ASSIGNED NUMBERS

Status of this Memo

    This memo is an official status report on the numbers used in
    protocols in the Internet community. Distribution of this memo is
    unlimited.

Introduction

    This Network Working Group Request for Comments documents the
    currently assigned values from several series of numbers used in
    network protocol implementations. This RFC will be updated
    periodically, and in any case current information can be obtained
    from Joyce Reynolds. If you are developing a protocol or application
    that will require the use of a link, socket, port, protocol, etc.,
    please contact Joyce to receive a number assignment.

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        4676 Admiralty Way
        Marina del Rey, California 90292-6695

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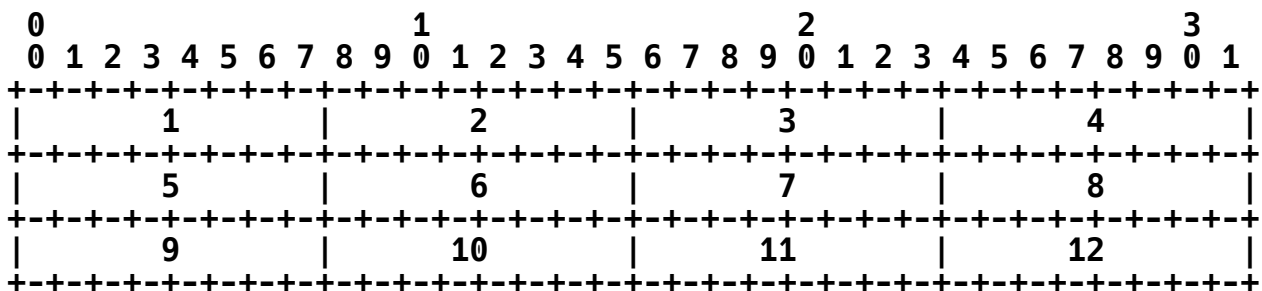   Electronic mail: JKREYNOLDS@ISI.EDU

    Most of the protocols mentioned here are documented in the RFC series
    of notes. Some of the items listed are undocumented. Further
    information on protocols can be found in the memo "Official Internet
    Protocols" [91]. The more prominent and more generally used are
    documented in the "DDN Protocol Handbook, Volume Two, DARPA Internet
    Protocols" [36] prepared by the NIC. Other collections of older or
    obsolete protocols are contained in the "Internet Protocol Transition
    Workbook" [57], or in the "ARPANET Protocol Transition Handbook"
    [38]. For further information on ordering the complete 1985 DDN
    Protocol Handbook, write: SRI International (SRI-NIC), DDN Network
    Information Center, Room EJ291, 333 Ravenswood Avenue, Meno Park,
    CA., 94025; or call: 1-800-235-3155.

    In the entries below, the name and mailbox of the responsible
    individual is indicated. The bracketed entry, e.g., [nn,iii], at the

right hand margin of the page indicates a reference for the listed
protocol, where the number ("nn") cites the document and the letters
("iii") cites the person. Whenever possible, the letters are a NIC
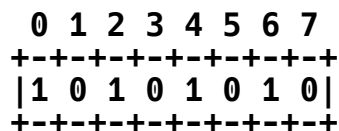Ident as used in the WhoIs (NICNAME) service.

The convention in the documentation of Internet Protocols is to
express numbers in decimal and to picture data in "big-endian" order
[14]. That is, fields are described left to right, with the most
significant octet on the left and the least significant octet on the
right.

The order of transmission of the header and data described in this
document is resolved to the octet level. Whenever a diagram shows a
group of octets, the order of transmission of those octets is the
normal order in which they are read in English. For example, in the
following diagram the octets are transmitted in the order they are
numbered.

```
    0                   1                   2                   3
    0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   |       1       |       2       |       3       |       4       |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   |       5       |       6       |       7       |       8       |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   |       9       |      10       |      11       |      12       |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Transmission Order of Bytes

Whenever an octet represents a numeric quantity the left most bit in
the diagram is the high order or most significant bit. That is, the
bit labeled 0 is the most significant bit. For example, the
following diagram represents the value 170 (decimal).

```
                         0 1 2 3 4 5 6 7
                        +-+-+-+-+-+-+-+-+
                        |1 0 1 0 1 0 1 0|
                        +-+-+-+-+-+-+-+-+
```

Significance of Bits

Similarly, whenever a multi-octet field represents a numeric quantity
the left most bit of the whole field is the most significant bit.
When a multi-octet quantity is transmitted the most significant octet
is transmitted first.

VERSION NUMBERS

In the Internet Protocol (IP) [36,80] there is a field to identify
the version of the internetwork general protocol. This field is 4
bits in size.

Assigned Internet Version Numbers

Decimal	Keyword	Version	References
0		Reserved	[JBP]
1-3		Unassigned	[JBP]
4	IP	Internet Protocol	[80,JBP]
5	ST	ST Datagram Mode	[41,JWF]
6-14		Unassigned	[JBP]
15		Reserved	[JBP]

PROTOCOL NUMBERS

   In the Internet Protocol (IP) [36,80] there is a field, called
   Protocol, to identify the the next level protocol. This is an 8 bit
   field.

   Assigned Internet Protocol Numbers

Decimal	Keyword	Protocol	References
0		Reserved	[JBP]
1	ICMP	Internet Control Message	[72,JBP]
2	IGMP	Internet Group Management	[34,JBP]
3	GGP	Gateway-to-Gateway	[49,MB]
4		Unassigned	[JBP]
5	ST	Stream	[41,JWF]
6	TCP	Transmission Control	[81,JBP]
7	UCL	UCL	[PK]
8	EGP	Exterior Gateway Protocol	[92,DLM1]
9	IGP	any private interior gateway	[JBP]
10	BBN-RCC-MON	BBN RCC Monitoring	[SGC]
11	NVP-II	Network Voice Protocol	[15,SC3]
12	PUP	PUP	[7,XEROX]
13	ARGUS	ARGUS	[RWS4]
14	EMCON	EMCON	[BN7]
15	XNET	Cross Net Debugger	[47,JFH2]
16	CHAOS	Chaos	[NC3]
17	UDP	User Datagram	[79,JBP]
18	MUX	Multiplexing	[16,JBP]
19	DCN-MEAS	DCN Measurement Subsystems	[DLM1]
20	HMP	Host Monitoring	[48,RH6]
21	PRM	Packet Radio Measurement	[ZSU]
22	XNS-IDP	XEROX NS IDP	[102,XEROX]
23	TRUNK-1	Trunk-1	[SA2]
24	TRUNK-2	Trunk-2	[SA2]
25	LEAF-1	Leaf-1	[SA2]
26	LEAF-2	Leaf-2	[SA2]
27	RDP	Reliable Data Protocol	[106,RH6]
28	IRTP	Internet Reliable Transaction	[59,TXM]
29	ISO-TP4	ISO Transport Protocol Class 4	[51,RC77]
30	NETBLT	Bulk Data Transfer Protocol	[13,DDC1]
31	MFE-NSP	MFE Network Services Protocol	[93,BCH2]
32	MERIT-INP	MERIT Internodal Protocol	[HWB]
33	SEP	Sequential Exchange Protocol	[JC120]
34-60		Unassigned	[JBP]
61		any host internal protocol	[JBP]
62	CFTP	CFTP	[42,HCF2]
63		any local network	[JBP]

