

## DGH A3000 Users Manual using RS-485 modules



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### **Disclaimer:**

The information in this publication has been checked and believed to be accurate; however, no responsibility is assumed for possible inaccuracies or omissions. Applications information in this manual is intended as suggestions for possible use of the product and not as explicit performance in a specific application. Specifications may be subject to change without notice.

The A3000 is not an intrinsically safe device and should not be used in an explosive environment unless enclosed in an approved explosion proof housing.

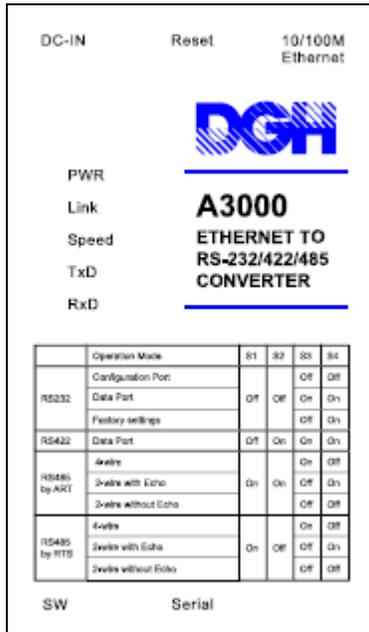
## Installation Guide using DGH RS-485 Modules:

The following steps outline the connections for any DGH module using the RS-485 communications standard to a A3000 Ethernet converter. Any alterations to the DGH module setup configuration should be completed before connecting the module to the Ethernet converter.

### Steps in Order:

1. [Product Label](#)
2. [Module Configuration](#)
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5. [A3000 Serial Port Settings](#)
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## A3000 Label and LED Descriptions:



## LED Descriptions (Illuminated when):

<b>PWR</b>	Power is applied.
<b>Link</b>	Connected to network.
<b>Speed</b>	100Mbps connection detected, 10Mbps when dark.
<b>TxD</b>	Sending information to RS-485 serial port pins.
<b>RxD</b>	Receiving information from the RS-485 serial port pins.

### Module Configuration:

1. Configure the DGH module Device Address and application Baud Rate. The module should be connected to a host computer to perform this configuration. The DGH Utility Software 2000 is the easiest software to use when configuring the module. Wire the module up to the computer and connect the "Default\*" terminal to GND terminal. At the Utility Software main menu select "Setup" and then "Modules". Click on the "Settings" button to open the proper serial port. The port settings should be: 300 baud, Mark Parity, 7 Data bits, 1 Stop bit and RTS Only flow control. The TX and RX delays should be left in their default conditions. Then return to module setup screen and select the Model Number, Device Address is "1" and press "Read Setup" button. Adjust the Device Address and Baud Rate to correct values and apply the changes.

### Module Connections:

Ensure that power is "Off" or disconnected from both the A3000 and the DGH Module. Complete the following steps:

1. Set the DIP Switches on the A3000 module Switches 1 and 2 "On" (Up) and Switches 3 and 4 "Off" (Down).

A3000 DIP Switch			
SW1	SW2	SW3	SW4
UP	UP	DN	DN

2. Connect a DGH module to the A3000 converter using a DGH CA-3 cable and the DB-9 gender changer supplied with the A3000 converter.
  - a. Apply the DB-9 gender changer to the DB-9 connector on the A3000.
  - b. Insert the DB-9 end of the DGH CA-3 interconnect cable into the DB-9 gender changer connector.
  - c. Make the following connections from DGH CA-3 to DGH Module terminals. All undesignated wires in the CA-3 should be left unconnected.

