

Internet Protocol Definitions

We have only supplied definitions for those words and acronyms that you will need to know while diagnosing you're MSS II.

Soft Reset: Power down and Restart.

Performing a soft reset by powering down your routers, switches, and modems, allows them to release the current network configuration information from memory. Upon powering the devices back on it allows them to automatically rediscover the correct configuration information.

Hard Reset: Resetting components to factory defaults.

This refers to an operation that generally requires a special button sequence to press, and reading the instructions that came with your network devices, which include the MSS II, routers, and modems. (Switches typically don't have reset buttons) Reset buttons are generally on the back of the device, and are accessed through a small hole with a paperclip to set the device back to factory defaults.

Internet Protocol (IP) also (TCP/IP) Address:

A typical phone number looks like this 408-867-5309. A computer phone number or IP address looks like 182-202-198-172. This phone number or IP address as the computer industry calls it, is usually supplied by a **DHCP** server and is assigned (leased) to the **MAC** address on your computers network interface card. Everything on your network will have a specific **IP** and **MAC** (machine address). A computer with multiple network adapters will have a separate **IP** and **MAC** address for each adapter, and each one must be in a different subnet.

Subnet Mask – The internet has been dubbed the information super highway, and it is subject to slowing, and traffic jams. The subnet mask is used to separate portions of a network to help with performance and is used in conjunction with the IP address to determine which subnet an adapter belongs to. At the simplest level, communication is only possible between two network interface cards when they're in the same subnet.

Default Gateway – On most home networks the default gateway is the **IP** address of your **Internet Service Providers Router**. When you start adding devices to your home network that require the addition of a **Router** the default gateway becomes the IP address of your Router and your ISP is then listed as a DNS server on your network. All devices that are capable of connecting to the internet from your home network must use the default gateway to send and receive data over the internet.

DHCP Server – (**D**ynamic **H**ost **C**onfiguration **P**rotocol) This is the portion of a network that acts like a telephone switchboard operator. When logging on to the web your computer system requests an **IP** (phone number) address from the **DHCP** server allowing you access to the internet. Most everybody's networks are configured to obtain an **IP** address automatically, because it's easiest and most efficient. The **DHCP** server manages the **IP** (computer phone numbers) addresses and allows you to lease a line while connected. When you disconnect from the internet the DHCP server will lease the number to another computer requesting access to the internet. The DHCP server also keeps track of the numbers that are currently being used and makes sure that your IP address isn't leased to another computer while you're connected. Allowing DHCP servers to automatically control the lease of IP addresses keeps the service from running out of IP numbers.

DNS Servers – The **D**omain **N**ame **S**ystem serves as the internet phone book by associating various sorts of information and translating human readable computer hostnames (like www.seagate.com) into the **IP** addresses like (63.146.109.227) that networking equipment can understand, and deliver. The **D**omain **N**ame **S**ystem also keeps a list of the available mail exchange servers for the given domain.

Ethernet cable: This is the cable that is used to connect all devices on your network. You will also see the Ethernet cables referred to as Cat5E, Cat6E cables or its official designation 10BaseT. The Ethernet cable has 8 wires twisted into 4 pairs of brown, blue, green, and orange. Ethernet cable connectors (called RJ-45) resemble phone cable connectors and are roughly twice the size of a normal phone cable connector. Phone cable connectors are called RJ-11 and they can accommodate 6 wires.

Crossover Cable: A crossover cable allows two host devices to communicate without the use of a switch, hub, or router. Connecting 2 host devices with a regular Ethernet cable is the same as trying to carry on a conversation while speaking through the wrong end of a telephone receiver. Ethernet cables have 8 wires though they only use 4 of them to send and receive data. The orange and green wires are switched on one end of the cable allowing two host devices to directly connect, eliminating any switches and routers that can cause diagnostic problems. The crossover cable looks exactly like a normal Ethernet cable except the message transmit wires, are switched with the message received wires on one of the connectors, this keeps the data from crashing into each other on the transmit and receive channels. Switching the wires allows the send and receive data to loop properly between both devices when connected to a 10/100 Network Interface Card.

Network: A network can be classified as any interconnected system, like the Internet, Cable TV, Satellite TV, and Cell Phones. All of these interconnected devices are nothing more than our original phone lines evolution through the use of new technologies and electronics. A computer network does nothing more than allow 2 computers the ability to communicate and exchange information by wire, or wirelessly.

Network Interface Card: Abbreviated as **NIC**, and also known as Ethernet Card, Network Card, Network adapter, Ethernet adapter, or Gigabit Card. Consider the NIC as your computer's telephone.

