$C\epsilon$

MADE IN
USA

i.Server
MicroServer™

Pressure/Temp

http://192.168.1.200

Pressure/Temp
Alarm SP1(above)=0095.0 F   Alarm SP2(below)=0

Temperature   78.3   F   Archives_Inactive

122

9/Div

32

Mon Jul 24 09:42:10 PST 2006

1 Day
1 Minute
1 Hour
1 Day
1 Week
1 Month
1 Year

(1 Hour/Div)

Main Menu

1020.8hP
108.2 °F

UNITS TIME STBY BKLT

BAROMETER/TEMPERATURE
i.Server MicroServer

omega.com®

i.BTX–M

Barometric Pressure
+ Temperature

omega.com®
Ω OMEGA®

OMEGAnet® On-Line Service	Internet e-mail
www.omega.com	info@omega.com

Servicing North America:

USA:
ISO 9001 Certified

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Stamford CT 06907-0047
TEL: (203) 359-1660   FAX: (203) 359-7700
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i

LIST OF FIGURES:

LIST OF TABLES:

NOTES, WARNINGS and CAUTIONS

Information that is especially important to note is identified by the following labels:

- **NOTE**
- **WARNING or CAUTION**
- **IMPORTANT**
- **TIP**

NOTE: Provides you with information that is important to successfully setup and use the iServer.

CAUTION: Tells you about the risk of electrical shock.

CAUTION: Risk of danger. Tells you of circumstances or practices that can effect the instrument's functionality and must refer to accompanying documents.

TIP: Provides you helpful hints.

FEATURES

- **Virtual Chart Recorder**
- **Web Server**
- **Temperature**
- **Barometric Pressure**
- **Accurate Readings**
- **Password Protection**
- **Email Alarms**
- **Data Logging**
- **Two Relay Alarms**
- **2, 4 or 8M bytes Flash Memory Card**
- **Real-Time Clock**
- **LCD Display**
- **UPS / Stand-alone 9Vdc Battery**

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PART 1

INTRODUCTION

1.1 Safety and EMC Considerations

Refer to the CE Approvals Section.

EMC Considerations

• Whenever EMC is an issue, always use shielded cables.
• Never run signal and power wires in the same conduit.
• Use twisted-pair wires for signal connections.
• Install Ferrite Bead(s) on signal wires close to the instrument if EMC problems persist.

Failure to follow all instructions and warnings may result in injury!

1.2 Before You Begin

Inspecting Your Shipment: Remove the packing slip and verify that you have received everything listed. Inspect the container and equipment for signs of damage as soon as you receive the shipment. Note any evidence of rough handling in transit. Immediately report any damage to the shipping agent. The carrier will not honor damage claims unless all shipping material is saved for inspection. After examining and removing the contents, save the packing material and carton in the event reshipment is necessary.

Customer Service: If you need assistance, please contact the Customer Service Department nearest you.

Manuals, Software: The latest Operation Manual as well as free software and iServer Mail Notifier are available at **the website listed on the cover page of this manual or on the CD-ROM enclosed with your shipment**.

1.3 Description

View Temperature + Barometric Pressure with a Web Browser. The iServer let's you monitor and record Temperature and Barometric Pressure over an Ethernet network or the Internet with no special software except a Web browser. The iServer serves Active Web Pages to display real time readings and display charts of temperature and barometric pressure, or log data in standard data formats for use in a spreadsheet or data acquisition program such as Excel or Visual Basic.

Adjustable Charts. The Java™ Applet chart scales are fully adjustable on the fly. For example, the chart can display one day, one week, one month or one year. Temperature and barometric pressure can be charted across the full span (0-70ºC) or within any narrow range (such as 20-30ºC). Barometric pressure can be displayed in hectopascals (hPa), millimeters of Mercury (mmHg), or inches of Mercury (inHg).

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Award-winning Technology. The iServer is simple to install and use. It features award winning technology that requires no special software except a Web browser. The iServer connects to an Ethernet Network with a standard RJ45 connector and sends data in standard TCP/IP packets. It is easily configured with a simple menu using a Web browser and can be password protected. From within an Ethernet LAN or over the Internet, the user simply types its IP address or an easy to remember name such as "Cleanroom 5" or "Midwest Server Room" in any Web Browser, and the iServer serves a Web Page with the current readings. The iServer comes complete with one temperature/barometric pressure wand probe, full documentation and software.

Alarms and Email. If temperature and/or barometric pressure exceeds a set limit, the iServer can trigger an alarm that could be sent by email to an Internet enabled pager or cell phone.

A standard web browser can be used to monitor and chart temperature and barometric pressure. The browser can also be used to configure the device's IP address, passwords for access and overall configuration parameters. An iLD Big Display can display temperature and barometric pressure received from an iServer over the Ethernet or the Internet.

The following example illustrates how you can hookup an iServer and iLD to your network:
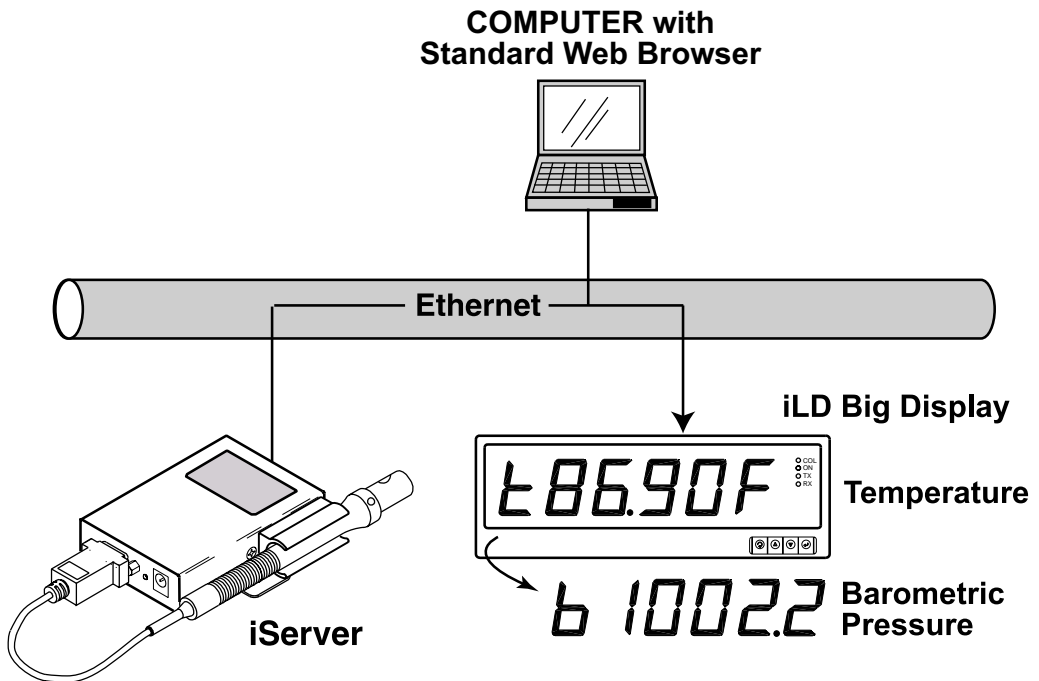
Figure 1.1 iServer and iLD Big Display on the Ethernet Network

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PART 2 HARDWARE

2.1 Mounting

Position unit where required. Mark and drill holes as required.

Note ☞ If unit is to be mounted on a flat surface, you may take the bottom rubber feet off the unit.

Note ☞ It is recommended that you ground your unit by wrapping a wire around the mounting tab screw and tightening a lock washer so that it embeds itself into the metal of the mounting tab. Or by connecting a wire to the Return/Ground position of the relay connector, see **Figure 2.7**.

2.2 DIP Switches

The iServer is shipped with all DIP switches in **"OFF"** position.

DIP Switch Usage

1) N/C - not used
2) To change to default factory settings
3) To enable/disable DHCP
4) N/C - not used

Note ☞ To set the iServer to factory default settings, slide DIP switch #2 to ON position. Power the iServer on and wait about 10 seconds until the iServer fully boots up. Set the DIP switch #2 back to OFF position (it does not matter if the iServer is powered ON or OFF, just make sure that the DIP switch is set to OFF, otherwise, every time the unit is power-cycled the factory settings will take over.

Note ☞ To enable the DHCP, slide DIP switch #3 to ON position and power the unit on. Besides using DIP switch #3 you can enable DHCP by settting the iServer's IP address to 0.0.0.0.   An iServer with IP address of 0.0.0.0 will request an IP address, gateway address, and subnet mask from the DHCP server over the Ethernet.
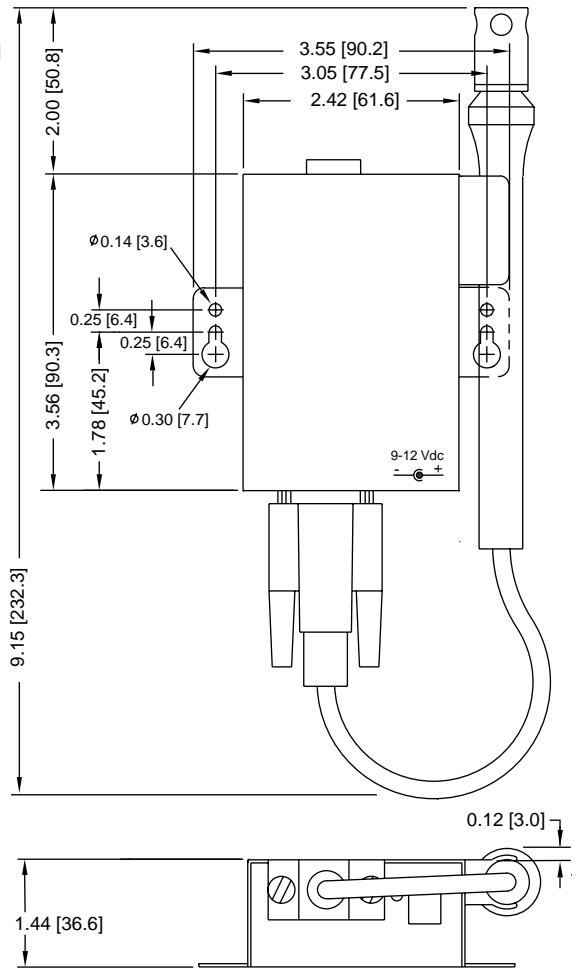
Figure 2.1 Mounting
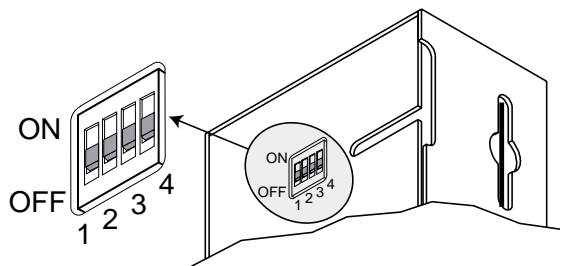
Figure 2.2 DIP Switches

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2.3 Parts of the iServer Unit
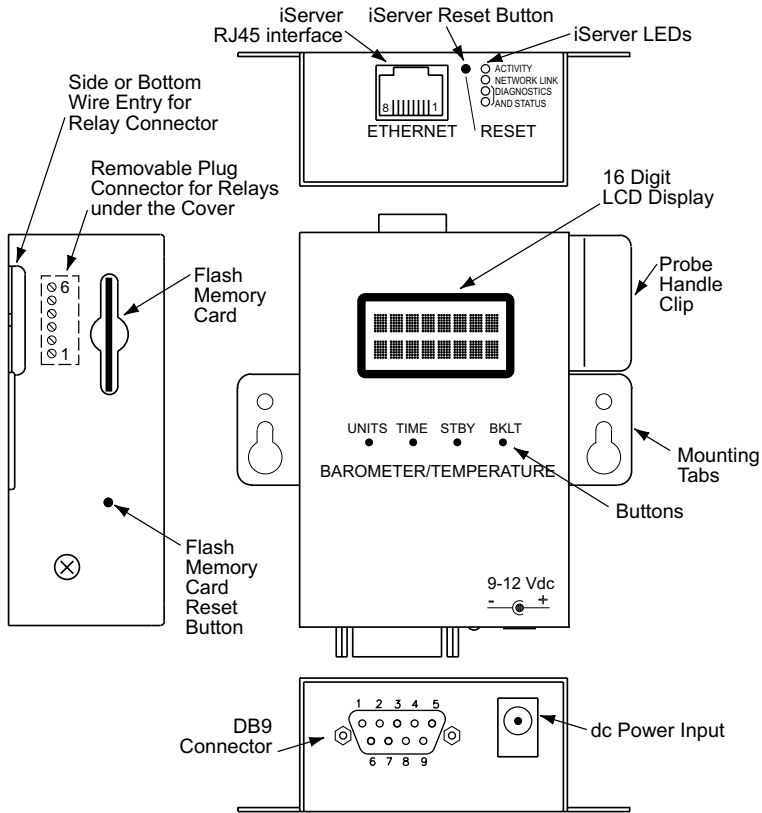
Figure 2.3 Parts of the iServer Unit

Table 2.1 Parts of iServer Unit

ETHERNET	RJ45 interface for 10BASE-T connection.
iServer RESET	Button: Used for power reseting the iServer board (Ethernet connection).
FLASH RESET	Button: Used for power reseting the Flash Memory Card/LCD board.
ACTIVITY	LED (Red) Blinking: Indicates network activities (receiving or sending packets).
NET LINK	LED (Green) Solid: Indicates good network link.
DIAGNOSTICS	LED (Yellow) Blinking: Indicates transmitting data from iServer to flash memory card. When DHCP enabled, it remains solid until DHCP IP address is received. LED (Green) Blinking: Indicates receiving data by the iServer from flash memory card
UNITS	Button: Change display units of measurement from °C to °F
TIME	Button: Change display from DATE and TIME to Pressure and Temperature
STBY	Button: Will stop the Flash from recording.
BKLT	Button: Display Back Light

When using the small push buttons, hold the button until "WAIT" is displayed on the LCD and then release.