Connections	
CA-3 Wire	Module Terminals
GREEN	(B) GND
BLUE	(G) DATA*
RED	(Y) DATA

3. Apply power to both the A3000 converter and the DGH module.

### Ethernet Setup:

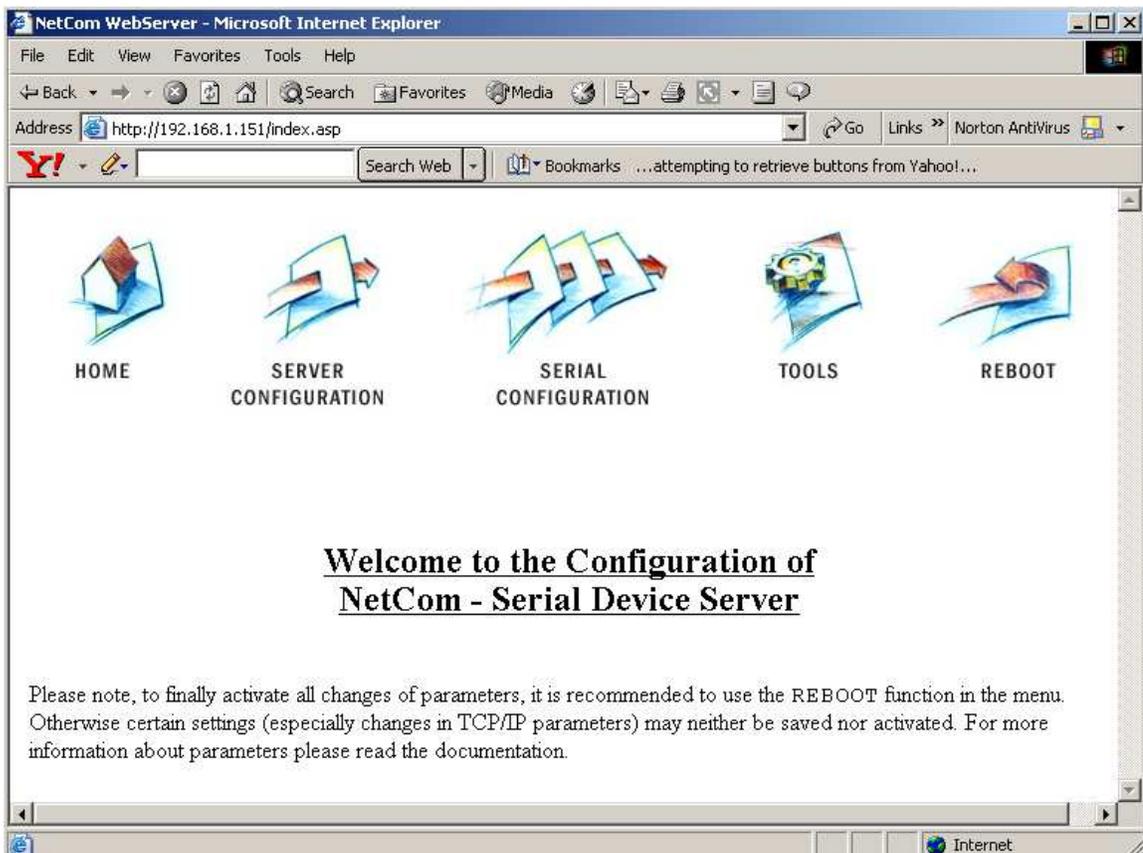
The A3000 converter can be configured using a direct Ethernet connection to a host computer Network Interface Card (NIC card) or by connecting the A3000 to a network that contains a DHCP server. The direct connection method requires that users utilize the factory default IP address (192.168.254.254) to communicate with the A3000. This method may be preferred as the IP address is known. The DHCP network connection method allows the A3000 to receive an IP number automatically from a network DHCP server. This method will require the A3000 NetManager software, or another method such as a router DHCP Client List table, to determine the new IP number before configuring the device.

When using a direct connection method for the first time, the default IP number should be used to communicate with the A3000 in a web browser. Simply connect an ethernet “cross over” cable between the computer and the A3000. Ensure that the NIC card contains an IP number with the first three octets set to the same values as Default IP in A3000. For example, manually set the NIC card IP address to 192.168.254.1. This would be done in the Windows Device Manager under “Network Adapters”. Then open a web browser and type <http://192.168.254.254> into the URL address line.