```
        64      SAT-EXPAK   SATNET and Backroom EXPAK            [SHB]
        65      MIT-SUBNET  MIT Subnet Support                   [NC3]
        66      RVD         MIT Remote Virtual Disk Protocol     [MBG]
        67      IPPC        Internet Pluribus Packet Core        [SHB]
        68                  any distributed file system          [JBP]
        69      SAT-MON     SATNET Monitoring                    [SHB]
        70                  Unassigned                           [JBP]
        71      IPCV        Internet Packet Core Utility         [SHB]
     72-75                  Unassigned                           [JBP]
        76      BR-SAT-MON  Backroom SATNET Monitoring           [SHB]
        77                  Unassigned                           [JBP]
        78      WB-MON      WIDEBAND Monitoring                  [SHB]
        79      WB-EXPAK    WIDEBAND EXPAK                       [SHB]
    80-254                  Unassigned                           [JBP]
       255                  Reserved                             [JBP]
```

                          PORT NUMBERS

    Ports are used in the TCP [36,81] to name the ends of logical
    connections which carry long term conversations. For the purpose of
    providing services to unknown callers, a service contact port is
    defined. This list specifies the port used by the server process as
    its contact port. The contact port is sometimes called the
    "well-known port".

    To the extent possible, these same port assignments are used with the
    UDP [37,79].

    To the extent possible, these same port assignments are used with the
    ISO-TP4 [52].

    The assigned ports use a small portion of the possible port numbers.
    The assigned ports have all except the low order eight bits cleared
    to zero. The low order eight bits are specified here.

    Port Assignments:

Decimal	Keyword	Description	References
0		Reserved	[JBP]
1-4		Unassigned	[JBP]
5	RJE	Remote Job Entry	[9,JBP]
7	ECHO	Echo	[70,JBP]
9	DISCARD	Discard	[69,JBP]
11	USERS	Active Users	[65,JBP]
13	DAYTIME	Daytime	[68,JBP]
15		Unassigned	[JBP]
17	QUOTE	Quote of the Day	[75,JBP]
19	CHARGEN	Character Generator	[67,JBP]
20	FTP-DATA	File Transfer [Default Data]	[71,JBP]
21	FTP	File Transfer [Control]	[71,JBP]
23	TELNET	Telnet	[87,JBP]
25	SMTP	Simple Mail Transfer	[77,JBP]
27	NSW-FE	NSW User System FE	[17,RHT]
29	MSG-ICP	MSG ICP	[63,RHT]
31	MSG-AUTH	MSG Authentication	[63,RHT]
33	DSP	Display Support Protocol	[MLC]
35		any private printer server	[JBP]
37	TIME	Time	[83,JBP]
39	RLP	Resource Location Protocol	[MA]
41	GRAPHICS	Graphics	[98,JBP]
42	NAMESERVER	Host Name Server	[74,JBP]
43	NICNAME	Who Is	[46,JAKE]
44	MPM-FLAGS	MPM FLAGS Protocol	[JBP]