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2.4 Disassembly Instruction

You may need to open the unit for one of the following reasons:
• To wire relay connector. (Refer to **Figure 2.7**)

• To connect or replace the battery.

• To change S5 jumper. In the absence of AC power, and if S5 is installed, the LCD Backlight and iServer Board will be on and running on the battery power. **Refer to Section 2.7**.

Note ☞ Disconnect the power supply before proceeding.

Remove Cover as shown.

COVER

FLASH CARD

MOUNTING SCREWS (2)

RELAY CONNECTOR

FLASH RESET SWITCH

JTAG

S5

S5 (WITH LONG PINS)

TRAY

REMOVE BATTERY CLIP INSULATOR COVER AND STORE WHERE SHOWN WHEN 9V BATTERY IS BEING USED.

KEEP INSULATOR COVER ON BATTERY CLIP WHEN BATTERY IS NOT BEING USED
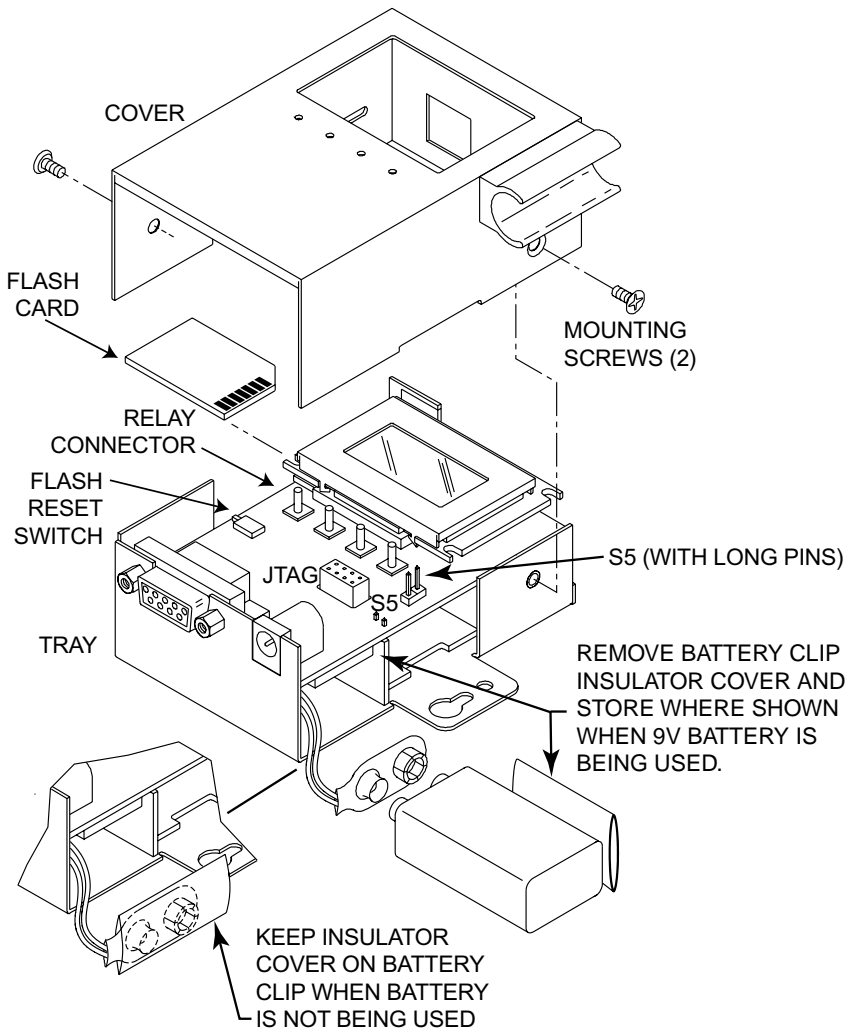
Figure 2.4 Opening the Unit

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2.5 Network Communication Interfaces

2.5.1 10Base-T RJ-45 Pinout

The 10BASE-T Ethernet network (RJ45) system is used in the iServer for network connectivity. The 10 Mbps twisted-pair Ethernet system operates over two pairs of wires. One pair is used for receiving data signals and the other pair is used for transmitting data signals. This means that four pins of the eight-pin connector are used.

ETHERNET
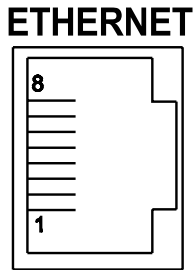
Pin	Name	Description
1	+Tx	+ Transmit Data
2	-Tx	- Transmit Data
3	+RX	+ Receive Data
4	N/C	Not Connected
5	N/C	Not Connected
6	-Rx	- Receive Data
7	N/C	Not Connected
8	N/C	Not Connected

Figure 2.5 RJ45 Pinout

2.5.2 10Base-T Crossover Wiring

When connecting the iServer directly to the computer's network port, the transmit data pins of the computer should be wired to the receive data pins of the iServer, and vice versa. The 10Base-T crossover cable with pin connection assignments are shown below.

Note☞ Use straight through cable for connecting the iServer to an Ethernet hub. The ports on the hub are already crossed.
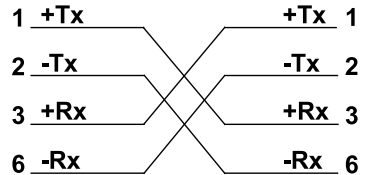
Figure 2.6 10Base-T Crossover Cable Wiring

2.6 Relay Wiring Connections

To access the Relay Connector you must remove the cover, refer to **Section 2.4.**

Note☞ It is recommended that you ground your unit by connecting a wire to the Ground/Return position of the relay connector. Or by wrapping a wire around the mounting tab screw and tightening a lock washer so that it embeds itself into the metal of the mounting tab.
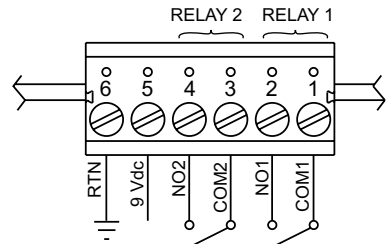
Figure 2.7 Relay Connections

2.7 Running on Battery Power

The battery and S5 jumper are installed: if there is a power outage the iServer board will be fully functional including the LCD backlight "ON" for approximately 1 hour. You need to make sure that the *LCD/PWR* field on the Configuration page of the iServer is set to *UPS* (see **Section 4.3.5.F**)

Battery installed and S5 jumper in storage position (Factory Default): if there is a power outage the LCD Backlight and iServer Ethernet board will not run, but the unit will be collecting and storing data for approximately 10 days.

When you first connect the battery, without the AC power adaptor, the unit will be in "Sleep Mode", in order to save power, and the LCD will display "Flash Standby" (provided that S5 jumper is not installed). When battery is installed, plug the AC adaptor into unit and push the Flash Reset Button (refer to **Figure 2.3** or **Figure 2.4**). Unit is now ready to be configured for recording the data. Also, if the AC adaptor is unplugged after configuring the unit, it will be ready for recording data.

If you want to move the unit to a different location, remove AC adaptor and press the Flash Reset button. Repeat the steps in the above paragraph.

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PART 3
NETWORK CONFIGURATION

3.1 Network Protocols

The iServer can be connected to the network using standard TCP/IP protocols.
It also supports ARP, HTTP (WEB server), DHCP, DNS and Telnet protocols.

3.2 Ethernet (MAC) Address

MAC (Media Access Control) address is your computer's unique hardware number.
When you're connected to the LAN from your computer, a correspondence table relates
your IP address to your computer's physical (MAC) address. The MAC address can be
found on a label attached to your device and contains 6 bytes (12 characters) of
hexadecimal numbers XX:XX:XX:XX:XX:XX hex

For example: 0A:0C:3D:0B:0A:0B

Note ☞ Remove the small label with the default IP address and there will be room to put
your IP address. See **Figure 3.1**
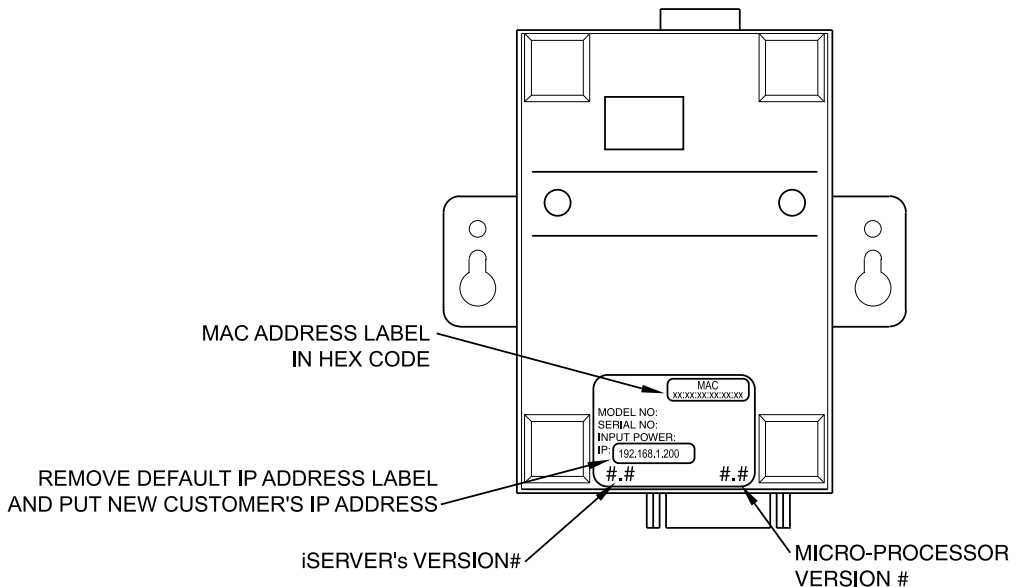
Figure 3.1 Labeling

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3.3 DHCP

DHCP, Dynamic Host Configuration Protocol enables individual computers or devices to extract their IP configurations from a server (DHCP server). If the DHCP is enabled on your iServer, as soon as the iServer is connected to the network, there is an exchange of information between DHCP server and the iServer. During this process the IP address, the Gateway address, and the Subnet Mask will be assigned to the iServer by the DHCP server. Note that the DHCP server must be configured correctly to do such assignment.

If fixed or static IP address is desired, the DHCP must be disabled. The iServer is shipped with DHCP disabled (factory default). The DHCP can be enabled by setting the DIP switch # 3 to the **"ON"** position (refer to **Figure 3.2**).

Note☞ DIP switch # 3 shown in **"ON"** position
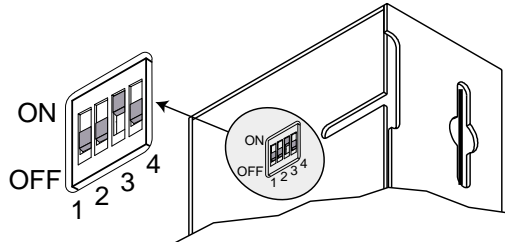
Note☞ To enable the DHCP, slide DIP switch #3 to ON position and power the unit on. Besides using DIP switch #3 you can enable DHCP by settting the iServer's IP address to 0.0.0.0.   An iServer with IP address of 0.0.0.0 will request an IP address, gateway address, and subnet mask from the DHCP server over the Ethernet

Figure 3.2 DIP Switch on the Bottom Side of iServer

3.4 DNS

DNS, Domain Name System enables individual computers and devices to be recognized over a network based on a specific name instead of an IP address. For example, instead of having to use **http://192.168.1.200** (IP address), you would use only **http://eis03ec** or any eight character name stored as Host Name under the Access Control page in the iServer Home Page. The default DNS name for an iServer is **"eis"** followed by the last four digits of the MAC address of that particular iServer.

Note☞

1. It is very important to communicate with the network administrator in order to understand the DHCP and its existing configurations on the host server, before enabling the DHCP on the iServer.

2. The iServers are shipped with a default static IP address of **192.168.1.200** and Subnet Mask of **255.255.255.0**.

3. On Novell networks or Windows 2000 Server where the DCHP is an updated function of DNS, this feature may be beneficial since a particular name can be assigned eliminating the need for the IP address, as described in **Section 3.4**.

3.5 IP Address

Every active device connected to the TCP/IP network must have a unique IP address. This IP address is used to build a connection to the iServer. Every computer using TCP/IP should have a unique 32-bit address. It is divided into two portions, the network ID and the host ID. For instance, every computer on the same network uses the same network ID. At the same time, all of them have a different host ID. For more details about the IP address see **Appendix B**.