Network cards are available in 3 flavors 10/100 Mbps, 10/100/1000 Mbps, and wireless. The 10/100 cards can switch between 10 Mbps to 100 Mbps automatically depending upon network traffic situations, and the 10/100/1000 performs the same basic operation but can transfer data up to 10 times faster than the 10/100 card. The network cards transfer capabilities are rated in **Mega bits per second**, and most of today's computers come with the **NIC** card already embedded into the motherboard of the system. Every **NIC** has an **MAC** address assigned to it so no two **NIC** cards are alike, and a computer can be equipped with more than one card.

MAC Address: The **Media Access Control** address (or machine address) is a 48 bit number assigned to the **NIC** Ethernet adapter in your computer. It is very much like the address on the front of your house, or the license plate on your car, and it gives your machine its own identity on the network.

MAC addresses are unique and no 2 network devices by any manufacturer anywhere in the world can have the same **MAC** address. If you type `ipconfig /all` from the command prompt your pc's **MAC** address will be displayed after the **Physical Address** : **00-0F-B0-C0-3B-AD** line. When ever you send an email, the **MAC** address, TCP/IP address, and email address are sent in a string of identity characters.

Firewall: A firewall is a hardware or software device which is configured to allow, deny, or regulate the flow of traffic through computer networks with different levels of trust. Most home routers have a hardware firewall enabled by default and they protect your LAN from malicious intrusions over the internet. The hardware firewall included with your router is positioned between your home LAN and the internet. The biggest problems we face are the software firewalls that are enabled between your local computer and your router. Typically your operating system and virus software have the firewall enabled by default. Having more than one firewall enabled can halt all data transfers over your network.

Gateway: The gateway supplied by your network's router serves as an entrance to another network, which is usually the internet, or your internet service provider.

Hub: A Hub supplies common connection points for devices in a network. They are commonly used to connect segments of a [LAN](#). A hub generally has 4, 8, or more Ethernet ports. Hubs are the slow poke of your network because they don't know where to send the data when they receive it, so they copy all the data to every other port until it reaches its intended host. Hubs only allow one device to transmit data at a time, and since they can't manage the flow of data they often have a lot of data collisions resulting in a slow performing network. Only use a hub if you absolutely have to.

Switch: Switches usually have 8 connections and they are used to expand the device capabilities on your network by connecting directly to a router. Routers usually only have 4 connections and they tend to fill up quick. Switches are much more efficient than hubs because they can look at the messages that are sent, examine the MAC address in the message, and send it to the correct port and computer, or MSS II. Switches don't need to be configured on your network, once they are connected to the **DHCP** router an **IP** address is issued (Leased) and the switch starts delivering messages appropriately.

Router: The router is the telephone switchboard operator of your home's network, it performs a lot of functions behind the scenes that allow all your home networking components to communicate flawlessly. Routers typically include configuration software to help set up your home network. After the initial setup most routers can be re-configured from an Internet Explorer window. A router typically includes a 4 - 8 port Ethernet switch or hub, all routers have a **WAN** Port that connects to a DSL or cable modem for broadband Internet service, and the integrated switch allows users to easily create a **LAN**.

The role played by the router in most home networks is message/data handler, DHCP server, DNS proxy server, gateway, wireless connection, and hardware firewall. The router is connected to at least two networks, and is most commonly connected to your homes local area network, and your internet service provider's network. Routers are located at gateways, the place where two or more networks connect. Routers have the ability to look at the data that is flowing, but they don't have the ability to read it. The router determines the destination by looking at the header information (numbers) of the data flow. The router also uses a few other tools such as **Internet Control Message Protocol (ICMP)** and a **Network Address Translator** to determine the most efficient path for delivery.

LAN: Local Area Network is also known as a domain. Your LAN is your own personal network in your house that allows all your devices to talk to each other via router, switch, and wireless connection. Your domain or LAN stops at your routers gateway. When you pass information through your routers gateway to connect to the internet, you are connecting to your Internet Service Providers domain, or (**WAN**) Wide Area Network. Your router is always connected to your internet service providers modem whether it's cable, or DSL.

Packet: This is how networks handle the data that is sent from point to point, it is formatted into chunks of data called packets or IP packets.

UDP: User Datagram Protocol is used by programs on networked computers to send short messages called datagrams. This protocol is mainly used to reduce overhead by avoiding checking the data packets that are sent. This protocol is mainly used by time sensitive applications that prefer dropped packets of information over delayed packets. The most common network applications that use **UDP** include online games, **DNS**, media streamers such as **VoIP**, **TFTP**, and **IPTV**.