```
45        MPM        Message Processing Module [recv]      [73,JBP]
46        MPM-SND    MPM [default send]                    [73,JBP]
47        NI-FTP     NI FTP                               [103,SK8]
49        LOGIN      Login Host Protocol                     [PHD1]
51        LA-MAINT   IMP Logical Address Maintenance       [58,AGM]
53        DOMAIN     Domain Name Server                 [61,70,PM1]
55        ISI-GL     ISI Graphics Language                  [6,RB9]
57                   any private terminal access             [JBP]
59                   any private file service                [JBP]
61        NI-MAIL    NI MAIL                                [4,SK8]
63        VIA-FTP    VIA Systems - FTP                       [DXD]
65        TACACS-DS  TACACS-Database Service                [3,RHT]
67        BOOTPS     Bootstrap Protocol Server            [29,WJC2]
68        BOOTPC     Bootstrap Protocol Client            [29,WJC2]
69        TFTP       Trivial File Transfer                [95,DDC1]
71        NETRJS-1   Remote Job Service                     [8,RTB3]
72        NETRJS-2   Remote Job Service                     [8,RTB3]
73        NETRJS-3   Remote Job Service                     [8,RTB3]
74        NETRJS-4   Remote Job Service                     [8,RTB3]
75                   any private dial out service            [JBP]
77                   any private RJE service                 [JBP]
79        FINGER     Finger                                [44,KLH]
81        HOSTS2-NS  HOSTS2 Name Server                      [EAK1]
83        MIT-ML-DEV MIT ML Device                           [DPR]
85        MIT-ML-DEV MIT ML Device                           [DPR]
87                   any private terminal link               [JBP]
89        SU-MIT-TG  SU/MIT Telnet Gateway                   [MRC]
91        MIT-DOV    MIT Dover Spooler                       [EBM]
93        DCP        Device Control Protocol                [DT15]
95        SUPDUP     SUPDUP                                [20,MRC]
97        SWIFT-RVF  Swift Remote Vitural File Protocol      [MXR]
98        TACNEWS    TAC News                               [FRAN]
99        METAGRAM   Metagram Relay                         [GEOF]
101       HOSTNAME   NIC Host Name Server                 [45,JAKE]
102       ISO-TSAP   ISO-TSAP                              [12,MTR]
103       X400       X400                                   [HCF2]
104       X400-SND   X400-SND                               [HCF2]
105       CSNET-NS   Mailbox Name Nameserver              [96,MAS3]
107       RTELNET    Remote Telnet Service                 [76,JBP]
109       POP-2      Post Office Protocol - Version 2      [11,JKR1]
111       SUNRPC     SUN Remote Procedure Call               [DXG]
113       AUTH       Authentication Service               [99,MCSJ]
115       SFTP       Simple File Transfer Protocol         [56,MKL1]
117       UUCP-PATH  UUCP Path Service                     [35,MAE]
119       NNTP       Network News Transfer Protocol        [53,PL4]
121       ERPC       HYDRA Expedited Remote Procedure Call[101,JX0]
123       NTP        Network Time Protocol                 [60,DLM1]
125       LOCUS-MAP  Locus PC-Interface Net Map Server    [105,BXG]
```

```
127        LOCUS-CON  Locus PC-Interface Conn Server    [105,BXG]
129        PWDGEN     Password Generator Protocol       [107,FJW]
130        CISCO-FNA  CISCO FNATIVE                         [WXB]
131        CISCO-TNA  CISCO TNATIVE                         [WXB]
132        CISCO-SYS  CISCO SYSMAINT                        [WXB]
133        STATSRV    Statistics Service                   [DLM1]
134        INGRES-NET INGRES-NET Service                    [MXB]
135        LOC-SRV    Location Service                      [JXP]
136        PROFILE    PROFILE Naming System                 [LLP]
137        NETBIOS-NS NETBIOS Name Service                  [JBP]
138        NETBIOS-DGM NETBIOS Datagram Service             [JBP]
139        NETBIOS-SSN NETBIOS Session Service              [JBP]
140        EMFIS-DATA EMFIS Data Service                    [GB7]
141        EMFIS-CNTL EMFIS Control Service                 [GB7]
142        BL-IDM     Britton-Lee IDM                      [SXS1]
143-159               Unassigned                            [JBP]
160-223               Reserved                              [JBP]
224-241               Unassigned                            [JBP]
243        SUR-MEAS   Survey Measurement                   [5,AV]
245        LINK       LINK                              [10,RDB2]
247-255               Unassigned                            [JBP]
```

                         DOMAIN SYSTEM PARAMETERS

     The Internet Domain Naming System (DOMAIN) includes several
     parameters. These are documented in RFC 883 [61]. The CLASS
     parameter is listed here. The per CLASS parameters are defined in
     separate RFCs as indicated.

     Domain System Parameters:

        Decimal   Name   References
        -------   ----   ----------
              0   Reserved   [PM1]
              1   Internet   [61,PM1]
              2   Unassigned   [PM1]
              3   Chaos   [PM1]
        4-65534   Unassigned   [PM1]
          65535   Reserved   [PM1]

ARPANET LOGICAL ADDRESSES

The ARPANET facility for "logical addressing" is described in
RFC 878 [57] and RFC 1005 [109]. A portion of the possible logical
addresses are reserved for standard uses.

There are 49,152 possible logical host addresses. Of these, 256 are
reserved for assignment to well-known functions. Assignments for
well-known functions are made by Joyce Reynolds. Assignments for
other logical host addresses are made by the NIC.

Logical Address Assignments:

Decimal	Description	References
0	Reserved	[JBP]
1	The BBN Core Gateways	[MB]
2-254	Unassigned	[JBP]
255	Reserved	[JBP]

ARPANET LINK NUMBERS

The word "link" here refers to a field in the original ARPANET
Host/IMP interface leader. The link was originally defined as an
8-bit field. Later specifications defined this field as the
"message-id" with a length of 12 bits. The name link now refers to
the high order 8 bits of this 12-bit message-id field. The Host/IMP
interface is defined in BBN Report 1822 [2].

The low-order 4 bits of the message-id field are called the sub-link.
Unless explicitly specified otherwise for a particular protocol,
there is no sender to receiver significance to the sub-link. The
sender may use the sub-link in any way he chooses (it is returned in
the RFNM by the destination IMP), the receiver should ignore the
sub-link.

Link Assignments:

Decimal	Description	References
0	Reserved	[JBP]
1-149	Unassigned	[JBP]
150	Xerox NS IDP	[102,XEROX]
151	Unassigned	[JBP]
152	PARC Universal Protocol	[7,XEROX]
153	TIP Status Reporting	[JGH]
154	TIP Accounting	[JGH]
155	Internet Protocol [regular]	[80,JBP]
156-158	Internet Protocol [experimental]	[80,JBP]
159	Figleaf Link	[JBW1]
160-194	Unassigned	[JBP]
195	ISO-IP	[52,RXM]
196-247	Experimental Protocols	[JBP]
248-255	Network Maintenance	[JGH]

IEEE 802 NUMBERS OF INTEREST

Some of the networks of all classes are IEEE 802 Networks. These
systems may use a Link Service Access Point (LSAP) field in much the
same way the ARPANET uses the "link" field. Further, there is an
extension of the LSAP header called the Sub-Network Access Protocol
(SNAP).

The IEEE likes to describe numbers in binary in bit transmission
order, which is the opposite of the big-endian order used throughout
the Internet protocol documentation.

Assignments:

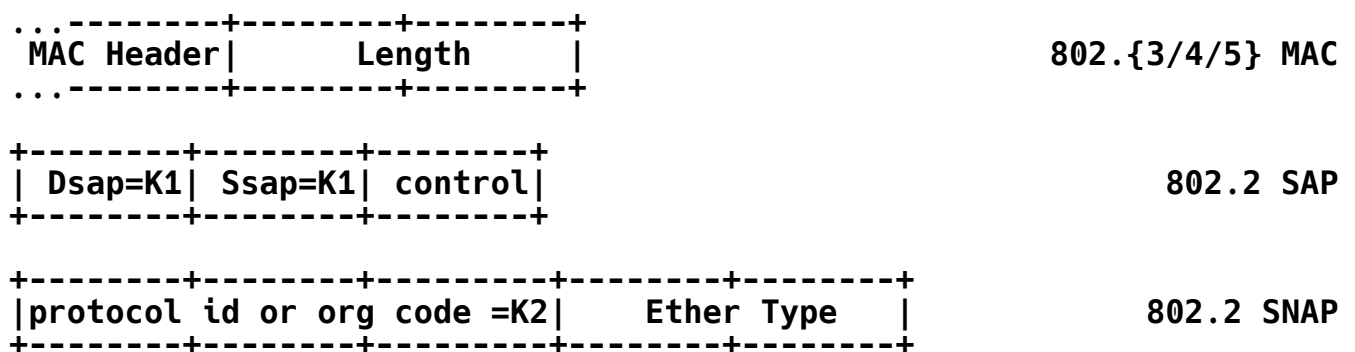| Link Service Access Point			Description	References
IEEE binary	Internet binary	decimal		
00000000	00000000	0	Null LSAP	[IEEE]
01000000	00000010	2	Indiv LLC Sublayer Mgt	[IEEE]
11000000	00000011	3	Group LLC Sublayer Mgt	[IEEE]
00100000	00000100	4	SNA Path Control	[IEEE]
01100000	00000110	6	DOD IP	[79,JBP]
01110000	00001110	14	PROWAY-LAN	[IEEE]
01110010	01001110	78	EIA-RS 511	[IEEE]
01110001	10001110	142	PROWAY-LAN	[IEEE]
01010101	10101010	170	SNAP	[IEEE]
01111111	11111110	254	ISO DIS 8473	[52,JXJ]
11111111	11111111	255	Global DSAP	[IEEE]

These numbers (and others) are assigned by the IEEE Standards Office.
The address is: IEEE Standards Office, 345 East 47th Street, New
York, N.Y. 10017, Attn: Vince Condello. Phone: (212) 705-7092.

At an ad hoc special session on "IEEE 802 Networks and ARP", held
during the TCP Vendors Workshop (August 1986), an approach to a
consistent way to send DoD-IP datagrams and other IP related
protocols on 802 networks was developed.

Due to some evolution of the IEEE 802.2 standards and the need to
provide for a standard way to do additional DoD-IP related protocols
(such as the Address Resolution Protocol (ARP) on IEEE 802 network,
the following new policy is established, which will replace the old
policy (see RFC 960 and RFC 948 [108]).

The new policy is for the Internet community to use the IEEE 802.2
encapsulation on 802.3, 802.4, and 802.5 networks by using the SNAP
with an organization code indicating that the following 16 bits
specify the EtherType code (where IP = 2048 (0800 hex), see Ethernet
Numbers of Interest).

                                                              Header

