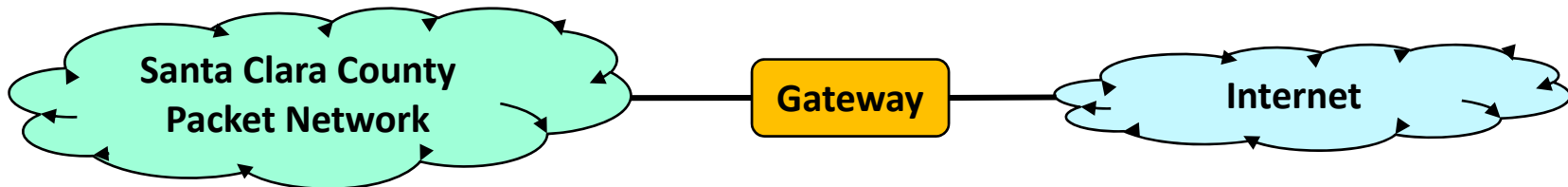
- The network is run like a commercial network
 - ARES/RACES – missing the point unless it works in an emergency
 - UPS, backup generators, physical and network security
 - Testing, automated monitoring, user communications
- All BBSs have equivalent functionality, user interface
 - Simplifies user training
 - Provides backup in case of failure
- All cities/agencies can reach at least 2 BBSs
 - Designated primary & secondary
 - Everyone in other cities knows where to find you
- All users in a city/agency use the same BBS
 - Simplifies addressing
 - Everyone in other cities knows where to find you

Connectivity Beyond County Borders

- Bay Area / ARRL Silicon Valley Section
 - All surrounding counties and Coastal Region EOC can reach at least one Santa Clara County BBS – no Internet required!
 - CalEMA Coastal Region, Alameda County, Contra Costa County, Marin County, Monterey County, San Benito County, San Francisco County, San Mateo County, Santa Cruz County
 - Tactical calls already installed in all SCCo BBSs
 - Anticipated use: mutual aid; connectivity to CalEMA Coastal Region for escalation
 - Next Step: establish regular “check-in” process with surrounding counties.

Connectivity Beyond County Borders

- Wide Area
 - AMPRnet gateway
 - Connectivity between amateur packet stations around the world
 - Uses 44/8 IP addresses, IP/IP tunnels
 - Working now
 - E-Mail gateway
 - Connectivity between packet and e-mail
 - Outbound is working now
 - Inbound coming soon; some restrictions due to Part 97
 - Traditional BBS network connection via RF – early 2012



Summary of Changes in 2011

- Jan, 2011
 - BBS names changes to W6XSC-# format
 - Moved 6 agencies from W6XSC-1 to W6XSC-2
 - New PKTMON and PKTTUE tactical calls for weekly check-in
- Mar, 2011
 - 2m access frequency change at W6XSC-1
 - New W6XSC-4 BBS at Frazier Peak
- May, 2011
 - SCCo Packet Installer v31
 - Launch PacFORMS from Outpost; auto message #s in PacFORMS
 - Duplicate bulletin suppression
 - Improved channel efficiency (skip “LM” if no new messages)
 - Locked “From” field
 - New “Draft” designation (if “Save” in Out Tray, instead of “Send”)
 - Prefill PacFORMS with message number, operator info
 - Improved channel efficiency (don’t send blank fields)
 - Automatic default browser detection

Summary of Changes in 2011

- Nov, 2011
 - AMPRnet gateway
 - E-mail gateway (outbound)
- All changes announced to scc-packet Yahoo group
- All changes documented on packet page of county website
 - www.scc-ares-races.org/packet.html

