



Massachusetts State 44 Net / AMPR.ORG IP Subnet Plan

Charles J. Hargrove, N2NOV
n2nov@n2nov.net
917-991-0356

This plan will describe the subnetting of the IPv4 address range allocated to the amateur radio community in Massachusetts. Currently all IPv4 addresses available to Massachusetts are coordinated by Charles Hargrove, N2NOV. The latest version of this document may be downloaded from http://HamGateMA.n2nov.net/Massachusetts_State_Subnet_Plan.pdf

The following IPv4 address subnet is allocated to the amateur radio community in Massachusetts:

44.44.0.0 / 255.255.0.0

It shall be further broken down into smaller subnets so as to allow all radio hams in the state to be allocated an address that will be geographically relevant and routable. The plan is based on a “hub and spoke” principal. Each county in the state will be allocated its own subnet. A regional hub (or hubs) will be assigned numbers from their subnet and in turn the hubs will issue addresses to their users. The master hub will be called “**hamgatema**” which will reside on the Internet. The purpose of the hubs will be to control traffic to and from the Massachusetts network so as to meet current FCC Part 97 rules and to help prevent unwanted traffic from escaping onto an RF based LAN.

HamGateMA hubs will not prevent RF based users from accessing the Internet should they so wish. Where possible all hubs will be accessible from both the Internet and a local RF LAN. Users may or may not be connected to the Internet, but will be connected via RF to their local hub. The regional hubs will be free to create any RF based LAN they so choose and are strongly encouraged to try experimental data transport methods. Data repeaters such as D-STAR, C4FM, DMR and HamNet (AREDN) are also encouraged to participate in this addressing scheme. The ultimate goal is that of interoperability. All hubs and users on the network will use the “**host.ampr.org**” naming convention. For the purposes of DNS entries, A, AAAA and CNAME records will be allowed and where possible MX records will be populated.

A word about IP and subnets etc:

Most readers will be familiar with expressions such as “subnet”, “netmask” and “gateway” from their exposure to their cable modems at home. However, most users will not understand what these terms mean. In short, the numbers that represent these expressions describe how many IP addresses are available to the local network, how to calculate the location of any IP address and where to go if you cannot reach your intended destination address directly on your LAN.

Just like your cable modem and WiFi router, the ham radio TCP/IP network uses subnets, netmasks and gateways to navigate around hosts for the purposes of sending email, viewing the Dxcluster, etc.

Unlike your equipment at home, when you join the Massachusetts ham radio data community you will be issued a set of numbers that will not only allow you to communicate with your fellow hams but also communicate worldwide via the Internet.

Your allocation is indeed an honest-to-goodness “real” IP address. Unlike the IP addresses you are familiar with in your home (192.168.x.x) which are repeated almost everywhere you go, your numbers are unique to you! Like all things in ham radio, the “big boys” want our stuff. There are no more IPv4 addresses available anywhere in the world and so your allocation is a valuable commodity just like your RF space. Use it or lose it!!!! (remember the 220 band in the 1990’s?)

And in case you were wondering, there are PLENTY of numbers for the ham community thanks to the foresight of the original pioneers of packet radio, so please use as many as you can justify. Each of the 14 counties in MA has over 4,000 addresses available. More is available should the need arise.

In the event that you lose interest in our data community, your numbers will be returned to the pool held for your county and issued to the next requesting user in that county.

It's all in the numbers:

There are a little over 65,500 IP addresses available to Massachusetts. Of that number, over 57,000 are shared among the various counties around the state leaving some 8,000 remaining should there be a need to "back fill" somewhere for a special project or for BGP. Should you have a need for more numbers than is available in your county please contact your coordinator to discuss your proposals.

The IP subnet details for a sample county is listed below. These subnets are further reduced to better fit the needs of any given county network between traditional packet messaging systems and experimental uses like VoIP and HSMM/Mesh networks. The 44 Net is understood to be routable packets to other systems by either RF/wireless LANs or the internet via IPIP encapsulation (VPN).

For example:

<u>Bristol County, MA</u>	44.44.16.1/255.255.240.0
Subnet	44.44.16.0/20
Range	44.44.16.1 – 44.44.31.254 (max. 4,094 hosts)
Network	44.44.16.0
Broadcast	44.44.31.255
Gateway	44.44.16.1
AX25 Hierarchical Address	<i>host.#bris.ma.usa.noam</i>

Each county /20 network can be broken up into two /21 networks like this:

<u>Traditional Packet BBS</u>	44.44.16.1/255.255.248.0
Subnet	44.44.16.0/21
Range	44.44.16.1 – 44.44.24.254 (max. 2,046 hosts)
Network	44.44.16.0
Broadcast	44.44.24.255
Gateway	44.44.16.1

<u>Experimental Uses</u>	44.44.25.1/255.255.248.0
Subnet	44.44.25.0/21
Range	44.44.25.1 – 44.44.31.254 (max. 2,046 hosts)
Network	44.44.25.0
Broadcast	44.44.31.255
Gateway	44.44.25.1

Requestors will then be issued a smaller subnet based on the number of routable addresses needed:

/29	6 usable addresses
/28	14
/27	30
/26	62
/25	126
/24	254

The below chart shows the 14 counties of Massachusetts with their associated IP range assignments, the National Weather Service FIPS code for weather radio alerting, the Massachusetts county 4 letter code that is used in the AX25 hierarchical addressing template and the 1 to 6 prefixes of USPS Zip Codes in each county for NTS message routing purposes for the EMA and WMA ARRL Sections.

<u>County</u>	<u>FIPS</u>	<u>Code</u>	<u>Section</u>	<u>Subnet</u>	<u>Packet</u>	<u>Other</u>	<u>ZIP1</u>	<u>ZIP2</u>	<u>ZIP3</u>	<u>ZIP4</u>	<u>ZIP5</u>	<u>ZIP6</u>
				<u>/20</u>	<u>/21</u>	<u>/21</u>						
SPARE			MA	0	0	8						
BRISTOL	25005	BRIS	EMA	16	16	24	020	023	027			
ESSEX	25009	ESSE	EMA	32	32	40	018	019				
MIDDLESEX	25017	MIDD	EMA	48	48	56	014	017	018	021	024	
NORFOLK	25021	NORF	EMA	64	64	72	020	021	023	024	027	
PLYMOUTH	25023	PLYM	EMA	80	80	88	020	023	025	027		
SUFFOLK	25025	SUFF	EMA	96	96	204	021	022	024			
BGP			MA	112	112	120						
BARNSTABLE	25001	BARN	EMA	128	128	136	025	026				
DUKES	25007	DUKE	EMA	144	144	152	025	027				
NANTUCKET	25019	NANT	EMA	160	160	168	025					
BERKSHIRE	25003	BERK	WMA	176	176	184	012	013				
FRANKLIN	25011	FRAN	WMA	192	192	200	010	013				
HAMPDEN	25013	HAMP	WMA	208	208	216	010	011	012	015		
HAMPSHIRE	25015	HAMS	WMA	224	224	232	010	012				
WORCESTER	25027	WORC	WMA	240	240	248	010	013	014	015	016	017