```
...--------+--------+--------+
 MAC Header|     Length      |                         802.{3/4/5} MAC
...--------+--------+--------+


+--------+--------+--------+
| Dsap=K1| Ssap=K1| control|                              802.2 SAP
+--------+--------+--------+


+--------+--------+---------+--------+--------+
|protocol id or org code =K2|    Ether Type   |          802.2 SNAP
+--------+--------+---------+--------+--------+
```

The total length of the SAP Header and the SNAP header is 8-octets,
making the 802.2 protocol overhead come out on a nice boundary.

K1 is 170. The IEEE likes to talk about things in little-endian bit
transmission order and specifies this value as 01010101. In
big-endian order, as used in Internet specifications, this becomes
10101010 binary, or AA hex, or 170 decimal.

K2 is 0 (zero).

The use of the IP LSAP (K1 = 6) is to be phased out as quickly as
possible.

                      ETHERNET NUMBERS OF INTEREST

   Many of the networks of all classes are Ethernets (10Mb) or
   Experimental Ethernets (3Mb). These systems use a message "type"
   field in much the same way the ARPANET uses the "link" field.

   If you need an Ethernet type, contact the XEROX Corporation, 2300
   Geng Road, Palo Alto, California 94303, ATTN: Ms. Pam Cance.

   Assignments:

Ethernet		Exp. Ethernet		Description	References
decimal	Hex	decimal	octal		
512	0200	512	1000	XEROX PUP	[7,XEROX]
513	0201	-	-	PUP Addr. Trans.	[XEROX]
1536	0600	1536	3000	XEROX NS IDP	[102,XEROX]
2048	0800	513	1001	DOD IP	[80,JBP]
2049	0801	-	-	X.75 Internet	[XEROX]
2050	0802	-	-	NBS Internet	[XEROX]
2051	0803	-	-	ECMA Internet	[XEROX]
2052	0804	-	-	Chaosnet	[XEROX]
2053	0805	-	-	X.25 Level 3	[XEROX]
2054	0806	-	-	ARP	[64,JBP]
2055	0807	-	-	XNS Compatability	[XEROX]
2076	081C	-	-	Symbolics Private	[DCP1]
4096	1000	-	-	Berkeley Trailer	[XEROX]
5632	1600	-	-	Valid	[XEROX]
21000	5208	-	-	BBN Simnet	[XEROX]
24577	6001	-	-	DEC MOP Dump/Load	[XEROX]
24578	6002	-	-	DEC MOP Remote Console	[XEROX]
24579	6003	-	-	DEC DECNET Phase IV	[XEROX]
24580	6004	-	-	DEC LAT	[XEROX]
24581	6005	-	-	DEC	[XEROX]
24582	6006	-	-	DEC	[XEROX]
32771	8003	-	-	Cronus VLN	[100,DT15]
32772	8004	-	-	Cronus Direct	[100,DT15]
32773	8005	-	-	HP Probe	[XEROX]
32774	8006	-	-	Nestar	[XEROX]
32784	8010	-	-	Excelan	[XEROX]
32821	8035	-	-	Reverse ARP	[40,JXM]
32824	8038	-	-	DEC LANBridge	[XEROX]
32859	805B	-	-	Stanford V Kernel experimental	[XEROX]
32860	805C	-	-	Stanford V Kernel production	[XEROX]
32892	807C	-	-	Merit Internodal	[HWB]
32923	809B	-	-	Appletalk	[XEROX]