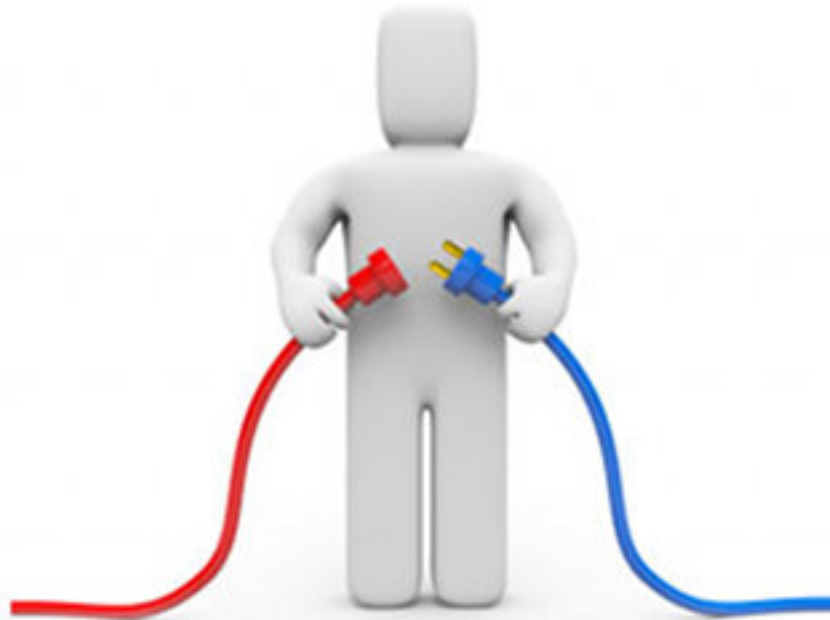
Santa Clara County OES, California
ARES/RACES

[Home](#) [Operations](#) [Packet](#) [Training and Events](#) [Reference Info.](#) [FAQ](#) November 28, 2011

PACKET RADIO INFORMATION

SANTA CLARA COUNTY PACKET NETWORK UPDATE NOTICES

[2011-11-28 - New Gateways \(PDF - 100 KB\)](#)
[2011-05-10 - New Features in SCCo Packet Installer v31 \(PDF - 105 KB\)](#)
[2011-03-09 - 2m Frequency Change at W6XSC-1 \(PDF - 91KB\)](#)
[2011-01-26 - Changes Completed \(PDF - 120 KB\)](#)
[2011-01-17 - New Features Coming \(PDF - 136 KB\)](#)
[2010-09-11 - New Features Available \(PDF - 101 KB\)](#)



How do I connect?

ACCESSING THE NETWORK

Antenna / Power Considerations



- Packet networks are simplex
- You must be able to hear EVERYONE else on the channel and they must ALL be able to hear you
 - If not, you WILL cause doubles
 - Even if the BBS can hear your HT set on 1 watt with a rubber duck antenna in the basement, the person two cities away from you can not!
 - Even if it works when the channel is quiet, you WILL cause doubles during a real incident (or a drill or public service event) when everyone is trying to connect
- Raise your antenna as high as possible
- Use plenty of power

W6XSC BBS Access Frequencies

- www.scc-ares-races.org
 - Packet > Packet Frequencies and BBS Listings

Call Sign	Host.Domain	2m Access	1.25m Access	Location	Comments
W6XSC-1	w6xsc-1.ampr.org	144.990	223.620	Santa Clara Co Office Bldg (San Jose)	JNOS; 24/7; UPS
W6XSC-2	w6xsc-2.ampr.org	145.730	-none-	Crystal Peak (South County)	JNOS; 24/7; UPS
W6XSC-3	w6xsc-3.ampr.org	144.310	223.540	Mountain View	JNOS; 24/7; UPS
W6XSC-4	w6xsc-4.ampr.org	145.690	223.560	Frazier Peak (above Milpitas)	JNOS; 24/7; UPS
W6XSC-5	w6xsc-5.ampr.org	varies	varies	Extra - for training, back-up, etc.	JNOS

<http://www.scc-ares-races.org/freqs/packet-freqs.html>

- Recommendations
 - EOCs use 220 access (less crowded, eases EOC antenna limitations)
 - Individuals use 2m access (more radio/antenna options)
 - Always connect to your primary BBS, if available; else, use secondary

Primary & Secondary BBSs

- Each city/agency has a primary and secondary BBS
 - Selection based on RF coverage, load
- All individuals use the same BBS as their city/agency
- Use primary if possible; otherwise, use secondary
- Why?
 - Simplifies sending a message to someone
 - Best RF coverage for most locations in the city/agency footprint
 - No need to forward intra-agency messages between BBSs
 - Distributes load across all BBSs
- If primary fails, cities/agencies on that BBS are distributed across remaining three BBSs
 - Keeps load distributed, even during a failure