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3.5.1 Default IP Address

The iServer is shipped with a default IP address set to **192.168.1.200** and Subnet Mask of **255.255.255.0**. If you are going to use a Web browser or Telnet program to access the iServer using its default IP address, make sure that the PC from which you're establishing the connection has an IP address that is in the same range as the iServer's IP address (**192.168.1.x**, where **x** can be any number from 1 to 254.

> **Note ☞**   Your PC's IP address <u>cannot</u> be the same as the iServer's IP address).

You also need to make sure that your PC's Subnet Mask is **255.255.255.0**. This is a good way to access the iServer over the network and make any configuration changes needed. If **192.168.1.200** is already in use on your network, use an Ethernet crossover cable between your computer and the iServer to change the IP address or any other settings within the iServer.

3.6 Port Number

All TCP connections are defined by the IP address and a port number. A port number is an internal address that provides an interface between an application running on your computer and the network through the TCP/IP protocol.

There are three default TCP socket port numbers assigned to the iServer:

1. Port (socket) number 1000 when using HTTPGET program.
2. Port (socket) number 2000 when trying to access the sensor (probe) connected to the port of the iServer to receive ASCII data.
3. Port (socket) number 2002 when trying to access the iServer itself for Power Recycling the iServer remotely. This can be done using Windows standard Telnet application.

Power recycling the iServer can also be done through the iServer's Web Server (see **Section 4.2**).

Telnet stands for Telecommunications Network, is a protocol that provides a way for users (or clients) to connect to computers (or servers) on a network, whether in the next building or across the world.

Example: C:\>Telnet 192.168.1.200 2002

You will then get the following screen.

Figure 3.3 Telnet Login into the iServer

You can open a Telnet session using other terminal emulation programs like Tera Term Pro (downloadable from the internet), which is a free software for MS-Windows. It supports VT100 emulation, Telnet connection and serial com port connections.

PART 4
OPERATIONS
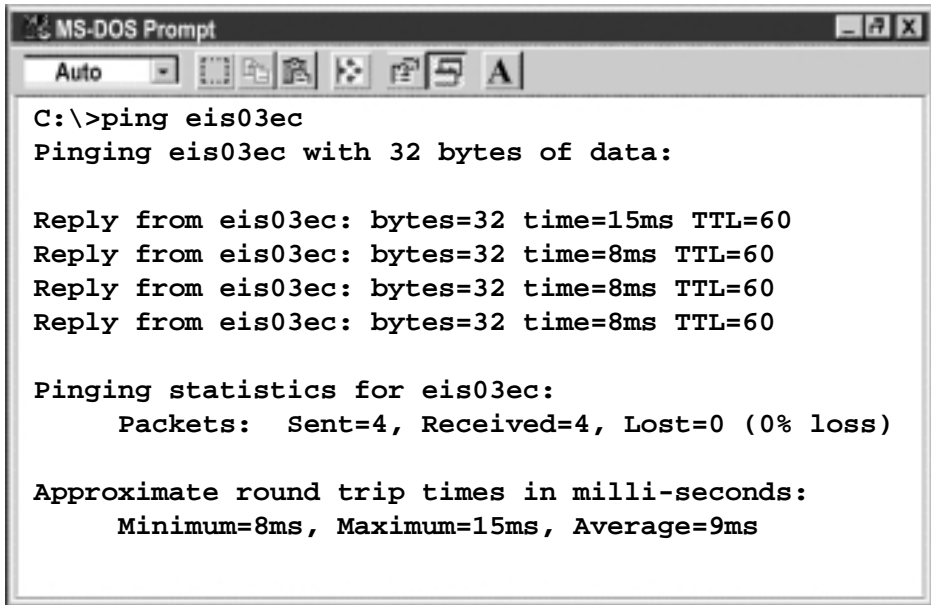
This iServer can be used and configured in several ways, depending on user's preference and network setup. It can be configured using a Web browser, like Netscape or Internet Explorer. It can also be configured using NEWPORT's iCONNECT Configuration Software.

If DHCP and DNS servers are used, the connection is very simple, no need to find the right IP address or watch for network conflicts, these are all done for you by your network DHCP and DNS server. All that is left for you to do, is to enable DHCP on the iServer (see **Section 2.2**) and use a straight network cable to connect the iServer to a hub and power it up.

If DHCP is not the preferred method, you can configure your PC's network connection with an IP address of **192.168.1.x** that is in the same range as the iServer's default IP address (**192.168.1.200**) and connect to the iServer using a cross-over network cable between your PC's network port and the iServer. After you're done with configuring the iServer, you can always set your PC back to its original settings.

On your computer, from the MS-DOS Prompt window type "**ping 192.168.1.200"** and press Enter. If DHCP and DNS servers are used type **"ping eisxxxx"**, where **xxxx** are the last four digits of the iServer's MAC address, located on the back of the device. You should get a reply as shown in **Figure 4.1**.

4.0 Testing the Connection

Figure 4.1 Pinging the iServer from MS-DOS Prompt

This proves that the connection is proper and you can get into configuration or run mode using the Telnet or Web browser.

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4.1 iCONNECT Software

The iServer may also be assigned an IP Address by using the iCONNECT software.

a) Download the iCONNECT software from the website listed in this manual.

b) Install iCONNECT software on a networked PC. This software is compatible with Windows 95, NT, 2000, and XP.

c) Use iCONNECT to assign an IP address to the iServer and access its web pages for configuration. You can also use any standard web browser to access the iServer's web pages. Consult with your IT department for obtaining an IP address.

Place the IP address in this box

Take the MAC address from the label attached to the bottom of the iServer and place it in this box

Click here to send the above IP address to the iServer

After the IP address is assigned to the iServer, click here to access it's web pages
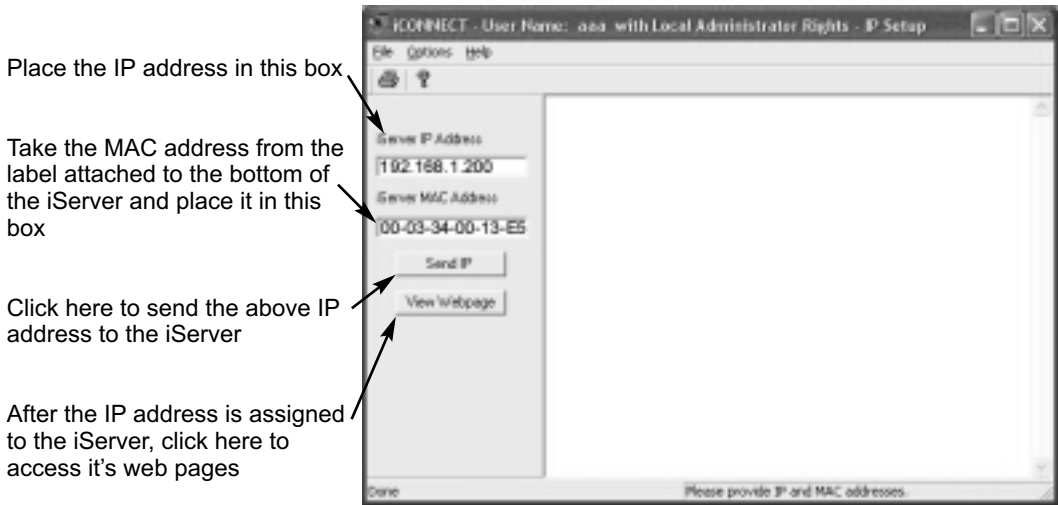
Figure 4.2 Assigning an IP Address using iCONNECT

d) To access the iServer for Configuration:

Click on the "View Webpage" button, you will access the iServer's home page, refer to **Section 4.3** for details.

Figure 4.3 Accessing the iServer's Home Page Menu

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4.2 Setting a New IP Address over the Network

Besides using the iCONNECT software, you may use the iServer's default IP address to access it and assign a new IP address to it.

The iServer is shipped with a default IP address of **192.168.1.200** and Subnet Mask of **255.255.255.0**. You can configure your PC's Network connection with an IP address that is in the same range as the iServer's IP address (**192.168.1.x**) and connect to the iServer using a crossover network cable between your PC and the iServer.

With this completed, you can go to the DOS-Prompt and ping **192.168.1.200**. If you receive responses back (**Figure 4.1**), you can go to a Web browser and type in *__http://192.168.1.200__* and it will take you to the iServer's main web page.

Select ▢Access Control▢, button, you'll be asked for the password. The default LOGIN password is "**12345678**" and the ADMINISTRATOR password is "**00000000**", then you should be on the Access Control page were you can simply type in the desired Static IP address, and click Save.

Figure 4.4 Access Control

For the IP address to take effect, the iServer needs to be turned OFF/ON. Clicking the "Power Recycle" button will turn the iServer OFF and ON. Pressing the physical button marked "RESET" on the iServer does the same thing.

You can now connect the iServer to an Ethernet hub using a straight through cable, power it up, and follow the ping routine mentioned in the previous section.

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4.3 Setup and Operation using the iServer Web Page

- Start your web browser.
- From the browser you type ***http://eisxxxx*** using the last four-digits from the MAC address label located on the device if DHCP and DNS are used. If a static IP address is used, then simply type ***http://x.x.x.x***, where ***x.x.x.x*** is the iServer's IP address.
- The Home Page, shown in **Figure 4.5**, will be displayed.
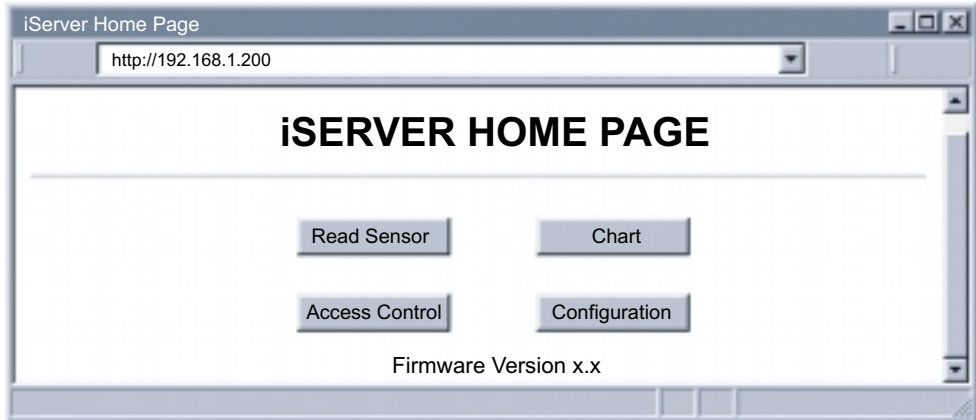
Figure 4.5 iServer Home Page

Note☞ In order to access certain menu items of the Home Page, users may be prompted for a password, as shown in **Figure 4.6**.

Figure 4.6   LOGIN and ADMINISTRATOR Passwords

There are 2 different access levels:

1. <u>ADMINISTRATOR Password</u> (administrator) allows certain groups and individual users to access and modify "entire" iServer parameters without any restrictions.

   The default password is **00000000**. This password can be up to 16 alphanumeric case-sensitive characters.

2. <u>LOGIN Password</u> (operator) allows users to access and modify all of the iServer's parameters, except "Access Control" which requires an Administrator password. The "Read Sensor" does not require a password.

   The default password is **12345678**. This password can be up to 16 alphanumeric case-sensitive characters.

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4.3.1 Read Sensor

- Click on ⬚Read Sensor⬚. In a few seconds the following page (**Figure 4.7**) will appear with all default values of 100.00. Then the actual readings of Temperature and Barometric Pressure will be displayed.
- This page automatically updates the Temperature and Barometric Pressure values.
- Click on Main Menu to return to Home Page.

⬛Note ☞⬛ While accessing the Read Sensor page, If a blank screen appears without any "java application running" or image of a "Java logo", please verify you have the latest Java Runtime Environment installed and configured according to the following instructions. If you do not have Java Runtime Environment, you may download it from our website or contact the Customer Service Department nearest you.
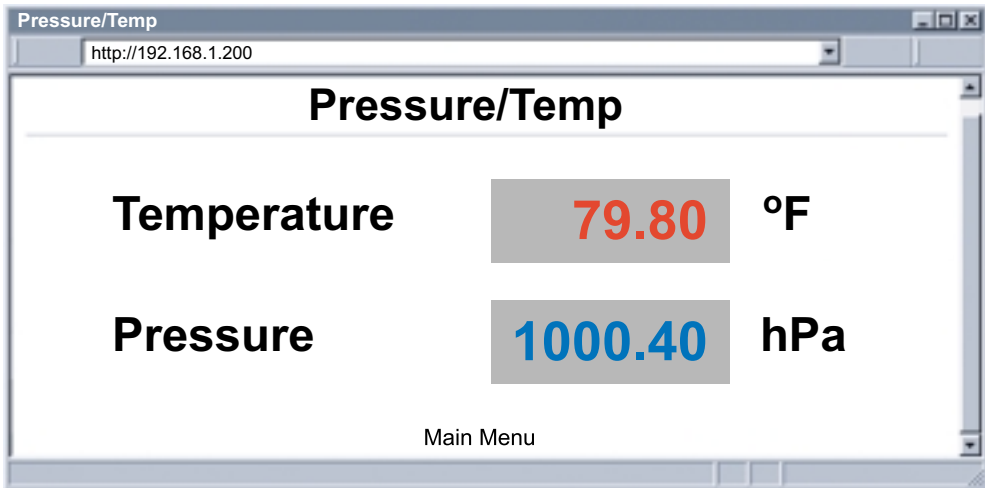
Figure 4.7 Read Sensor

4.3.1.1 Java Runtime Environment 1.4 Setup instructions

1. Go to your computer's Control Panel. Open the Java Plug-in
2. Select the "Cache" Tab
   Un-check the "Enable Caching" box
3. Select the "Proxy" Tab. Follow these **Browser Proxy Selection** instructions below. (Generally, un-check the box if accessing iServers on your local network and check the box for access from your internal network to the internet.)
4. Refresh or restart the webpage.