```
   36864   9000        -       -     Loopback                [XEROX]
```

The standard for transmission of IP datagrams over Ethernets and
Experimental Ethernets is specified in RFC 894 [50] and RFC 895 [66]
respectively.

NOTE: Ethernet 48-bit address blocks are now assigned by the IEEE.

   IEEE Standards Office, 345 East 47th Street, New York, N.Y. 10017,
   Attn: Vince Condello. Phone: (212) 705-7092.

ADDRESS RESOLUTION PROTOCOL PARAMETERS

The Address Resolution Protocol (ARP) specified in RFC 826 [64] has
several parameters. The assigned values for these parameters are
listed here.

Assignments:

Operation Code (op)

     1   REQUEST
     2   REPLY

Hardware Type (hrd)

     Type   Description   References
     ----   -----------   ----------
       1   Ethernet (10Mb)   [JBP]
       2   Experimental Ethernet (3Mb)   [JBP]
       3   Amateur Radio AX.25   [PXK]
       4   Proteon ProNET Token Ring   [JBP]
       5   Chaos   [GXP]
       6   IEEE 802 Networks   [JBP]
       7   ARCNET   [JBP]

Protocol Type (pro)

     Use the same codes as listed in the section called "Ethernet
     Numbers of Interest" (all hardware types use this code set for
     the protocol type).

PUBLIC DATA NETWORK NUMBERS

One of the Internet Class A Networks is the international system of
Public Data Networks. This section lists the mapping between the
Internet Addresses and the Public Data Network Addresses (X.121).

The numbers below are assigned for networks that are connected to the
Internet, and for independent networks. These independent networks
are marked with an asterisk preceding the number.

Assignments:

*	Internet	Public Data Net	Description	References
	014.000.000.000		Reserved	[JBP]
	014.000.000.001	3110-317-00035 00	PURDUE-TN	[CAK]
	014.000.000.002	3110-608-00027 00	UWISC-TN	[CAK]
	014.000.000.003	3110-302-00024 00	UDEL-TN	[CAK]
	014.000.000.004	2342-192-00149 23	UCL-VTEST	[PK]
	014.000.000.005	2342-192-00300 23	UCL-TG	[PK]
	014.000.000.006	2342-192-00300 25	UK-SATNET	[PK]
	014.000.000.007	3110-608-00024 00	UWISC-IBM	[MAS3]
	014.000.000.008	3110-213-00045 00	RAND-TN	[MO2]
	014.000.000.009	2342-192-00300 23	UCL-CS	[PK]
	014.000.000.010	3110-617-00025 00	BBN-VAN-GW	[JD21]
*	014.000.000.011	2405-015-50300 00	CHALMERS	[UXB]
	014.000.000.012	3110-713-00165 00	RICE	[PAM6]
	014.000.000.013	3110-415-00261 00	DECWRL	[PAM6]
	014.000.000.014	3110-408-00051 00	IBM-SJ	[SA1]
	014.000.000.015	2041-117-01000 00	SHAPE	[JFW]
	014.000.000.016	2628-153-90075 00	DFVLR4-X25	[GB7]
	014.000.000.017	3110-213-00032 00	ISI-VAN-GW	[JD21]
	014.000.000.018	2624-522-80900 52	DFVLR5-X25	[GB7]
	014.000.000.019	2041-170-10000 00	SHAPE-X25	[JFW]
	014.000.000.020	5052-737-20000 50	UQNET	[AXH]
	014.000.000.021	3020-801-00057 50	DMC-CRC1	[JR17]
	014.000.000.022	2624-522-80902 77	DFVLRVAX-X25	[GB7]
*	014.000.000.023	2624-589-00908 01	ECRC-X25	[PXD]
	014.000.000.024	2342-905-24242 83	UK-MOD-RSRE	[JXE2]
	014.000.000.025	2342-905-24242 82	UK-VAN-RSRE	[AXM]
	014.000.000.026-014.255.255.254		Unassigned	[JBP]
	014.255.255.255		Reserved	[JBP]

The standard for transmission of IP datagrams over the Public Data
Network is specified in RFC 877 [55].

TELNET OPTIONS

The Telnet Protocol has a number of options that may be negotiated.
These options are listed here. "Official Internet Protocols" [91]
provides more detailed information.

Options	Name	References
0	Binary Transmission	[85,JBP]
1	Echo	[86,JBP]
2	Reconnection	[33,JBP]
3	Suppress Go Ahead	[89,JBP]
4	Approx Message Size Negotiation	[102,JBP]
5	Status	[88,JBP]
6	Timing Mark	[90,JBP]
7	Remote Controlled Trans and Echo	[82,JBP]
8	Output Line Width	[31,JBP]
9	Output Page Size	[32,JBP]
10	Output Carriage-Return Disposition	[21,JBP]
11	Output Horizontal Tab Stops	[25,JBP]
12	Output Horizontal Tab Disposition	[24,JBP]
13	Output Formfeed Disposition	[22,JBP]
14	Output Vertical Tabstops	[27,JBP]
15	Output Vertical Tab Disposition	[26,JBP]
16	Output Linefeed Disposition	[23,JBP]
17	Extended ASCII	[104,JBP]
18	Logout	[18,MRC]
19	Byte Macro	[28,JBP]
20	Data Entry Terminal	[30,JBP]
22	SUPDUP	[19,20,MRC]
22	SUPDUP Output	[43,MRC]
23	Send Location	[54,EAK1]
24	Terminal Type	[97,MAS3]
25	End of Record	[78,JBP]
26	TACACS User Identification	[1,BA4]
27	Output Marking	[94,SXS]
28	Terminal Location Number	[62,RN6]
255	Extended-Options-List	[84,JBP]

MACHINE NAMES

These are the Official Machine Names as they appear in the NIC Host
Table. Their use is described in RFC 810 [39].

A machine name or CPU type may be up to 40 characters taken from the
set of uppercase letters, digits, and the two punctuation characters
hyphen and slash. It must start with a letter, and end with a letter
or digit.