Primary & Secondary BBSs

- Primary and Secondary BBSs are listed on the website

#	Agency	Prefix	Primary BBS (2.1)	Secondary BBS (2.2)
Santa Clara County Cities and Agencies				
1	CalFire VIPs - Santa Clara Unit	SCU	W6XSC-2	W6XSC-1
2	Campbell, City of	CBL	W6XSC-1	W6XSC-3
3	County Communications Center	CCC	W6XSC-1	W6XSC-3
4	Cupertino, City of	CUP	W6XSC-1	W6XSC-3
5	Gilroy, City of	GIL	W6XSC-2	W6XSC-1
6	Hospitals (all SCCo) & DEOC	HOS	W6XSC-2	W6XSC-1
7	Loma Prieta Region	LMP	W6XSC-1	W6XSC-3
8	Los Altos, City of	LOS	W6XSC-3	W6XSC-1

<http://www.scc-ares-races.org/freqs/packet-freqs.html>

Primary & Secondary BBSs

- In an emergency, web site may not be available
- The same information is also posted in a bulletin on all BBSs
 - Currently located in the “perm” area.
 - Bulletin area name will probably change in the next few months
- Keep a copy in your Outpost “Archive” folder at all times
 - You may also want to save it as a text file on your PC
- Post it at your EOC or operating position

Agency Name	Pfx	Pri	Sec
-----	---	-----	-----
Cal-Fire VIPs Santa Clara Unit	SCU	W6XSC-2	W6XSC-1
Campbell, City of	CBL	W6XSC-1	W6XSC-3
County Comm Center	CCC	W6XSC-1	W6XSC-3
Cupertino, City of	CUP	W6XSC-1	W6XSC-3
Gilroy, City of	GIL	W6XSC-2	W6XSC-1
Santa Clara Co Hospitals	HOS	W6XSC-2	W6XSC-1
Loma Prieta Region	LMP	W6XSC-1	W6XSC-3
Los Altos, City of	LOS	W6XSC-3	W6XSC-1

Outpost: Setup > Identification

- Individuals use their FCC call sign
 - Outpost sets TNC automatically when you set your call sign in the Station Identification screen
 - Alternatively: Set your TNC “mycall” with your FCC call sign; then “connect w6xsc-#” (where # = 1-5); TNC sends your call sign

Station Identification

Identification

Legal

User Call Sign: N6MEF

User Name: Michael Fox

Tactical

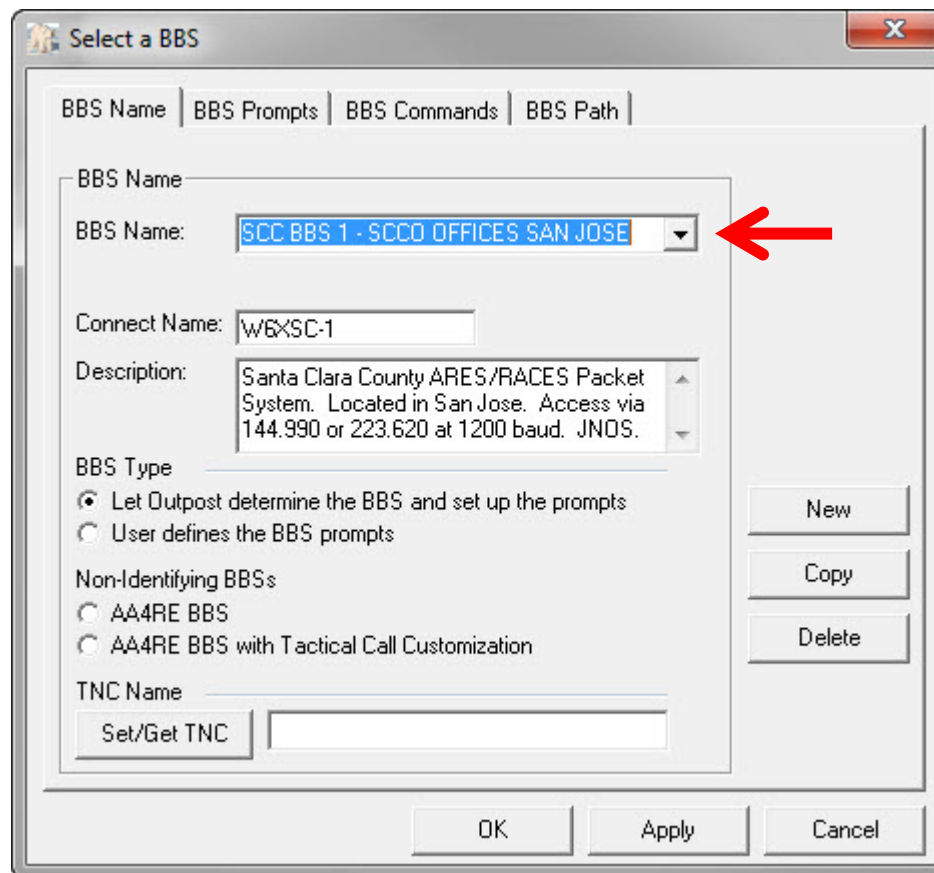
Use Tactical Call for all BBS interaction