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4.3.1.2 Java Runtime Environment 1.5 (5.0) Setup instructions

1. Go to your computer's Control Panel. Open the Java Plug-in
2. Click on "Settings" & "View Applets" in the "General" tab.
3. Select the "Settings" button on the General Tab

   Un-check the "Enable Caching" box. Then close dialog box to show the General Tab again
4. Select the "Network Settings" button on the General Tab.

   Proceed to the Browser tab. Follow the **Browser Proxy Selection** instructions below.You should either select the "Use Browser Settings" option or the "Direct Connection" option depending on the network connections between your computer and the iServer product. (Generally, select "Direct Connection" if accessing iServers on your local network and select "Use Browser Settings" option for access from your internal network to the internet.)
5. Refresh or restart the webpage.

4.3.1.3 Browser Proxy Selection

Accessing iServer units within your internal network

• Usually when the computer and iServer are on an internal network, you will not use Proxy server access.
• You should un-check the "Use Browser Settings" option on the "Proxy" tab.

Accessing iServer units using the internet

• Often the web browser will use Proxy server access to the internet. In such cases, the default Java runtime settings on the "Proxy" tab should suffice. The default setting is the "Use Browser Settings" option.
• If the default proxy setting doesn't work, then you may have a situation where the proxy settings of the web browser are incorrect.

Diagnostics:

If the web page of the iServer appears, then the HTTP Proxy is working fine.

If the data isn't updated on the iServer upon selecting the Read Sensor web page, there may be a problem with access through a winsock proxy server. In such cases your network administrator will need to provide the winsock proxy server and port #s. (If the administrator requires knowledge of the port # required on the iServer, the value is 2003).

These values should be entered into the Socks line on the "Proxy" tab (of the Java Plugin control panel) or into the "connections" tab on the View,Internet Options dialog and make sure that the Proxy tab shows that the "Use Browser Settings" option is not selected (i.e. when you specify proxy connections in the Java Plugin control panel.

Accessing iServer units over Peer-to-Peer network

A simple peer-to-peer network is setup by disconnecting from the main network (as users will often do when trying to do initial setup of the iServer) and then connecting the iServer to another computer using a ethernet hub, an ethernet switch, or a Cross-over cable connection.

Often when using a peer-to-peer network, the Java plugin and the web browser (such as Internet Explorer) have internet connections configured to connect through proxy servers. In such case, you will need to simply assign the final IP address on this peer to peer network and then view the iServer charts after connecting the iServer into the regular network. Otherwise you can disable the Java plug-in's "Use Browser Settings" temporarily and then reconfigure the Java plug-in settings for regular network access after testing the iServer chart access on your peer-to-peer network.

The "Use Browser Settings" should not be selected. And the HTTP and Socks proxy entries should be blank. Also, setup the internet browser so that proxy servers are disabled.

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4.3.2 Adjustable Chart

- Click on ⟨Chart⟩, the following page (**Figure 4.8**) should appear. The Java™ Applet graph displays Temperature and Barometric Pressure and can be charted across the full span (-40 to 123ºC) or within any narrow range (such as 20-30ºC). The time-base can display one minute, one hour, one day, one week, one month or one year.

Note ☞ If a blank screen appears without any "java application running" or image of a "Java logo", please verify you have the latest Java Runtime Environment installed and configured according to the instructions (refer to **Section 4.3.1.1**). If you do not have Java Runtime Environment, you may download it from our website or contact the Customer Service Department nearest you.
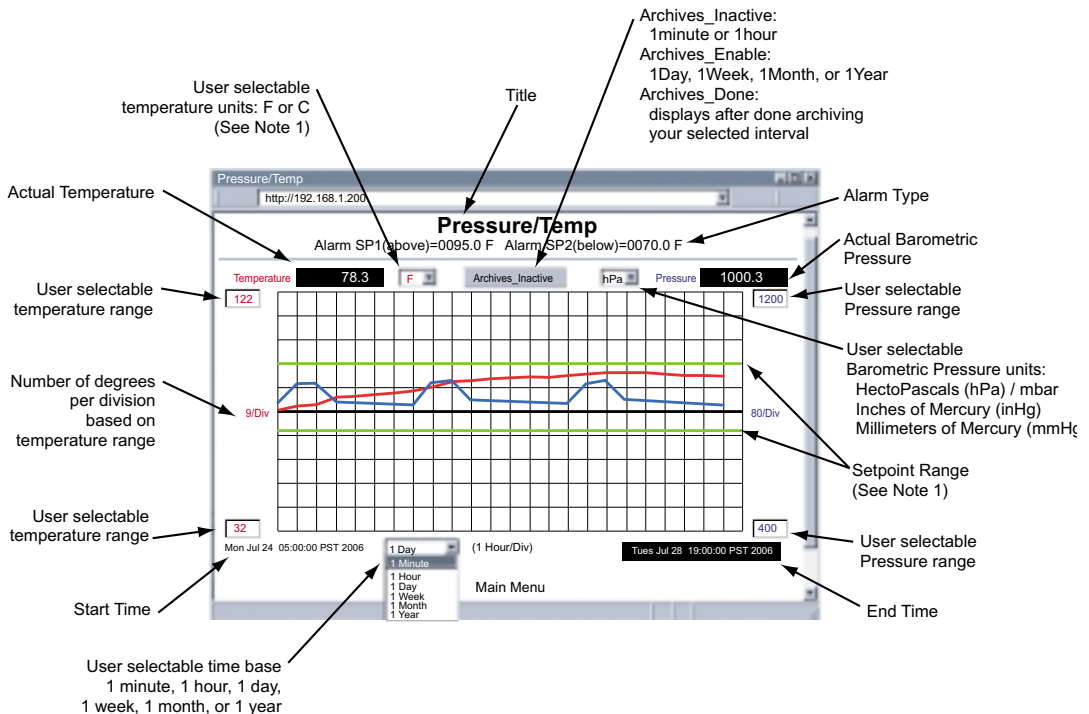
Figure 4.8 Adjustable Chart

Note ☞ 1). If you select an Alarm the degree C or F unit must match your "Sensor Unit" for the Setpoint line to show correctly.

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4.3.3 Retrieving Data from Flash

To retrieve and graph the data that is stored in the Flash Memory, you have two options:

OPTION 1:

You can use the iServer's WEB interface to chart the data stored in the flash memory.

1. Click on the "Chart" button located on the Server Home Page, see **Figure 4.5**.
2. Select a time interval of Day, Week, Month or Year (Minute and Hour are not selectable for data retrieval).
3. As soon as the time interval is selected the "*Archives_Inactive*" button will change to "*Archives_Enable*".
4. Click on "*Archives_Enable*" button to graph the stored data.

OPTION 2:

Download the iServer Download Utility **iFlash** software from the website listed in this manual and install it on your networked PC. This software is compatible with Windows 95, 98, NT, 2000, and XP operating systems. After the installation is completed, you can run the program to obtain the screen shown in **Figure 4.9**.

IP Address: Place the IP address of the iServer from which you want to download data, in this window.

Output Filename: Assign the path and the file name in which the downloaded data will be placed, in this window.

Model: Select the iBTX-M option.

Latest Data for: This option allows you to download data for the last day, week, or month. By selecting "Full" you can download the whole data.

Output Format: This option gives the data in either Excel format (check the box) or Text format (uncheck the box). By default, the temperature and barometric pressure values are always provided.

Header Data: You can choose what to appear for the header of the data file either in Excel or Text format.

Scale: This will give you the temperature in either Fahrenheit or Celsius as well as barometric pressure units..

Access Log: The completion of data download will be reported in this window. You can start downloading by clicking on the "Start Download" button.
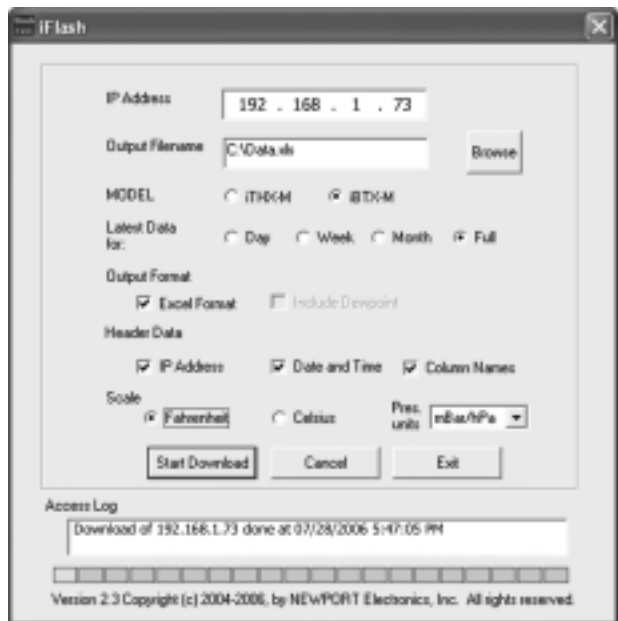
Figure 4.9 iFLASH Download Utility

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4.3.4 Access Control

This section describes the "Access Control" page of the iServers's Web interface. This page allows the users to set up the network and security parameters of the iServer.
At the initial entrance to the "Access Control" page you will be prompted for the LOGIN Password (see **Figure 4.6**) prior to an ADMINISTRATOR Password.

Note ☞ The DHCP can be enabled by setting the dip switch number 3 to ON position.

Note ☞ Changes made in the iServer's Access Control page can be saved permanently by pressing the Save button and power recycling the iServer.

If you change a field and press Save, this message will appear

Figure 4.10 Access Control

Login Password: This allows users to access and modify all of the iServer Home Page menu items, except "Access Control", which requires an Administrator password. The default Login password is **12345678**. This password can be up to 16 alpha-numeric case-sensitive characters. If there is no Login Password assigned (blank box) the iServer will not require a password to access and modify iServer Home page menu items.

Admin (administrator) Password: This allows users to access and modify the "Access Control" page. The default password is **00000000**. This password can be up to 16 alpha-numeric case-sensitive characters.   If there is no Administrator Password assigned (blank box) the iServer will not require password to access and modify "Access Control" page.

Host Name: Refer to **Section 3.4**, DNS.

MAC Address: This is also called Hardware address or Ethernet address, which is assigned to the iServer at production. The MAC (Media Access Control) address is the iServer's unique hardware number and is not changeable.

IP Address: The IP (Internet Protocol) address is a 32-bit number that identifies each sender or receiver of information that is sent in packets across the Ethernet or the Internet. The iServer's default IP address is **192.168.1.200**. The iServer's IP address should be changed to fit user's networking environment. Consult with your IT department for obtaining an IP address.

Gateway Address: A gateway is a network point that acts as an entrance to another network. A gateway is often associated with a router, which knows where to direct a given packet of data that arrives at the gateway. If the iServer is sending packets to another network node that is not on the same network on which the iServer is connected, a gateway address needs to be given to the iServer. The gateway address should be the IP address of the router connected to the same LAN to which the iServer is connected. The iServer's default gateway address is 0.0.0.0. Consult with your IT department for obtaining a gateway address.

Subnet Mask: It is a 32-bit number that is used to determine which part of the IP address is the network portion and which part is the host portion. The iServer's default subnet mask is **255.255.255.0**. Consult with your IT department for obtaining a subnet mask.

Power Recycle: Clicking this button will reset the power on the iServer.

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4.3.5 Configuration

Setting up the Flash Memory Card can be done in the Configuration page. From the Home Page Menu click on Configuration to get to the page (see **Figure 4.11**).

General Description of the Configuration page: There are two general sections "Flash Card Memory" and "Server". Flash Card Memory consists of the following titles: Real Time Clock (RTC), Title, Alarm Setup, and Flash Recording. Server consists of Terminal Server and Remote Access.

Title and Flash Recording selections can be edited *once* by selecting "*Activation - StartRecord*" and after that, no modification will take place unless recording is stopped (the reason for this is to be compliant with the data logging rules). The remaining parameters can be changed during recording as explained below.

There are several scenarios depending on the state of the Flash Card and the Real Time Clock (RTC):

#1) RTC is not set and Flash Card is empty.

All the fields must be updated exactly according to the indicated format, "*Adjust RTC Only*" check box must be left unchecked, "*Activation*" selection must set to "*StartRecord*" and click the "*Update*" button. Having done this, it is recommended to select "*Configuration*" from "*Activation*" drop down window, click the "*Update*" button, set the "*Activation*" to "*Status/RTC/Alarm*" and click the "*Update*" button one more time to review/verify that the setup took place as it was intended.

#2) RTC is set, and recording is in progress.

The only possible setups are to update "*Date*" and "*Time*" of the Real Time Clock along with checking "*Adjust RTC Only*" box. Also, alarms can be updated provided that "*Activation*" is set to "*Status/RTC/Alarm*". Otherwise, the recording has to be stopped by selecting "*StopRecord*" of the "*Activation*" drop down window prior to modifying the Flash Card setup. An alternative way to stop recording is to push Standby Button (refer to **Figure 2.3**) of the unit.