```
ALTO
AMDAHL-V7
APOLLO
ATT-3B20
BBN-C/60
BURROUGHS-B/29
BURROUGHS-B/4800
BUTTERFLY
C/30
C/70
CADLINC
CADR
CDC-170
CDC-170/750
CDC-173
CELERITY-1200
COMTEN-3690
CP8040
CRAY-1
CRAY-X/MP
CRAY-2
CTIWS-117
DANDELION
DEC-10
DEC-1050
DEC-1077
DEC-1080
DEC-1090
DEC-1090B
DEC-1090T
DEC-2020T
DEC-2040
DEC-2040T
DEC-2050T
DEC-2060
DEC-2060T
DEC-2065
DEC-FALCON
```

        DEC-KS10
        DORADO
        DPS8/70M
        ELXSI-6400
        FOONLY-F2
        FOONLY-F3
        FOONLY-F4
        GOULD
        GOULD-6050
        GOULD-6080
        GOULD-9050
        GOULD-9080
        H-316
        H-60/68
        H-68
        H-68/80
        H-89
        HONEYWELL-DPS-6
        HONEYWELL-DPS-8/70
        HP3000
        HP3000/64
        IBM-158
        IBM-360/67
        IBM-370/3033
        IBM-3081
        IBM-3084QX
        IBM-3101
        IBM-4331
        IBM-4341
        IBM-4361
        IBM-4381
        IBM-4956
        IBM-PC
        IBM-PC/AT
        IBM-PC/XT
        IBM-SERIES/1
        IMAGEN
        IMAGEN-8/300
        IMSAI
        INTEGRATED-SOLUTIONS
        INTEGRATED-SOLUTIONS-68K
        INTEGRATED-SOLUTIONS-CREATOR
        INTEGRATED-SOLUTIONS-CREATOR-8
        INTEL-IPSC
        IS-1
        IS-68010
        LMI
        LSI-11

```
        LSI-11/2
        LSI-11/23
        LSI-11/73
        M68000
        MASSCOMP
        MC500
        MC68000
        MICROVAX
        MICROVAX-I
        MV/8000
        NAS3-5
        NCR-COMTEN-3690
        NOW
        ONYX-Z8000
        PDP-11
        PDP-11/3
        PDP-11/23
        PDP-11/24
        PDP-11/34
        PDP-11/40
        PDP-11/44
        PDP-11/45
        PDP-11/50
        PDP-11/70
        PDP-11/73
        PE-7/32
        PE-3205
        PERQ
        PLEXUS-P/60
        PLI
        PLURIBUS
        PRIME-2350
        PRIME-2450
        PRIME-2755
        PRIME-9655
        PRIME-9755
        PRIME-9955II
        PRIME-2250
        PRIME-2655
        PRIME-9955
        PRIME-9950
        PRIME-9650
        PRIME-9750
        PRIME-2250
        PRIME-750
        PRIME-850
        PRIME-550II
        PYRAMID-90
```

        PYRAMID-90MX
        PYRAMID-90X
        RIDGE
        RIDGE-32
        RIDGE-32C
        ROLM-1666
        S1-MKIIA
        SMI
        SEQUENT-BALANCE-8000
        SIEMENS
        SILICON-GRAPHICS
        SILICON-GRAPHICS-IRIS
        SPERRY-DCP/10
        SUN
        SUN-2
        SUN-2/50
        SUN-2/100
        SUN-2/120
        SUN-2/140
        SUN-2/150
        SUN-2/160
        SUN-2/170
        SUN-3/160
        SUN-3/50
        SUN-3/75
        SUN-3/110
        SUN-50
        SUN-100
        SUN-120
        SUN-130
        SUN-150
        SUN-170
        SUN-68000
        SYMBOLICS-3600
        SYMBOLICS-3670
        TANDEM-TXP
        TEK-6130
        TI-EXPLORER
        TP-4000
        TRS-80
        UNIVAC-1100
        UNIVAC-1100/60
        UNIVAC-1100/62
        UNIVAC-1100/63
        UNIVAC-1100/64
        UNIVAC-1100/70
        UNIVAC-1160
        VAX-11/725

        VAX-11/730
        VAX-11/750
        VAX-11/780
        VAX-11/785
        VAX-11/790
        VAX-11/8600
        VAX-8600
        WANG-PC002
        WANG-VS100
        WANG-VS400
        XEROX-1108
        XEROX-8010

SYSTEM NAMES

These are the Official System Names as they appear in the NIC Host
Table. Their use is described in RFC 810 [39].

A system name may be up to 40 characters taken from the set of
uppercase letters, digits, and the two punctuation characters hyphen
and slash. It must start with a letter, and end with a letter or
digit.

AEGIS
APOLLO
BS-2000
CEDAR
CGW
CHRYSALIS
CMOS
CMS
COS
CPIX
CTOS
CTSS
DCN
DDNOS
DOMAIN
EDX
ELF
EMBOS
EMMOS
EPOS
FOONEX
FUZZ
GCOS
GPOS
HDOS
IMAGEN
INTERCOM
IMPRESS
INTERLISP
IOS
ITS
LISP
LISPM
LOCUS
MINOS
MOS
MPE5
MSDOS

        MULTICS
        MVS
        MVS/SP
        NEXUS
        NMS
        NONSTOP
        NOS-2
        OS/DDP
        OS4
        OS86
        OSX
        PCDOS
        PERQ/OS
        PLI
        PSDOS/MIT
        PRIMOS
        RMX/RDOS
        ROS
        RSX11M
        SATOPS
        SCS
        SIMP
        SWIFT
        TAC
        TANDEM
        TENEX
        TOPS10
        TOPS20
        TP3010
        TRSDOS
        ULTRIX
        UNIX
        UT2D
        V
        VM
        VM/370
        VM/CMS
        VM/SP
        VMS
        VMS/EUNICE
        VRTX
        WAITS
        WANG
        XDE
        XENIX

PROTOCOL AND SERVICE NAMES

These are the Official Protocol Names. Their use is described in
greater detail in RFC 810 [39].

A protocol or service may be up to 40 characters taken from the set
of uppercase letters, digits, and the punctuation character hyphen.
It must start with a letter, and end with a letter or digit.