When using a DHCP server network connection, the network DHCP server (usually a router) will provide the A3000 with an IP address automatically. The A3000 Net Manager software (mentioned below) is the easiest way to determine the new IP address. Open a web browser program and enter the IP address into URL address line. The A3000 is factory configured for DHCP Enabled.

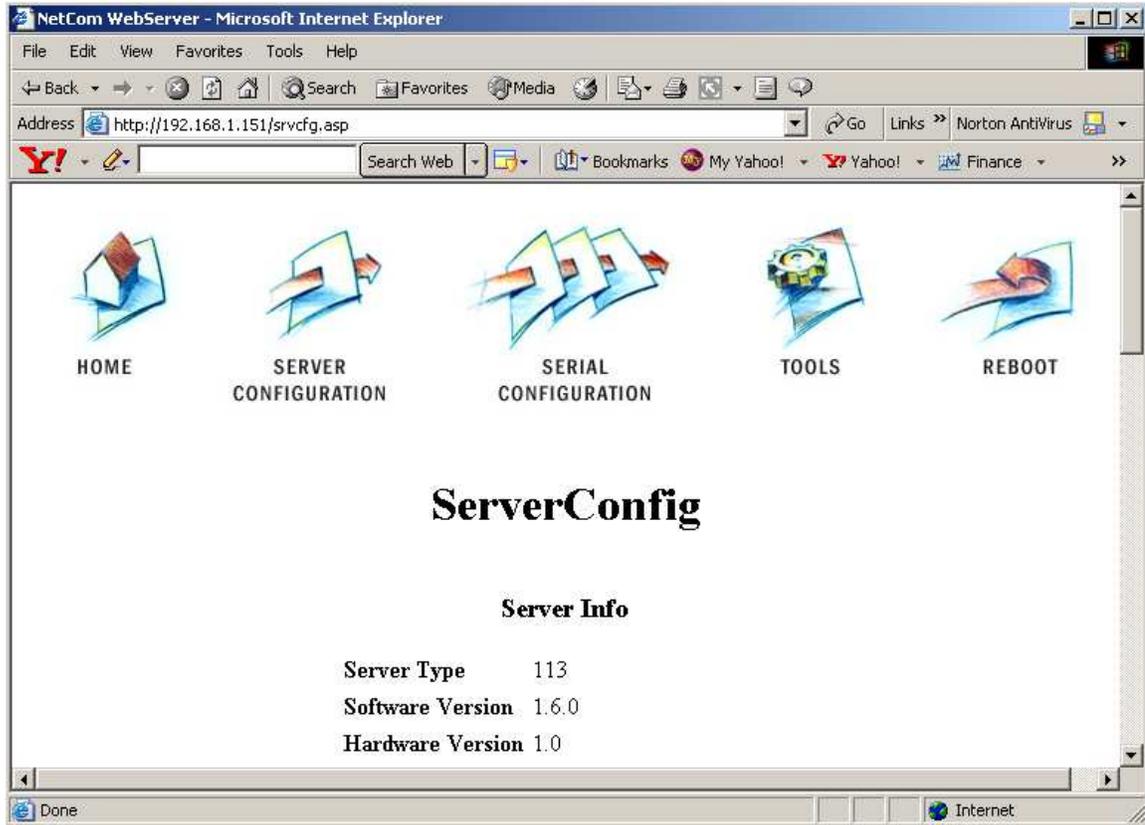
**Note:** If DHCP mode has been Disabled and/or alterations have been made to the configuration then the default IP Address may not work as it could have been changed. In this case, use the Net Manager software to determine the present IP address.

The configuration page of the A3000 should load, similar to the image below.