Tactical Call Sign: ◇◇◇◇ (8 Characters max)

Additional ID Text:

Outpost: Setup > BBS

- Select your primary BBS
 - Outpost SCC is preconfigured with all five W6XSC BBSs





TACTICAL CALL SIGNS

Review: FCC vs. Tactical Call Signs

- FCC Call Sign
 - Assigned by FCC
 - Used to identify an amateur operator or its station
 - Part 97: “each amateur station ... must transmit its assigned call sign ... at the end of each communication, and at least every ten minutes during a communication.”
- Tactical Call Sign
 - Assigned by net control or other local authority
 - Used to identify a function or a location
 - “Staging”, “EOC”, “Fire Station 1”
 - Use to call another function/location or answer a call
- Using both for packet – just like for voice
 - Connect using tactical calls, send messages to tactical calls
 - Final ID with FCC call sign

What Are Tactical Call Signs?

- Call sign used to identify a function or location, instead of the individual assigned there
- Examples:
 - Santa Clara County EOC
 - Good Samaritan Hospital
 - Mountain View Varsity Park CERT
 - Packet Check-in Net Control for Monday or Tuesday
- Each is assigned a 6 letter abbreviation
- Does not replace FCC call sign
 - You must still configure your FCC call sign
 - Outpost automatically IDs with FCC call sign at the end of a connection if a tactical call sign is used

Tactical Call Usage

- When should I connect using a tactical call?
 - Real incidents; drills, public service events, too
 - Only when you are operating as that function/location
 - Examples:
 - When you are the packet operator for your city EOC
 - When you are the packet operator for your CERT group
 - When you are the packet operator for a shelter
 - When you are the packet check-in net control operator
 - Otherwise, just connect using your FCC call sign
- Which tactical call should I use?
 - It depends on your organization and assignment
 - Usually assigned by your city/agency EC, or county DEC

Tactical Call Usage

- How do I know which tactical calls to send TO?
 - City/agency main tactical calls are posted as a bulletin to all BBSs
 - They're easy enough to get for legitimate users, but we don't post them publicly
 - Your city/agency has a list of their own additional tactical calls
 - All tactical calls for a given agency start with the same prefix
 - All tactical calls with the same prefix have the same primary BBS

#Tactical	Agency Name	Pfx	Pri	Sec
#-----	-----	---	-----	-----
XXXXXX	Cal-Fire VIPs Santa Clara Unit	SCU	W6XSC-2	W6XSC-1
X	Campbell, City of	CBL	W6XSC-1	W6XSC-3
X	County Comm Center	CCC	W6XSC-1	W6XSC-3
X	Cupertino, City of	CUP	W6XSC-1	W6XSC-3
X	Gilroy, City of	GIL	W6XSC-2	W6XSC-1
X	Santa Clara Co Hospitals	HOS	W6XSC-2	W6XSC-1
X	Loma Prieta Region	LMP	W6XSC-1	W6XSC-3
XXXXXX	Los Altos, City of	LOS	W6XSC-3	W6XSC-1

CENSORED

Please do NOT send "test" messages to tactical calls. They do not need to be tested.

Tactical Call Example

- In the examples that follow, we will use the mythical city of “Xanadu”
- Xanadu’s main tactical call entry would look like:

#Tactical	Agency Name	Pfx	Pri	Sec
#-----	-----	---	-----	-----
XNDEOC	Xanadu, City of	XND	W6XSC-4	W6XSC-2

- Xanadu has other tactical calls which all start with the “XND” prefix:
 - Example: XNDFS1 = Xanadu Fire Station 1

Your EC can request a list of tactical calls for your city/agency. Follow the procedure on www.scc-ares-races.org/packet.html.

Outpost: Setup > ID (Tactical Call)

- Cities/Agencies/Locations/Functions use tactical call sign
 - Configure your FCC call sign as usual
 - Also check “Use Tactical Call ...” and enter your tactical call
 - Outpost logs in with your tactical call, then automatically IDs with your FCC call sign at the end of your session.