```
ARGUS                 - ARGUS Protocol
AUTH                  - Authentication Service
BBN-RCC-MON           - BBN RCC Monitoring
BL-IDM                - Britton Lee Intelligent Database Machine
BOOTPC                - Bootstrap Protocol Client
BOOTPS                - Bootstrap Protocol Server
BR-SAT-MON            - Backroom SATNET Monitoring
CFTP                  - CFTP
CHAOS                 - CHAOS Protocol
CHARGEN               - Character Generator Protocol
CISCO-FNA             - CISCO FNATIVE
CISCO-TNA             - CISCO TNATIVE
CISCO-SYS             - CISCO SYSMAINT
CLOCK                 - DCNET Time Server Protocol
COOKIE-JAR            - Cookie Jar Authentication Procedure
CSNET-NS              - CSNET Mailbox Nameserver Protocol
DAYTIME               - Daytime Protocol
DCN-MEAS              - DCN Measurement Subsystems Protocol
DCP                   - Device Control Protocol
DISCARD               - Discard Protocol
DOMAIN                - Domain Name Server
ECHO                  - Echo Protocol
EGP                   - Exterior Gateway Protocol
EMCON                 - Emission Control Protocol
EMFIS-CNTL            - EMFIS Control Service
EMFIS-DATA            - EMFIS Data Service
FINGER                - Finger Protocol
FTP                   - File Transfer Protocol
FTP-DATA              - File Transfer Protocol Data
GGP                   - Gateway Gateway Protocol
GRAPHICS              - Graphics Protocol
HMP                   - Host Monitoring Protocol
HOST2-NS              - Host2 Name Server
HOSTNAME              - Hostname Protocol
ICMP                  - Internet Control Message Protocol
IGMP                  - Internet Group Management Protocol
IGP                   - Interior Gateway Protocol
INGRES-NET            - INGRES-NET Service
IP                    - Internet Protocol
```

```
     IPCU            - Internet Packet Core Utility
     IPPC            - Internet Pluribus Packet Core
     IRTP            - Internet Reliable Transaction Protocol
     ISI-GL          - ISI Graphics Language Protocol
     ISO-TP4         - ISO Transport Protocol Class 4
     ISO-TSAP        - ISO TSAP
     LA-MAINT        - IMP Logical Address Maintenance
     LEAF-1          - Leaf-1 Protocol
     LEAF-2          - Leaf-2 Protocol
     LINK            - Link Protocol
     LOC-SRV         - Location Service
     LOGIN           - Login Host Protocol
     MERIT-INP       - MERIT Internodal Protocol
     METAGRAM        - Metagram Relay
     MIT-ML-DEV      - MIT ML Device
     MFE-NSP         - MFE Network Services Protocol
     MIT-SUBNET      - MIT Subnet Support
     MIT-DOV         - MIT Dover Spooler
     MPM             - Internet Message Protocol (Multimedia Mail)
     MPM-FLAGS       - MPM Flags Protocol
     MPM-SND         - MPM Send Protocol
     MSG-AUTH        - MSG Authentication Protocol
     MSG-ICP         - MSG ICP Protocol
     MUX             - Multiplexing Protocol
     NAMESERVER      - Host Name Server
     NETBIOS-DGM     - NETBIOS Datagram Service
     NETBIOS-NS      - NETBIOS Name Service
     NETBIOS-SSN     - NETBIOS Session Service
     NETBLT          - Bulk Data Transfer Protocol
     NETED           - Network Standard Text Editor
     NETRJS          - Remote Job Service
     NI-FTP          - NI File Transfer Protocol
     NI-MAIL         - NI Mail Protocol
     NICNAME         - Who Is Protocol
     NSW-FE          - NSW User System Front End
     NTP             - Network Time Protocol
     NVP-II          - Network Voice Protocol
     POP2            - Post Office Protocol - Version 2
     PRM             - Packet Radio Measurement
     PUP             - PUP Protocol
     PWDGEN          - Password Generator Protocol
     QUOTE           - Quote of the Day Protocol
     RDP             - Reliable Data Protocol
     RJE             - Remote Job Entry
     RLP             - Resource Location Protocol
     RTELNET         - Remote Telnet Service
     RVD             - Remote Virtual Disk Protocol
     SAT-EXPAK       - Satnet and Backroom EXPAK
```