Complete the following steps to properly configure your A3000 converter:

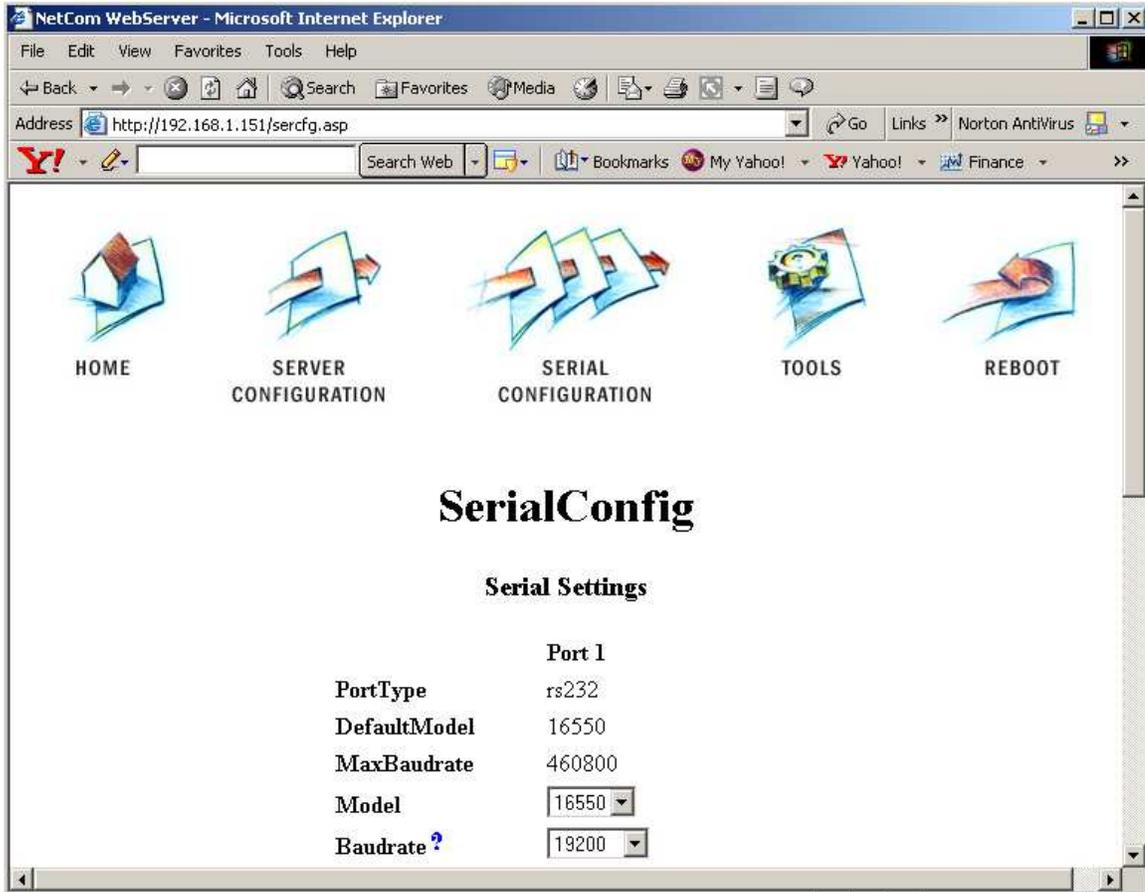
1. Move the computer mouse over the “Server Configuration” selection and double-click the mouse left button.



2. Move down the page to the Server Parameter configuration values. Depending on the application, the A3000 can receive an IP Address automatically or be programmed to a specific IP Address. If the DHCP drop-down list box indicates “Enabled” then the A3000 must be connected to a device, router, server, or other hardware that will provide the converter with an IP address. If DHCP list box indicates that DHCP “Disabled” then the converter must be assigned a specific IP Address and will utilize that IP Address each time the converter is power up.
3. Other network specific values may need to be entered such as: Netmask, Broadcast Address, Gateway, DNS, and Domain. These values are specific to the computer network that the A3000 will be connected to. See your system administrator for this information.