#3) RTC is set, recording is stopped, and Flash Card is not empty.

This means that a pre-recorded Flash Card is installed, and by activating the chart the archived data can be viewed (Refer to **Figure 4.8**). The chart has the following selections:

<p align="center">1 Minute, 1 Day, 1 Week, 1 Month, 1 Year</p>

In other words, they are the last specified selection e.g. 1 Day means the last day of the recorded data. Having done the selection, the "*Archives_Enable*" button must be clicked, which will then change to "*Archives_Done*" and the data will be retrieved accordingly. Also, the corresponding Start and End dates will reflect the respective time duration e.g. refer to **Figure 4.8** which is the last 1 Day, the dates are:

<p align="center">02/20/2004 09:42:10   to   02/21/2004 09:42:10.</p>

#4) RTC is not set and the Flash Card is not empty.

This is similiar to item 3) above except that at the power-up the installed Flash Card was not empty. Or, the Flash Card Reset Button (refer to **Figure 2.3**) was pushed.

4.3.5 Configuration (continued)

Configuration _ □ ✕

http://192.168.1.200 ▾

CONFIGURATION

A

No.	Sensor Name	Remote Format	Remote End Char (HEX)	Offset
1	Temperature	T0000.00	0D	0000.0
2	Pressure	P00000.0	0D	0000.0

Click on Device No. on the left to modify Sensor Parameters.

B

Real Time Clock

Date: `07/24/2006` mm/dd/yyyy Time: `16:15:24` hh:mm:ss

Adjust RTC Only ☐   Time Stamp ☐

Secured Applet ☐

C

2-MegaBytes Flash Card   15 Kbytes Used Spaced

D

Flash Card Pre-Recorded AC Power On

E

Alarm Setup

Alarm Type: `T&T:Hi/Lo ▾` Enabled Alarm: `UnLatch ▾`

SP1: `0095.0` nnnn.n SP2: `0070.0` nnnn.n

F

Flash Recording

Title: `Pressure/Temp` **Sensor Units:** `F:hPa ▾`   LCD/PWR: `ON ▾`

Type: `Wrap ▾`   Interval: `10_sec ▾`   Activation: `Status/RTC/Alarm ▾`

Start Date: `07/25/2006` mm/dd/yyyy Time: `05:00:00` hh:mm:ss

End Date: `07/28/2006` mm/dd/yyyy Time: `19:00:00` hh:mm:ss

G

Terminal Server

TCP/UDP: `TCP ▾` Server Type: `Command ▾` Number of Connections: `5 ▾` Port `2000`

H

Remote Access (Tunneling)

Remote IP Address: `0.0.0.0`   Remote Port: `2000` Remote Access: `disable ▾`

[Update]

Figure 4.11 Configuration

Below are the definitions of terms used in the Configuration page.

A) Sensor/Device Setup

Clicking on the No. **1** or **2** allows you to modify the Sensor/Device Parameters (see **Section 4.3.6** for more details).

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B) Real Time Clock

RTC Date and Time: The formats are *mm/dd/yyyy* and *hh:mm:ss*. The exact formats are required otherwise an error message will appear in the Title box. Note: time is military time/24 hour based.

Adjust RTC Only: If checked, the clock will be updated and nothing else, provided that "*Activation*" is set to "*Status/RTC/Alarm*". To verify the clock, set the "*Activation*" to "*Configuration*", click *Update* button, then set "*Activation*" to "*Status/RTC/Alarm*" and click *Update* button one more time.

Time Stamp: If checked, the Temperature/Barometric Pressure values will be stamped with time and date using Port 1000 (HTTPget program must be used, see **Section 4.5.1**).

Secured Applet: If checked, the LOGIN password is required to open "Read Sensor" and "Chart" pages.

C) Flash Card Size: Reports the Flash Card density and if it is already recorded, how many locations are filled.

0-Megabytes: Flash Card is not installed or a bad Flash Card
2-Megabytes, 4-Megabytes, 8-Megabytes: available sizes of Flash Cards.

D) Flash Card Message: Describes RTC setup, listed in the previous 4 scenarios.

Flash Card Module Malfunctional	*Open Sensor*
Flash Card Standby	*Flash Card Recording Stopped*
Flash Card Pre-Recorded	*Flash Card Recording Complete*
Flash Card Recording On	*Wait Reading Flash*
Flash Card Module Not Initialized	*Recording Initialized*
Flash Card Corrupt Initialization	

If the battery is not connected or the voltage is low, the statement "*Low Battery*" will be added to the above statements. You may also see a statement "*Archive Busy*" if another client is busy receiving archive data. In this case, refrain from activating the applet, instead keep clicking the *Update* button and make sure "*Activation*" is set to "*Status/RTC/Alarm*" until the "*Archive Busy*" statement is no longer displayed.

E) Alarm Setup: There are two alarms which can be assigned to temperature or barometric pressure.

Alarm Type: Selection of Temperature (T) or Barometric Pressure (B) and Above Setpoint (Hi) or Below Setpoint (Lo):

T&T:Hi/Lo	*T&B:Hi/Lo*	*T&B:Hi/Hi*	
B&B:Hi/Lo	*T&B:Lo/Hi*	*T&B:Lo/Lo*	*No Alarm*

Example: If T&T:Hi/Lo is selected, the temperature will be monitored against these two Hi and Lo values. If temperature goes above Hi value, Relay 1 will be energized, and if temperature goes below Lo value Relay 2 will be energized.

Alarm Enabled: Selections of *"Latched "* or *"Unlatch"* are available. If "*Unlatch*" is selected, the relay in the iServer will be turned on (closed) when the temperature and/or barometric pressure values fall outside of Setpoint range. When the temperature and/or barometric pressure values are back within the range, the relay will be turned off (opened).

If "*Latched*" is selected, the relay in the iServer will be turned on (closed) when the temperature and/or barometric pressure values fall outside of Setpoint range and will remain on until the user turns it off.

SP1 and SP2: Editable box for Setpoint values. The format is *nnn.n*, it must be followed exactly otherwise the modification will not take place for any modified item in the Alarm Setup.

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F) Flash Recording

Title: Editable field with up to 16 characters long. The given name will display as a title on the Chart and Read Sensor pages either for the real-time data or the stored data.

Sensor Unit: The unit of temperature either in degree Fahrenheit *F* or degree Celcius *C f*or each type of barometric pressure unit *hPa, inHg* or *mmHg.*.

LCD/PWR: The selections are "*ON* ", "*OFF* ", and "*UPS*". Selecting "*OFF*" will cause the LCD to turn off during a power outage, provided the battery is connected. The current consumption is about 1.5mA or 3mA depending on "*OFF* " or "*ON* " selection respectively. If recording is "*ON* ", depending on the recording interval, the LCD will be updated every 10 seconds or 1 minute. Therefore, when the LCD is set to "*ON* ", it could take some time before the LCD is turned on. If recording is not "*ON* ", the LCD will be updated every 10 seconds.

Selecting "*UPS*" puts the iServer into full operational mode when it's running on the battery (S5 jumper needs to be installed, see **Section 2.4** and **2.7**). This means that in case of power outage, sensing, recording, LCD display, and network communication capabilities of the iServer will all operate on the battery. Due to heavy power consumption the battery will not last more than an hour.

Type: The selections are: "*Limited*", "*Wrap*", or "*Nonwrap*".

Limited: You must define the *Start Date* and *Time*, and *End Date* and *Time* in which you need the recording to be done.

Wrap: You only need to define the *Start Date* and *Time*. The iServer will record data until the Flash is full, then the iServer will continue to record and overwrite the existing data.

Nonwrap: You only need to define the *Start Date* and *Time*. The iServer will record data until the Flash is full, then the iServer will stop recording.

Interval: The recording interval at which the temperature or barometric pressure is being stored into the Flash Card. The selections are "*10 seconds*" and "*1 minute*".

Activation: The selections are "*Status/RTC/Alarm*", "*StartRecord* ", "*Configuration*", and "*StopRecord* ". Refer to previous scenarios #1 and #2 at the beginning of this **Section 4.3.5** for more details.

Status/RTC/Alarm: Select "*Configuration*" and "*Status/RTC/Alarm*", each followed by clicking the Update button to retrieve the latest recording settings. By selecting "*Status/RTC/Alarm*" only, followed by clicking the "Update" button the iServer will report back all the settings, but the "Recording" settings.

StartRecord: Select to initiate a recording.

Configuration: Select to retrieve the latest recording settings, followed by "*Status/RTC/Alarm*" option.

StopRecord: Select to stop an ongoing recording.

Reset: Selecting this option will reset the flash memory, LCD, recording sections, and the Ethernet connection to a fresh start. It is suggested to select "*Reset* " followed by clicking the "Update" button if you experience recording problems.

Start Date, Time: Starting date and time for recording. The format is *mm/dd/yyyy* and *hh:mm:ss*, it must be followed exactly. Entry is required for all Types of Flash Recording.

End Date, Time: Ending date and time for recording. The format is *mm/dd/yyyy* and *hh:mm:ss*, it must be followed exactly. Entry is required for Limited Type of Flash Recording only.

NOTE 1: While the recording is in progress, the first letter of the measurement unit ("h"P, "i"Hg or "m"Hg), located on the LCD screen blinks continuously.

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NOTE 2: Downloading data and recording can not be done at the same time. While downloading data, the writing process to the flash memory will be internally disabled while the data is being read from the memory flash. For small amounts of data to be retrieved (1 Day or 1 Week), this is not a significant interruption in the recording data. However, for large amounts of data (1 Month or 1 Year) it may take 4 to 8 minutes to download the data. In "*Archives_Enabled* " mode, charting remains static, while data download is taking place.

NOTE 3: The number of barometric pressure/temperature values that can be recorded depends on the memory flash capacity (2 Mbytes, 4 Mbytes or 8 Mbytes) and number of barometric pressure / temperature values (540,540, 1,081,212 and 2,162,556). The time to fill the memory flash depends on the recording interval time, e.g. 1 minute interval for 4 Mbytes is 1,081,212 minutes or 750 days. If the flash is busy sending data to the applet to chart the archive, the iServer will refuse to initiate a call to provide archived data to the second applet until it has finished with the first one.

NOTE 4: If there is a loss of power while recording the data, the number of data logged can not be stored, therefore having restored the power the logged data will be read from Flash Memory and the number of recorded data will be stored for future use. During this process the LCD will display "*Reading Flash*", and if you connect through a web browser the Configuration page will display "*Wait Reading Flash*".

NOTE 5: After you "*StartRecord*" the flash recording followed by clicking the "*Update*" button, if you then need to make any changes in the Flash Recording section you must either select "*StopRecord*" followed by clicking the "*Update*" button or push the reset button on the side of the iServer and reconfigure the Flash Recording section again.

NOTE 6: If you stop the recording prematurely, when you download the data, you will lose the last 256 bytes of the data that was left in the buffer and was not transferred into the flash card. Therefore, we strongly suggest downloading the data while the recording is still on and then stop the recording if desired.

G) Terminal Server

TCP/UDP*: The iServer supports *TCP* and *UDP* protocols (default is TCP). If UDP is selected, it can be configured either for Broadcast UDP or Directed UDP. In case of Broadcast UDP, the iServer will transmit the data to every node on the network. This can be accomplished if the Remote IP Address is set to 255.255.255.255.

The Broadcast UDP is a practical solution when one iServer needs to communicate with multiple nodes over the network. In the case of directed UDP, the iServer will transmit the data to a specific node on the network. This can be accomplished if the Remote IP Address is set to the IP address of that specific node.

Server Type: *Continuous* mode sends the temperature and barometric pressure to the Ethernet every two seconds. It is mainly used to send readings to a remote display. *Command* mode needs a command to query the iServer to send the reponse back to querying device.

Note ☞ In order to change from one type to another, make sure to close any TCP connections to the sensor. The unit could get locked up if changing the type while the TCP socket is still open to the sensor. Reseting the power will correct the problem.

Number of Connections: The range is from *0 to 5*. If 0 is selected, the Terminal Server feature is disabled. This means that no network connection can be made to the iServer's sensor. If 1 is selected, only one network connection can be made to the sensor. Any number more than 1 would allow that number of network hosts to read from the iServer simultaneously (default is 5).

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Port: (default 2000) is the default TCP port number for the port to which the sensor is connected. Ports 1000 (used for HTTPget, refer to **Section 4.5**), 2002, 2003, and 2004 are reserved for internal use.

Note ☞ Terminal Server usually describes a device that exchanges data between Ethernet/TCPIP networks and RS-232/RS-485 systems. With this iServer, the data is obtained digitally from the sensor (irrelevant to RS-232 or RS-485 interface) and can be accessed from anywhere on the network.

A computer program, such as NEWPORT's Mail Notifier, OPC Server, iLOG, iFLASH or httpget can send TCP requests and obtain readings using the Terminal Server feature.

H) Remote Access

Remote IP Address: iServer can establish a connection to a remote device (e.g. an iLD Remote Display with an Ethernet iServer embedded board) with this IP.

Remote Port: (default 2000) the remote port number for the connection. Ports 1000 (used for HTTPget, refer to **Section 4.5**), 2002, 2003, and 2004 are reserved for internal use.