Station Identification

Identification

Legal

User Call Sign: N6MEF

User Name: Michael Fox

Tactical

Use Tactical Call for all BBS interaction

Tactical Call Sign: XNDFS1 (6 Characters max)

Additional ID Text: Xanadu Fire Station 1



“You want it to go where?”

PACKET MESSAGE ADDRESSING

Review: E-mail

- You want to contact Joe Ham who lives in Mountain View.
 - Without knowing his e-mail address, can you guess what it is? (nope)
 - How about just the left hand side of the address (...@)? (nope)
 - How about just the right hand side of the address (@...)? (nope)
- So you ask Joe for his e-mail address. He tells you:
 - jham3270@gmail.com
 - dxbandit2000@yahoo.com
 - joseph@joehamtheman.org
 - ab6cde@arri.net
 - Joe.Ham@eng1.compuco.com
- Which one should you use?
 - It usually depends. Often, it's not clear. Not great for EmComm.
- How can you keep track of all of this?
 - Manually, with address book in your e-mail application

SCCo Packet Network Addresses

- Similar to e-mail addresses, except:
- The left-hand-side of the address (...@) is known
 - For an individual, it's the person's call sign
 - For agencies & locations it's the tactical call sign
- The right-hand-side of the address (@...) is known
 - It's w6xsc-#.ampr.org (where # is 1-5)
 - And you can figure out the “#” based on the primary and secondary BBS assigned to the city/agency's prefix

#Tactical	Agency Name	Pfx	Pri	Sec
#-----	-----			-----
XNDEOC	Xanadu, City of	XND	W6XSC-4	W6XSC-2

Review: E-mail

- Standard e-mail address format
 - Generically
 - <left-hand-side>@<right-hand-side>
 - Typically seen on the Internet
 - “user@host.domain”
 - Example: joe.ham@eng1.compuco.com
 - “user@domain”
 - Example: joe3270@yahoo.com
 - Requires company-wide (**domain-wide**) address database which routes e-mails to the right server for each user.

SCCo Packet Network Addressing

- Standard packet message address format:
 - “user@host.domain”
 - “host” is the BBS name (W6XSC-#)
 - “domain” is ampr.org
 - n6mef@w6xsc-1.ampr.org (Michael Fox in Santa Clara)
 - k6fsh@w6xsc-3.ampr.org (Bob “Fish” Fishman in Mountain View)
 - kz6o@w6xsc-2.ampr.org (Logan Zintsmaster in Morgan Hill)
 - xndeoc@w6xsc-4.ampr.org (Xanadu Emergency Operations Ctr)
 - xndfs1@w6xsc-4.ampr.org (Xanadu Fire Station 1)
- This format works no matter where you are
 - Same BBS
 - Different W6XSC BBS
 - Different BBS on AMPRnet somewhere else in the world

Review: E-mail Address Shortcuts

- You can usually leave off the **domain** when you are sending e-mail within an organization
 - “**user**@**host**”
 - Example: **joe.ham**@**eng1**
- Sometimes, you can just send to “**user**”
 - Usually on the same host, sometimes in the same domain
 - “**user**”
 - Example: **joe.ham**

SCCo Packet Network Addressing

- You can leave off the domain (“.ampr.org”):
 - “user@host”
 - “host” is the BBS name (W6XSC-#)
 - n6mef@w6xsc-1 (Michael Fox in Santa Clara)
 - k6fsh@w6xsc-3 (Bob “Fish” Fishman in Mountain View)
 - kz6o@w6xsc-2 (Logan Zintsmaster in Morgan Hill)
 - xndeoc@w6xsc-4 (Xanadu EOC)
 - xndfs1@w6xsc-4 (Xanadu Fire Station 1)
- This works within the W6XSC network
- This should work in worldwide AMPRnet network
 - It *should*, but it depends on if the BBS is set up properly

SCCo Packet Network Addressing

- Special case:
 - “user” (with no @...)
- If “user” is an FCC call sign, message stays on local BBS (we don't know where else it should go):
 - n6mef → stays on whatever BBS you are connected to
 - k6fsh → stays on whatever BBS you are connected to
 - kz6o → stays on whatever BBS you are connected to

SCCo Packet Network Addressing

- Special case:
 - “user” (with no @...)
- If “user” is a tactical call, message is forwarded to the primary BBS for that agency’s prefix:

