

# Subnetting Tip Sheet v7

Courtesy of  
[EasySubnetting.com](http://EasySubnetting.com)

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Class of IP Addresses				
Class	Range	High Order Bits	Number of Networks	Number of Hosts
A	1-127	0	126	1,666,214
B	127-191	10	16,384	65,534
C	192-223	110	2,097,152	254
D	224-239	1110	Used for Multicasting	
E	240-255	11110	Experimental, reserved for future use	

Default Subnet Mask, Networks, and Hosts Per Class				
Class A	/8	11111111.00000000.00000000.00000000	255. 0. 0. 0	N . H . H . H
Class B	/16	11111111.11111111.00000000.00000000	255.255. 0. 0	N . N . H . H
Class C	/24	11111111.11111111.11111111.00000000	255.255.255. 0	N . N . N . H

Quick Binary Chart								
Bits, Right to Left	8	7	6	5	4	3	2	1
Octet borrow from	128	64	32	16	8	4	2	1
Custom subnet to be used	128	192	224	240	248	252	254	255
Bits Borrowed	1	2	3	4	5	6	7	8
Subnets Created (2 <sup>n</sup> )	2	4	8	16	32	64	128	256
Class C Remaining Hosts (2 <sup>n</sup> -2)		62	30	14	6	2	0	0

## Steps To Subnetting

1. Determine Class
2. Determine Default Subnet Mask
3. Determine # of Subnets  
OR
4. Determine # of Hosts
5. Determine Borrowed Bits
6. Determine Custom Subnet Mask

### To Create Custom Subnet Mask

**Subnets:** Start from LEFT to RIGHT turning bits ON (borrow) from the host portion of the default subnet mask. Add up borrowed bits and calculate number of subnets using 2<sup>n</sup> where n is the number of borrowed bits.

**Hosts:** From RIGHT to LEFT, add the number of remaining bits turned OFF and calculate the number of hosts on each subnet using 2<sup>n</sup>-2 where n is the number of remaining bits.

Bits	2 <sup>n</sup> = x (subtract 2 for useable hosts)
1	2 <sup>1</sup> = 2 (Note the results double for each bit)
2	2 <sup>2</sup> = 4
3	2 <sup>3</sup> = 8
4	2 <sup>4</sup> = 16
5	2 <sup>5</sup> = 32
6	2 <sup>6</sup> = 64
7	2 <sup>7</sup> = 128
8	2 <sup>8</sup> = 256
9	2 <sup>9</sup> = 512
10	2 <sup>10</sup> = 1,024
11	2 <sup>11</sup> = 2,048
12	2 <sup>12</sup> = 4,096
13	2 <sup>13</sup> = 8,192
14	2 <sup>14</sup> = 16,384
15	2 <sup>15</sup> = 32,768
16	2 <sup>16</sup> = 65,536
17	2 <sup>17</sup> = 131,072
18	2 <sup>18</sup> = 262,144
19	2 <sup>19</sup> = 524,288
20	2 <sup>20</sup> = 1,048,576
21	2 <sup>21</sup> = 2,097,152
22	2 <sup>22</sup> = 4,194,304
23	2 <sup>23</sup> = 8,388,608
24	2 <sup>24</sup> = 16,777,216