Remote Access:** Remote Access can be enabled and disabled. If enabled, the iServer can send its data to a remote node on the same network (the "Remote IP address" and "Remote Port" must be entered).

Note ☞ *TCP/UDP: when UDP mode is selected, Remote Access should be disabled and Remote IP and Port are the UDP remote listening IP and Port. If the Remote IP is set to 255.255.255.255, the UDP packet becomes a broadcasting packet which will allow any device listening to the Remote port to receive the packet.

**If Remote Access is enabled, Terminal Server is automatically disabled.

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4.3.6 Sensor Parameters
• In the first column of Configuration page (**Figure 4.11**), click on No. **1** to view and modify the Sensor Parameters page for Temperature.

Note ☞ You may type any ASCII characters in the first three boxes, but you must delete the leading spaces.
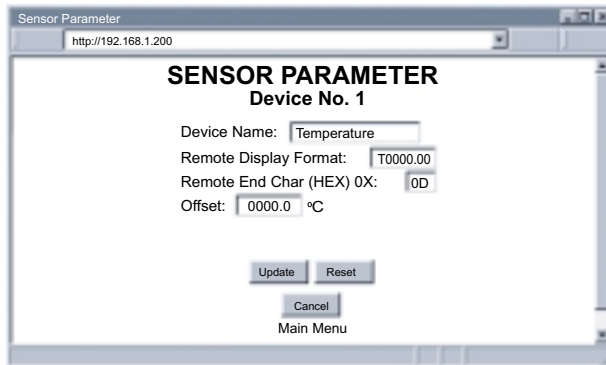
Figure 4.12 Sensor Parameters

Below are some definitions of terms used in the Sensor Parameters page.

<u>**Device Name:**</u> is a text field and can take up to 16 alphanumeric characters, it shows on the "Configuration" and the "Read Sensor" page.

<u>**Remote Display Format:**</u> Remote display format is used for Terminal Server continuous mode.

P0000.0mbar in barometric pressure setting, displays **P** and **0000.0mbar** is the barometric pressure value displayed.

Example: if the barometric pressure is **1014.4**, then **P1014.4**mbar will be seen in the remote display. If no format is specified (blank), there is no reading sent out. If temperature is **76.25** and **00.0F** is used in temperature setting, the remote site will show **76.2F**.

This format setup is originally based on iLD Remote Display, which has four or six LEDs. For six LEDs, **T00.00F** format, and for four LEDs, **00.0F** formats are appropriate.

<u>**Remote End Char:**</u> The default value is 0D (Hex representation of <CR>). This means that the iServer sends <CR> after each temperature and barometric pressure value. This will be done only in Continuous mode.

This is how the data will appear on the host with OD assigned:
    T75.7F
    P1014.9mbar
If the end character, for instance, is 20 (Hex representation of space), the data will then appear as: **T75.7F P1014.9mbar**

If nothing is set for the "Remote End Char" field, the iServer will then forward the data to the LAN with no characters followed.

<u>**Offset:**</u> Since the sensing probe is solid state electronics, there is no need for calibration. If it's determined that the readings are slightly off, the user can manually assign numerical values (including negative) to adjust the readings for temperature and barometric pressure. For temperature offset, the unit must be in degree C, for barometric pressure the unit must be in hPa. The Offset can be changed while recording is on.
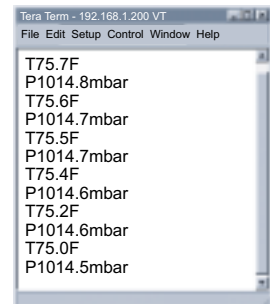
Figure 4.13 Remote End Char

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4.4 Telnet Setup

Set the *Number of Connections* to 1-5 other than 0, using telnet simulation program connect to iServer. In continuous mode, the telnet teminal will receive continuous messages from the iServer. In command mode, the command can be sent to query the iServer and get a response back. Refer to **Figure 3.3**

Send remote reset: Telnet port 2002 will bring a terminal for admin password. After typing the password and following with the end character, the message Admin. Login Successful will be showed on the terminal. Now type "reset" following with return character to reset the iServer. If no character is received within 20 seconds, the terminal will be closed automatically.

Note ☞   Initiating the archive chart while Telnet is active will halt Telnet until the archive chart is done.

4.5 HTTPGET Program

The Httpget software is used to send a single HTTP or TCP request to an iServer product.   In contrast, the telnet or Hyperterminal programs allow a continuous connection with multiple requests to be sent to the iServer product.

Generally httpget is used for simply programming an IP address to the iServer or for quickly obtaining a reading of from a device.

The iServer product must be configured from the configuration web page so that the "Server Type" value is set to "Command" (This is positioned under the heading of Terminal Server). Also the *Number of Connections* may need to be set to "0" to enable Port 1000 (Port 1000 is for access in a non-standard terminal mode).   To use Port 2000 access (where "2000" is the value stored in "Port"), the *Number of Connections* should be set to "2" for general usage.   The value of 2 can later be changed to a value from 1 to 5 depending on needs for secure access or fault tolerance.

Whenever Terminal Server service (using Port 2000 by default) is required, the *Number of Connections* must be set to a value from 1 to 5. The Terminal Server mode is the recommended mode for the most reliable connection when operating with NEWPORT software or with other programs supporting TCPIP communications. The Port 1000 access can be used with NEWPORT software and may be needed with some iServer products when you need to view readings from the web page while simultaneously collecting data through TCPIP communications.

4.5.1 HTTPGET using Port 1000

You can setup and read the information from the iServer by using the HTTPGET program. The following program can be used to read data from the embedded server firmware by using TCP port **1000**. The command string is sent to this TCP port, then the response can be read back from the same socket.

The Httpget.exe file is used to setup and read information from the iServer. This file will be automatically installed when you install the MailNotifier software available on our website and CD.

Notes on using **Httpget** :

The Httpget.exe program is installed to the windows directory (usually c:\winnt or c:\windows) when installing the Mail Notifier software.

1. Open up a command window (or have a DOS window)

    a) Click on start menu

    b) Click on "Run"

    c) In the dialog box that appears, type "cmd" or "command" and click on "OK" button.

    d) A command window should now appear.

2. If you now type "httpget" and press the "enter" key, the program options should be displayed.

3. Next run httpget with the options displayed below

    ## httpget -r -S "*SRTC\r" 192.168.1.200:1000

where:

-r –S   are parameters needed for the command string

*SRT   is the command as the following:

*SRTC	Read the temperature in C
*SRTF	Read the temperature in F
*SRHb	Read the pressure in mbar / hPa.
*SRHi	Read the pressure in inHg (Mercury).
*SRHm	Read the pressure in mmHg (Mercury).
*SRA	Read the SP1 and SP2
*SRB	Read the temperature and barometric pressure
*SRYS	Indicate Power to be on AC or DC
*SRYRST	Reset Power on iServer

\r   is the carriage return termination character
192.168.1.200   is an IP address
1000   is a socket port number

Response:

    076.6 (in Deg.F format)

4.5.2 HTTPGET and ARP to setup Device IP Address

Tip ☞ Use the iCONNECT software, which may be downloaded from our website, to do these IP changes whenever possible.

Use ARP first to assign the mac address to a static IP address in computer arp table by this command:

apr –s 192.168.1.200 00-03-34-00-00-06-b6

Then use the following command to assign new IP to the device:

Httpget –r –S "00000000" 192.168.1.200:1

where:

"**00000000**" is admin. password. If the password is wrong, the unit will ignore the new IP. If the new IP is taken, you will get the message " New IP is Assigned" after the httpget command. The device will reset automatically.

"**192.168.1.200**" is an example of an IP addresss. It is replaced with an IP address suitable for your network

"**00-03-34-00-00-06-b6**" is replaced with your iServer product MAC address.

4.6 ARP Protocol

ARP is the Internet layer protocol responsible for matching or obtaining the MAC (hardware) address that corresponds to a particular IP address. The ARP command allows the user to view the current contents of the ARP cache of the local computer (residing on the same network). Microsoft includes the ARP.EXE utility for viewing and modifying the ARP cache with its Windows products. The following ARP commands can be used to view cache entries:
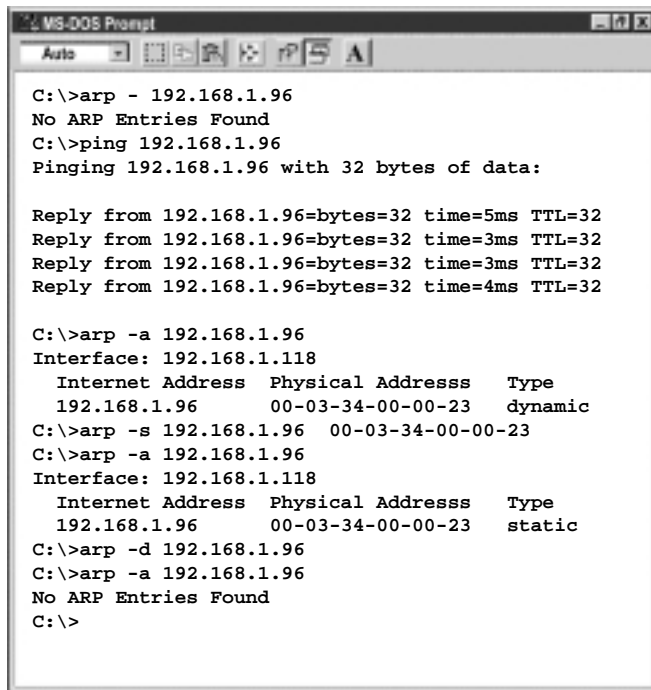
• **arp –a** ➔ Use this command to view all ARP cache entries.
• **arp –a** plus **IP address** ➔ Use this command to view ARP cache entries associated with one particular interface on a network with multiple adapters.
• **arp –g** ➔ Same as arp –a.
• **arp –N** ➔ Use this command to display ARP entries for specific network interface.
• **arp – s** plus **IP address** plus **Physical address** ➔ Use this command to manually add a permanent static entry to the ARP cache.
• **arp –d** ➔ Use this command to manually delete a static entry.

Note ☞   Ping the destination computer using IP address first before using the arp -a command.

The following window shows <u>examples</u> of arp commands and responses.
• Your computer has an IP address of **192.168.1.118**
• The destination computer has an IP address of **192.168.1.96**

```
C:\>arp - 192.168.1.96
No ARP Entries Found
C:\>ping 192.168.1.96
Pinging 192.168.1.96 with 32 bytes of data:

Reply from 192.168.1.96=bytes=32 time=5ms TTL=32
Reply from 192.168.1.96=bytes=32 time=3ms TTL=32
Reply from 192.168.1.96=bytes=32 time=3ms TTL=32
Reply from 192.168.1.96=bytes=32 time=4ms TTL=32

C:\>arp -a 192.168.1.96
Interface: 192.168.1.118
  Internet Address   Physical Addresss    Type
    192.168.1.96        00-03-34-00-00-23    dynamic
C:\>arp -s 192.168.1.96  00-03-34-00-00-23
C:\>arp -a 192.168.1.96
Interface: 192.168.1.118
  Internet Address   Physical Addresss    Type
    192.168.1.96        00-03-34-00-00-23    static
C:\>arp -d 192.168.1.96
C:\>arp -a 192.168.1.96
No ARP Entries Found
C:\>
```
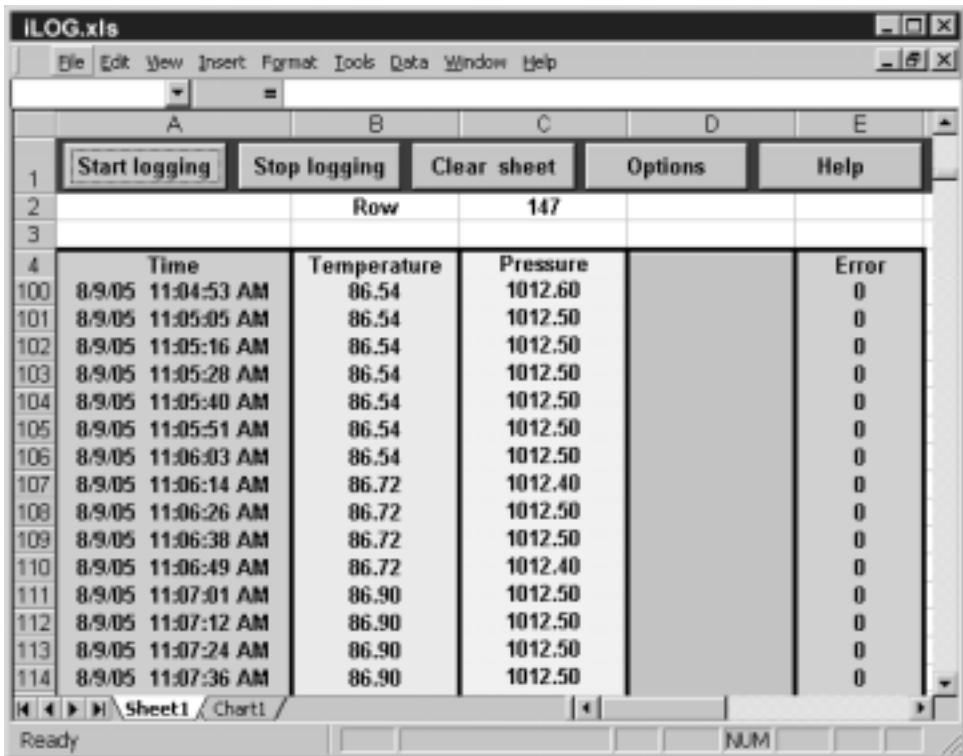
Figure 4.14 ARP Commands and Responses

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4.7 iLOG Software

The iLOG software can be used only with NEWPORT Electronics instruments. This is an
Excel application software that can log temperature and barometric pressure from an
iServer over the Ethernet or the internet.

a) Download the iLOG software from the website listed in this manual.

b) Install iLOG software on a networked PC. This software is compatible with Windows
    95, 98, NT, 2000, and XP.

c) For complete information of how to use the iLOG software, click on the HELP button.