#Tactical	Agency Name	Pfx	Pri	Sec
#-----	-----			-----
XNDEOC	Xanadu, City of	XND	W6XSC-4	W6XSC-2

- xndeoc → forwarded to: xndeoc@w6xsc-4.ampr.org
- xndfs1 → forwarded to: xndfs1@w6xsc-4.ampr.org
- You can manually override (e.g. if w6xsc-4 is down):
 - xndeoc@w6xsc-2.ampr.org
 - xndfs1@w6xsc-2

Example Scenario 1

- You are connected to W6XSC-1
- List all the ways you can send to:
 - Michael Fox (N6MEF) in Santa Clara
 - Pat Moore (K6PMM) in Gilroy
 - Xanadu EOC

Example Scenario 1 – How'd you do?

- You are connected to W6XSC-1
- List all the ways you can send to:
 - Michael Fox (N6MEF) in Santa Clara
 - n6mef@w6xsc-1.ampr.org
 - n6mef@w6xsc-1
 - n6mef
 - Pat Moore (K6PMM) in Gilroy
 - k6pmm@w6xsc-2.ampr.org
 - k6pmm@w6xsc-2
 - Xanadu EOC
 - xndeoc@w6xsc-4.ampr.org
 - xndeoc@w6xsc-4
 - xndeoc

Example Scenario 2 – W6XSC-1 is Down

- W6XSC-1 is Down; you are connected to W6XSC-2
- List all the ways you can send to:
 - Michael Fox (N6MEF) in Santa Clara
 - Pat Moore (K6PMM) in Gilroy
 - Xanadu EOC

Example Scenario 2 – How'd you do?

- W6XSC-1 is Down; you are connected to W6XSC-2
- List all the ways you can send to:
 - Michael Fox (N6MEF) in Santa Clara
 - n6mef@w6xsc-3.ampr.org
 - n6mef@w6xsc-3
 - Pat Moore (K6PMM) in Gilroy
 - k6pmm@w6xsc-2.ampr.org
 - k6pmm@w6xsc-2
 - k6pmm
 - Xanadu EOC
 - xndeoc@w6xsc-4.ampr.org
 - xndeoc@w6xsc-4
 - xndeoc

Example Scenario 3 – W6XSC-4 is Down

- W6XSC-4 is Down; you are connected to W6XSC-3
- List all the ways you can send to:
 - Michael Fox (N6MEF) in Santa Clara
 - Pat Moore (K6PMM) in Gilroy
 - Xanadu EOC

Example Scenario 3 – How'd you do?

- W6XSC-4 is Down; you are connected to W6XSC-3
- List all the ways you can send to:
 - Michael Fox (N6MEF) in Santa Clara
 - n6mef@w6xsc-1.ampr.org
 - n6mef@w6xsc-1
 - Pat Moore (K6PMM) in Gilroy
 - k6pmm@w6xsc-2.ampr.org
 - k6pmm@w6xsc-2
 - Xanadu EOC
 - xndeoc@w6xsc-2.ampr.org
 - xndeoc@w6xsc-2

AMPRnet Gateway (new)

- What is the AMPRnet?
 - The “AMateur Packet Radio network” is a worldwide IP network of packet radio systems.
 - AMPRnet address space = 44/8 (44.xxx.yyy.zzz)
- What is an AMPRnet gateway?
 - Interconnection between our network and AMPRnet
- Why is it useful?
 - All W6XSC BBSs can be reached from any BBS in the network
 - All W6XSC BBSs can reach any other BBS in the network
- How will we use it?
 - For connecting to other counties (and elsewhere) which are not reachable by radio
 - Example: Michigan connects all their counties this way
- How do I send messages to other AMPRnet users?
 - user@host.domain, where domain is ampr.net

E-mail Gateway (new)

- What is an E-mail gateway?
 - Interconnection between packet messages and e-mail
- Why is it useful?
 - Connect to others who don't have packet capability
- How will we use it?
 - Messages to non-ham organizations
 - Message to ham organizations with no packet connection
 - Health & welfare traffic to family members
- How do I send messages to e-mail addresses?
 - user@host.domain – i.e. send to the regular email addr.
- Note: gateway is currently outbound only
 - Inbound is in the works; subject to Part 97 restrictions

Thank You

Michael Fox
n6mef@arrl.net