```
    SAT-MON             - SATNET Monitoring
    SEP                 - Sequential Exchange Protocol
    SFTP                - Simple File Transfer Protocol
    SMTP                - Simple Mail Transfer Protocol
    ST                  - Stream Protocol
    STATSRV             - Statistics Service
    SU-MIT-TG           - SU/MIT Telnet Gateway Protocol
    SUNRPC              - SUN Remote Procedure Call
    SUPDUP              - SUPDUP Protocol
    SUR-MEAS            - Survey Measurement
    SWIFT-RVF           - Remote Virtual File Protocol
    TACACS-DS           - TACACS-Database Service
    TACNEWS             - TAC News
    TCP                 - Transmission Control Protocol
    TELNET              - Telnet Protocol
    TFTP                - Trivial File Transfer Protocol
    TIME                - Time Server Protocol
    TRUNK-1             - Trunk-1 Protocol
    TRUNK-2             - Trunk-2 Protocol
    UCL                 - University College London Protocol
    UDP                 - User Datagram Protocol
    NNTP                - Network News Transfer Protocol
    USERS               - Active Users Protocol
    UUCP-PATH           - UUCP Path Service
    VIA-FTP             - VIA Systems-File Transfer Protocol
    WB-EXPAK            - Wideband EXPAK
    WB-MON              - Wideband Monitoring
    XNET                - Cross Net Debugger
    XNS-IDP             - Xerox NS IDP
```

TERMINAL TYPE NAMES

These are the Official Terminal Type Names. Their use is described
in RFC 930 [97]. The maximum length of a name is 40 characters.

A terminal names may be up to 40 characters taken from the set of
uppercase letters, digits, and the two punctuation characters hyphen
and slash. It must start with a letter, and end with a letter or
digit.

```
ADDS-CONSUL-980
ADDS-REGENT-100
ADDS-REGENT-20
ADDS-REGENT-200
ADDS-REGENT-25
ADDS-REGENT-40
ADDS-REGENT-60
AMPEX-DIALOGUE-80
ANDERSON-JACOBSON-630
ANDERSON-JACOBSON-832
ANDERSON-JACOBSON-841
ANN-ARBOR-AMBASSADOR
ARDS
BITGRAPH
BUSSIPLEXER
CALCOMP-565
CDC-456
CDI-1030
CDI-1203
CLNZ
COMPUCOLOR-II
CONCEPT-100
CONCEPT-104
CONCEPT-108
DATA-100
DATA-GENERAL-6053
DATAGRAPHIX-132A
DATAMEDIA-1520
DATAMEDIA-1521
DATAMEDIA-2500
DATAMEDIA-3025
DATAMEDIA-3025A
DATAMEDIA-3045
DATAMEDIA-3045A
DATAMEDIA-DT80/1
DATAPOINT-2200
DATAPOINT-3000
DATAPOINT-3300
```

        DATAPOINT-3360
        DEC-DECWRITER-I
        DEC-DECWRITER-II
        DEC-GT40
        DEC-GT40A
        DEC-GT42
        DEC-LA120
        DEC-LA30
        DEC-LA36
        DEC-LA38
        DEC-VT05
        DEC-VT100
        DEC-VT132
        DEC-VT50
        DEC-VT50H
        DEC-VT52
        DELTA-DATA-5000
        DELTA-TELTERM-2
        DIABLO-1620
        DIABLO-1640
        DIGILOG-333
        DTC-300S
        EDT-1200
        EXECUPORT-4000
        EXECUPORT-4080
        GENERAL-TERMINAL-100A
        GSI
        HAZELTINE-1500
        HAZELTINE-1510
        HAZELTINE-1520
        HAZELTINE-2000
        HP-2621
        HP-2621A
        HP-2621P
        HP-2626
        HP-2626A
        HP-2626P
        HP-2640
        HP-2640A
        HP-2640B
        HP-2645
        HP-2645A
        HP-2648
        HP-2648A
        HP-2649
        HP-2649A
        IBM-3101
        IBM-3101-10

  IBM-3275-2
  IBM-3276-2
  IBM-3276-3
  IBM-3276-4
  IBM-3277-2
  IBM-3278-2
  IBM-3278-3
  IBM-3278-4
  IBM-3278-5
  IBM-3279-2
  IBM-3279-3
  IMLAC
  INFOTON-100
  INFOTONKAS
  ISC-8001
  LSI-ADM-3
  LSI-ADM-31
  LSI-ADM-3A
  LSI-ADM-42
  MEMOREX-1240
  MICROBEE
  MICROTERM-ACT-IV
  MICROTERM-ACT-V
  MICROTERM-MIME-1
  MICROTERM-MIME-2
  NETRONICS
  NETWORK-VIRTUAL-TERMINAL
  OMRON-8025AG
  PERKIN-ELMER-1100
  PERKIN-ELMER-1200
  PERQ
  PLASMA-PANEL
  QUME-SPRINT-5
  SOROC
  SOROC-120
  SOUTHWEST-TECHNICAL-PRODUCTS-CT82
  SUPERBEE
  SUPERBEE-III-M
  TEC
  TEKTRONIX-4010
  TEKTRONIX-4012
  TEKTRONIX-4013
  TEKTRONIX-4014
  TEKTRONIX-4023
  TEKTRONIX-4024
  TEKTRONIX-4025
  TEKTRONIX-4027
  TELERAY-1061

        TELERAY-3700
        TELERAY-3800
        TELETEC-DATASCREEN
        TELETERM-1030
        TELETYPE-33
        TELETYPE-35
        TELETYPE-37
        TELETYPE-38
        TELETYPE-43
        TELEVIDEO-912
        TELEVIDEO-920
        TELEVIDEO-920B
        TELEVIDEO-920C
        TELEVIDEO-950
        TERMINET-1200
        TERMINET-300
        TI-700
        TI-733
        TI-735
        TI-743
        TI-745
        TYCOM
        UNIVAC-DCT-500
        VIDEO-SYSTEMS-1200
        VIDEO-SYSTEMS-5000
        VISUAL-200
        XEROX-1720
        ZENITH-H19
        ZENTEC-30

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