	A	B	C	D	E
1	Start logging	Stop logging	Clear sheet	Options	Help
2		Row	147		
3					
4	Time	Temperature	Pressure		Error
100	8/9/05 11:04:53 AM	86.54	1012.60		0
101	8/9/05 11:05:05 AM	86.54	1012.50		0
102	8/9/05 11:05:16 AM	86.54	1012.50		0
103	8/9/05 11:05:28 AM	86.54	1012.50		0
104	8/9/05 11:05:40 AM	86.54	1012.50		0
105	8/9/05 11:05:51 AM	86.54	1012.50		0
106	8/9/05 11:06:03 AM	86.54	1012.50		0
107	8/9/05 11:06:14 AM	86.72	1012.40		0
108	8/9/05 11:06:26 AM	86.72	1012.50		0
109	8/9/05 11:06:38 AM	86.72	1012.50		0
110	8/9/05 11:06:49 AM	86.72	1012.40		0
111	8/9/05 11:07:01 AM	86.90	1012.50		0
112	8/9/05 11:07:12 AM	86.90	1012.50		0
113	8/9/05 11:07:24 AM	86.90	1012.50		0
114	8/9/05 11:07:36 AM	86.90	1012.50		0

Figure 4.15 iLOG Software Logging Data

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4.8 Mail Notifier Software

The Mail Notifier Software can be used only with NEWPORT Electronics instruments.

For complete information of how to use the Mail Notifier software, click on the Help menu of the main window.

The Mail Notifier software generates email notifications for alarm conditions. Users can be notified automatically of alarm conditions monitored via internet connections throughout the world. By use of the email forwarding of alarm conditions, alarm conditions can be monitored on a network isolated from the internet and forwarded to connections on the Internet.

The Mail Notifier utility operates under Windows 98, NT 4.0, 2000, and XP in conjunction with existing email that supports the MAPI messaging interface. If MS Outlook has been loaded, the MAPI support should be available.

4.8.1 Installation

The Mail Notifier must be loaded on a computer running Microsoft Windows (versions specified earlier) using an email program that provides MAPI access. Network access must be available between this computer and the iServer. Network access must also be available from this computer to the appropriate email server and from the email server to the recipient's email server.
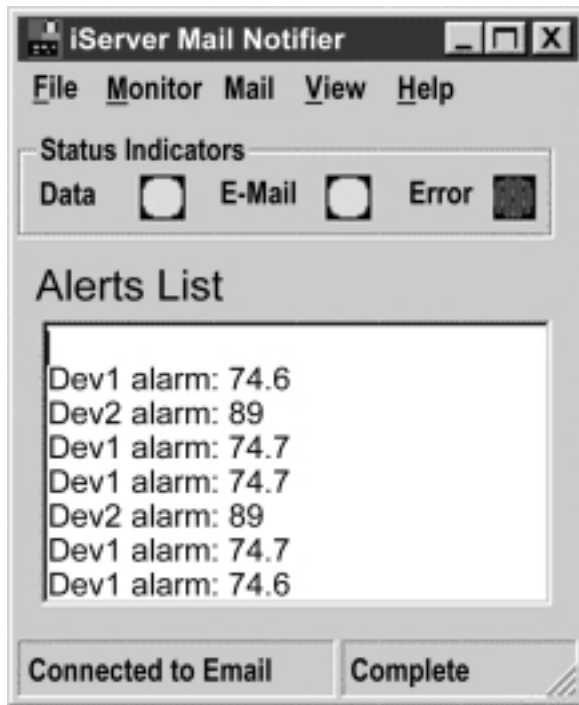
Figure 4.16 iServer Mail Notifier Main Window

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4.8.2 Program Options Setup and Configuration

Complete program setup requires:

- Entering a recipient for the email
- Specifying connection details to MAPI services.
- Defining alarms for devices, and selecting how and when the email will be active.

Figure 4.17 iServer Mail Notifier Profile Setup

The "Send To" tab contains a field to specify an email address to which alarm notifications will be sent (i.e. the recipient). Only one entry is permitted, in the address field. Additional addresses can be placed into "More Addresses" list.

Email Connection (MAPI Access)

The following instructions work with some versions of Microsoft Outlook.   Note though that some email systems may prevent the use of Mail Notifier due to security constraints.
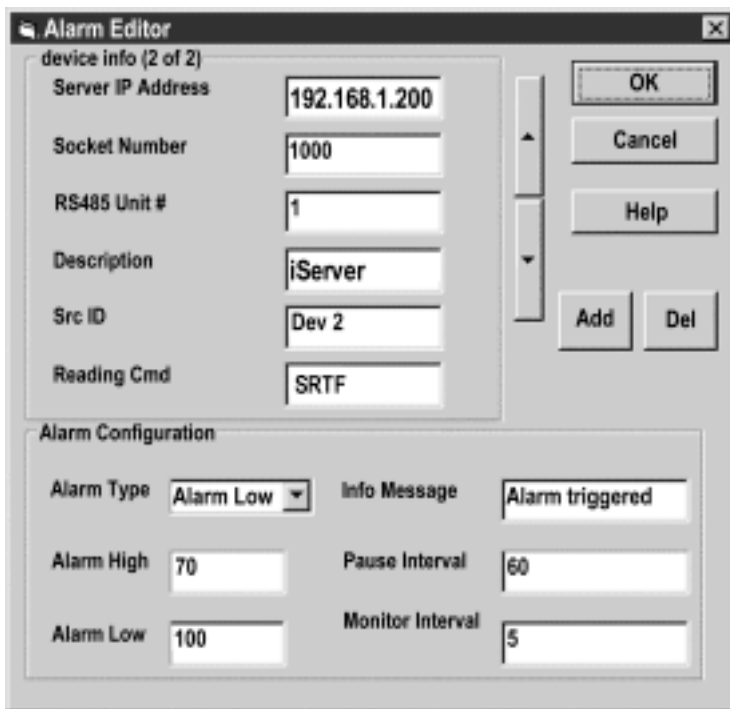
The simplest way to obtain a connection the the Email services is as follows:

1. Configure the Mail Notifier to connect to the email by displaying a Login Box.   This option is found by selecting View, Options from the Mail Notifier's menubar.   Select the "Email Setup" tab, mark the checkbox for "Use Login Box"

2. After Mail Notifier is configured to use the login box, the Mail Notifier can be started without user intervention if your MS Outlook program is running beforehand. Otherwise, the Mail Notifier will display a Login Box that should display the necessary User Profile.

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4.8.3 Device Setting and Configuration

Device setup requires:

• Entering the <u>IP address</u> for iServer device (for example **192.168.1.200**).

• Specifying <u>Socket number</u> (1000 or 2000 depending on iServer settings).

• Defining <u>RS485 Unit #</u> interface address (1 to 199). Enter "0" for RS232 interface or for iServer.

• Entering <u>Reading command</u>. Normally set to SRT to obtain reading from the devices.If you want to change this setting, refer to HTTPget **Section 4.5**.

• Defining the <u>Alarm setup</u> (High/Low, High value, or Low value).

• Specifying <u>Pause Interval</u>. It determines how many seconds each subsequential alarm notification will be sent.

• Determining <u>Monitor interval</u>. It establishes the interval or time resolution in seconds for which readings will be obtained from the device.

Figure 4.18 iServer Mail Notifier Device Setting

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PART 5 SPECIFICATIONS

SENSOR SPECIFICATIONS
BAROMETRIC PRESSURE (B)
Accuracy/Range:
±2.0 mbar / 0-1100 mbar (0-110 KPa)
Resolution: 0.1 mbar

TEMPERATURE (T)
Range*: 0°C to 70°C (32°F to 158°F)
Accuracy*:
± 0.8°C @ 20°C (± 1.5°F @ 68°F)
± 2°C for -40 to 125°C
(± 3.6°F for -40 to 257°F)
*Note: extended temperature range is for
 Industrial Probe only, the iServer's
 operating temperature is 0 to 70°C.
Response Time: 5 seconds
(63% slowly moving air)
Repeatability: ±0.1°C
Resolution: 0.01°C, 14bit

PROBE PHYSICAL DIMENSIONS
Wand Probe:
159 mm lg x 19 mm dia (6.25" x 0.75")
Cable with DB9 connector:
152 mm long (6")
Cable operating temp:
0 to 80°C (32 to 176°F)
Industrial Probe:
137mm lg x 16mm dia (5" x 0.63")
Cable with DB9 or stripped leads:
6.1m long (20')
Cable operating temp:
0 to 105°C (32 to 221°F)

iSERVER SPECIFICATIONS
INTERFACE
Ethernet: 10Base-T (RJ45)
Sensor: Digital 4-wire (DB-9)
Supported Protocols:
TCP/IP, UDP/IP, ARP, ICMP, DHCP, DNS,
HTTP, and Telnet
LED Indicators: Network Activity,
Network Link, and Diagnostics
LCD Display: 16 digits, 6mm (0.23")

Processor: Enhanced 8051, 22 MHz
Memory: 512 Kbytes Flash, 16 Kbytes
SRAM
Memory Data Flash Card: 2 Mbytes or
2 months of data storage at 10 second
logging intervals, or 1 year at 1 minute
logging intervals. Atmel# AT45DCB002
Optional Flash Cards:
4 Mbyte (2 years at 1 minute intervals)
8 Mbyte (4 years at 1 minute intervals)
Relay Outputs:
Two relays 1.5A @ 30Vdc
Management: Device configuration and
monitoring through embedded WEB
server
Embedded WEB Server: Serves WEB
pages containing real-time data and live
updated charts within definable time
intervals.
Agency Approvals: FCC-B, CE
Software: Field firmware upgradeable.
Including an Excel program for automatic
data logging within definable time
intervals, compatible with all Windows
operating systems.
POWER
Power Input: 9-12 Vdc
Consumption: 2.5 W max.
Safety Qualified ac Power Adapter
Nominal Output: 9 Vdc @ 0.5 A
Input: 100-240 Vac, 50/60Hz
Battery: 9 Vdc, alkaline
approximately 650 mA hours

ENVIRONMENTAL
Operating Temperature:
 0 to 70°C (32 to 158°F)
Storage Temperature:
-40 to 125°C (-40 to 257°F)

PACKAGING
Material: Metal case with flange mount
iServer Housing Dimensions:
36.6H x 62W x 90Dmm
(1.44 x 2.93 x 3.56 ")
Weight: 298 g (0.8 lbs.)

PART 6
FACTORY PRESET VALUES

PRESET PARAMETERS	FACTORY DEFAULTS
Network Interface:	
IP Address	192.168.1.200
Gateway Address	0.0.0.0
Subnet Mask	255.255.255.0
Device Host Name	eis and Last 4 digits from the MAC address
Login Password	12345678
Admin Password	00000000
DHCP	Disabled
Flow Control	None
End Character	0D (Hex) (Carridge Return)
Terminal Server:	
Server Type	Command
Number of Connections	5
Port #	2000
Server Mode	Disable
Remote Access (Tunneling):	
Remote Access	Disable
Remote Port	2000
Remote IP Address	0.0.0.0
LCD Backlight	On

APPENDIX A   **GLOSSARY**

User of this manual should be familiar with following definitions:

ARP (Address Resolution Protocol) is a protocol for mapping an Internet Protocol address (IP address) to a physical machine address that is recognized in the local network. For example, the IP address in use today is an address that is 32-bits long. In an Ethernet local area network, however, addresses for attached devices are 48-bits long. (The physical machine address is also known as a Media Access Control or MAC address.) A table, usually called the ARP cache, is used to maintain a correlation between each MAC address and its corresponding IP address. ARP provides the protocol rules for making this correlation and providing address conversion in both directions.

Ethernet is a network protocol defined by the IEEE 802.3 standard. Ethernet-based networks use MAC Address rather then IP Address to exchange data between computers. By using ARP and adding TCP/IP support, Ethernet devices may be connected as part of the Internet. An Ethernet LAN typically uses coaxial cable or special grades of twisted pair wires. The most commonly installed Ethernet systems are called 10BASE-T and provide transmission speeds up to 10 Mbps. Devices are connected to the cable and compete for access using a Carrier Sense Multiple Access with Collision Detection (CSMA/CD) protocol.

IP (Internet Protocol) is the method or protocol by which data is sent from one computer to another on the Internet.

IP address (Internet Protocol address) is a 32-bit number that identifies each sender or receiver of information that is sent in packets across the Internet.

IP Netmask is a 32-bit pattern of bits used to determine which part of the IP address is the network portion and which part is the host portion.

MAC (Media Access Control) Address is your computer's unique hardware number. When you're connected to the Internet from your computer, a correspondence table relates your IP address to your computer's physical (MAC) address on the LAN.

Ping is a utility that tests the network connectivity. It is used to determine if the host is capable of exchanging information with another host.

Port number/Socket number is a way to identify a specific process to which an Internet or other network message is to be forwarded when it arrives at a server. It is a predefined address that serves as a route from the application to the Transport layer or from the Transport layer to the application of the TCP/IP system.

Sockets are a method for communication between a client program and a server program in a network and defined as "the endpoint in a connection." Information transferred across the Internet primarily occurs between sockets.

TCP/IP (Transmission Control Protocol/Internet Protocol) is the basic communication language or protocol of the Internet. When you are set up with direct access to the Internet, your computer is provided with a copy of the TCP/IP program just as every other computer that you may send messages to or get information from also has a copy of TCP/IP. TCP/IP often is used as a general term to indicate generic access to the Internet.

UDP/IP (User Datagram Protocol/Internet Protocol) is the TCP/IP standard protocol that allows an application program on one machine to send a datagram to an application program on another. The UDP can be either in Broadcast or Directed form. The Broadcast UDP transmits data to every node on the same network. The Directed UDP transmits data to one node only.

Appendix B   IP Address

An IP address is a unique 32-bit address assigned to a computer and includes:

- A network ID number identifying a network.
- A host ID number identifying a computer on the network.

All IP addresses have been divided into three smaller groups (classes) A, B and C

- **Class A** addresses have 8-bits of network ID and 24-bits of host ID. They can support a large number of hosts, approximately 2 = 16,777,216 computers per network.

  The IP addresses range in binary from 00000001.xxxxxxxx.xxxxxxxx.xxxxxxxx
                              to 01111111.xxxxxxxx.xxxxxxxx.xxxxxxxx

  The IP addresses range in decimal from 1.x.x.x to 127.x.x.x

  Class A network ID's support a very large number of hosts.

- **Class B** addresses have 16-bits of network ID and 16-bits of host ID. They can support approximately 2^{16} = 65,536 computers per network.

The IP addresses range in binary from 10000000 00000000.xxxxxxxx.xxxxxxxx
                            to 10111111 11111111.xxxxxxxx.xxxxxxxx

  The IP addresses range in decimal from 128.0.x.x TO 191.255.xxx.xxx

  Class B network ID's support a medium number of hosts.

- **Class C** addresses have 24-bits of network ID and 8-bits of host ID. They can support approximately 2^8 = 256 computers per network.

  The IP addresses range in binary from 11000000.00000000.00000000.xxxxxxxx
                              to 11011111.11111111.11111111.xxxxxxxx

  The IP addresses range in decimal from 192.0.0.xxx to 223.255.255.xxx

  Class C network ID's support a small number of hosts.

Note ☞ The rest of the addresses are divided into two classes, D and E.
Class D networks are not assigned to the host. They are used for multicasting. The address range from 224.x.x.x to 239.x.x.x

Class E networks are experimental or reserved addresses.
The address range from 240.x.x.x to 247.x.x.x

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Appendix C   **IP Netmask**

IP Netmask or Subnet Mask is a 32-bit pattern of ones and zeros used to determine network portion of an IP address from the host portion of the IP address. Subnet mask is a network ID that is created by borrowing bits from host portion of IP address and using them as part of a network ID. The table below shows a default subnet mask for address Classes A, B, and C. Each bit that is set to "1" in the subnet mask corresponds to the bit in the IP address that is to be used as the network ID. Each bit that is set to "0" in the subnet mask corresponds to a bit in the IP address that is to be used as the host ID.

Address Class	Mask Binary Value	Mask Decimal Value or Dotted Notation
Class A	11111111 00000000 00000000 00000000	255.0.0.0
Class B	11111111 11111111 00000000 00000000	255.255.0.0
Class C	11111111 11111111 11111111 00000000	255.255.255.0

If your network requires more network ID's, you can extend the default subnet mask to include additional bits from the host ID. This allows for additional network ID's within the network. The table below shows some examples of subnet masks and bits moved from the hosts ID to create a new subnet.

Mask Dotted Notation	Mask Binary	Mask Bits
Class A		
255.0.0.0 (Default)	11111111 00000000 00000000 00000000	0
255.192.0.0	11111111 11000000 00000000 00000000	2
255.224.0.0	11111111 11100000 00000000 00000000	3
255.240.0.0	11111111 11110000 00000000 00000000	4
255.248.0.0	11111111 11111000 00000000 00000000	5
255.252.0.0	11111111 11111100 00000000 00000000	6
255.254.0.0	11111111 11111110 00000000 00000000	7
255.255.0.0	11111111 11111111 00000000 00000000	8
255.255.128.0	11111111 11111111 10000000 00000000	9
255.255.192.0.0	11111111 11111111 11000000 00000000	10
....	....	.
255.255.255.252	11111111 11111111 11111111 11111100	22
Class B		
255.255.0.0 (Default)	11111111 11111111 00000000 00000000	0
255.255.192.0	11111111 11111111 11000000 00000000	2
....	....	.
255.255.255.252	11111111 11111111 11111111 11111100	14
Class C		
255.255.255.0 (Default)	11111111 11111111 11111111 00000000	0
255.255.255.192	11111111 11111111 11111111 11000000	2
....	....	.
255.255.255.254	11111111 11111111 11111111 11111100	6

To determine the number of valid hosts ID's remaining after subnetting, use the following equation: $2^n - 2$, where n is the number of octet digits left after the subnet mask.

Appendix D   **ASCII Chart**

ASCII Char	Dec	Hex	Binary No Parity	ASCII Char	Dec	Hex	Binary No parity
NUL	00	00	00000000	@	64	40	01000000
SOH	01	01	00000001	A	65	41	01000000
STX	02	02	00000010	B	66	42	01000010
ETX	03	03	00000011	C	67	43	01000011
EOT	04	04	00000100	D	68	44	01000100
ENQ	05	05	00000101	E	69	45	01000101
ACK	06	06	00000110	F	70	46	01000110
BEL	07	07	00000111	G	71	47	01000111
BS	08	08	00001000	H	72	48	01001000
HT	09	09	00001001	I	73	49	01001001
LF	10	0A	00001010	J	74	4A	01001010
VT	11	0B	00001011	K	75	4B	01001011
FF	12	0C	00001100	L	76	4C	01001100
CR	13	0D	00001101	M	77	4D	01001101
SO	14	0E	00001110	N	78	4E	01001110
SI	15	0F	00001111	O	79	4F	01001111
DLE	16	10	00010000	P	80	50	01010000
DC1	17	11	00010001	Q	81	51	01010001
DC2	18	12	00010010	R	82	52	01010010
DC3	19	13	00010011	S	83	53	01010011
DC4	20	14	00010100	T	84	54	01010100
NAK	21	15	00010101	U	85	55	01010101
SYN	22	16	00010110	V	86	56	01010110
ETB	23	17	00010111	W	87	57	01010111
CAN	24	18	00011000	X	88	58	01011000
EM	25	19	00011001	Y	89	59	01011001
SUB	26	1A	00011010	Z	90	5A	01011010
ESC	27	1B	00011011	[	91	5B	01011011
FS	28	1C	00011100	\	92	5C	01011100
GS	29	1D	00011101	]	93	5D	01011101
RS	30	1E	00011110	^	94	5E	01011110
US	31	1F	00011111	_	95	5F	01011111
SP	32	20	00100000	`	96	60	01100000
!	33	21	00100001	a	97	61	01100001
"	34	22	00100010	b	98	62	01100010
#	35	23	00100011	c	99	63	01100011
$	36	24	00100100	d	100	64	01100100
%	37	25	00100101	e	101	65	01100101
&	38	26	00100110	f	102	66	01100110
'	39	27	00100111	g	103	67	01100111
(	40	28	00101000	h	104	68	01101000
)	41	29	00101001	I	105	69	01101001
*	42	2A	00101010	j	106	6A	01101010
+	43	2B	00101011	k	107	6B	01101011
,	44	2C	00101100	l	108	6C	01101100
-	45	2D	00101101	m	109	6D	01101101
.	46	2E	00101110	n	110	6E	01101110

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/	47	2F	00101111	o	111	6F	01101111
0	48	30	00110000	p	112	70	01110000
1	49	31	00110001	q	113	71	01110001
2	50	32	00110010	r	114	72	01110010
3	51	33	00110011	s	115	73	01110011
4	52	34	00110100	t	116	74	01110100
5	53	35	00110101	u	117	75	01110101
6	54	36	00110110	v	118	76	01110110
7	55	37	00110111	w	119	77	01110111
8	56	38	00111000	x	120	78	01111000
9	57	39	00111001	y	121	79	01111001
:	58	3A	00111010	z	122	7A	01111010
;	59	3B	00111011	{	123	7B	01111011
<	60	3C	00111100	|	124	7C	01111100
=	61	3D	00111101	}	125	7D	01111101
>	62	3E	00111110	~	126	7E	01111110
?	63	3F	00111111	DEL	127	7F	01111111

ASCII Control Codes

ASCII Char	Dec	Hex	Ctrl Key Equiv.	Definition	ASCII Char	Dec	Hex	Ctrl Key Equiv.	Definition
NUL	00	00	Crtl @	Null Character	DC1	17	11	Crtl Q	Data Control 1 - XON
SOH	01	01	Crtl A	Start of Header	DC2	18	12	Crtl R	Data Control 2
STX	02	02	Crtl B	Start of Text	DC3	19	13	Crtl S	Data Control 3 - XOFF
ETX	03	03	Crtl C	End of Text	DC4	20	14	Crtl T	Data Control 4
EOT	04	04	Crtl D	End of Transmission	NAK	21	15	Crtl U	Negative Acknowledge
ENQ	05	05	Crtl E	Inquiry	SYN	22	16	Crtl V	Synchronous Idle
ACK	06	06	Crtl F	Acknowledge	ETB	23	17	Crtl W	End of Trans Block
BEL	07	07	Crtl G	Bell	CAN	24	18	Crtl X	Cancel
BS	08	08	Crtl H	Back Space	EM	25	19	Crtl Y	End of Medium
HT	09	09	Crtl I	Horizontal Tabulation	SUB	26	1A	Crtl Z	Substitute
LF	10	0A	Crtl J	Line Feed	ESC	27	1B	Crtl [	Escape
VT	11	0B	Crtl K	Vertical Tabulation	FS	28	1C	Crtl \	File Separator
FF	12	0C	Crtl L	Form Feed	GS	29	1D	Crtl]	Group Separator
CR	13	0D	Crtl M	Carriage Return	RS	30	1E	Crtl |	Record Separator
SO	14	0E	Crtl N	Shift Out	US	31	1F	Crtl _	Unit Separator
SI	15	0F	Crtl O	Shift In	SP	32	20		Space
DLE	16	10	Crtl P	Data Link Escape					

PART 7
APPROVALS INFORMATION
7.1 CE APPROVAL

CE This product conforms to the EMC directive 89/336/EEC amended by 93/68/EEC, and with the European Low Voltage Directive 72/23/EEC.

Electrical Safety EN61010-1:2001

Safety requirements for electrical equipment for measurement, control and laboratory.

Basic Insulation

Pollution Degree 2

Dielectric withstand Test per 1 min

- Input Power to Sensor Metal Body: none
- Input Power to Ethernet Output: 1500Vac
- Input Power to Relays: 1500Vac
- Ethernet Output to Relays: 1500Vac

Measurement Category I

Category I are measurements performed on circuits not directly connected to the Mains Supply (power). Unit measures Air Temperature and Barometric Pressure.

Transients Overvoltage Surge (1.2/50uS Pulse)

- Input Power: 500V Transients Overvoltage
- Ethernet: 1500V Transients Overvoltage

Note: *The ac/dc power adaptor must have Safety Qualified Agency Approvals for CE with Double Insulation rating.*

The ac/dc power adaptor is 9Vdc.

The minimum output current rating is 500mA.

EMC EN61000-6-1:2001 (Immunity) and EN61000-6-3:2001 (Emmissions)

Immunity requirements for residential, commercial and light-industrial environments
- EMC Emissions   Table 1, Class B
- EMC Immunity   Table 1: Enclosure
                   Table 2: Signal Lines Ports
                   Table 3: Dc input/Dc output Ports

EMC EN61326:1997 + and A1:1998 + A2:2001

Immunity and Emissions requirements for electrical equipment for measurement, control and laboratory.
- EMC Emissions   Table 4, Class B of EN61326
- EMC Immunity   Table 1 of EN61326

Note: *I/O lines / sensor cables require shielded cables and these cables must be located on conductive cable trays or in conduits.*

⚠ Refer to the EMC and Safety installation considerations (Guidelines) of this manual for additional information.

7.2   FCC

This device complies with Part 15, Subpart B, Class B of the FCC rules.

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **one (1) year** from the date of purchase. In addition to OMEGA's standard warranty period, OMEGA Engineering will extend the warranty period for **one (1) additional year** if the warranty card enclosed with each instrument is returned to OMEGA.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear are not warranted, including but not limited to contact points, fuses, and triacs.

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FOR WARRANTY RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

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2. Model and serial number of product, and
3. Repair instructions and/or specific problems relative to the product.

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