## Serial Port Setup:

The A3000 Serial Port settings must be configured to match the settings of the DGH module. From the A3000 main menu in the web browser, click on the "Serial Configuration" icon.



Select the Serial Port Baud Rate, Parity, Data Bits and Stop Bits. The valid data settings for communicating with a DGH module would be: 8-N-1, Odd-7-1, or Even-7-1. For example, if the module is configured for 19.2K Baud and Even Parity then set the Baud Rate to 19.2K, 7 Data Bits, 1 Stop Bit, and Even Parity.

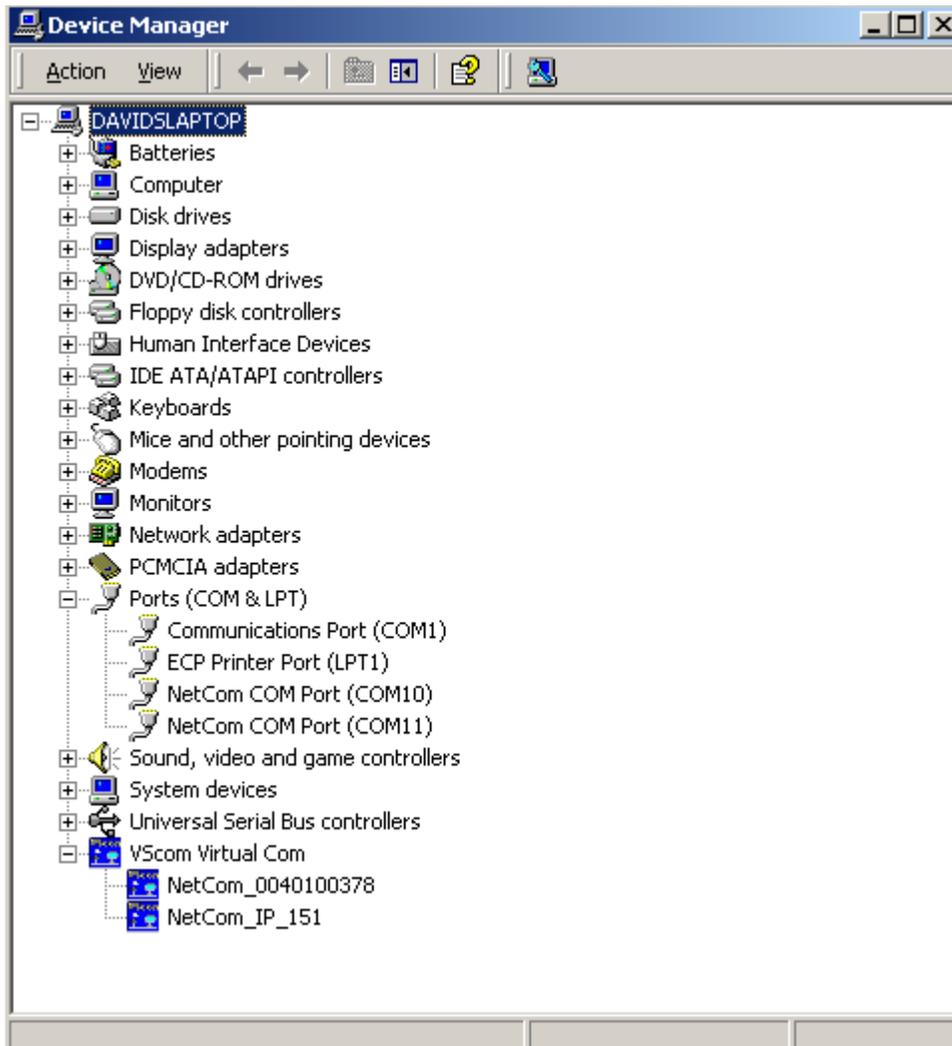
Note: All other user-selectable options can normally be left in their Default condition. In some applications, it might be necessary to alter those values.

## Computer Configuration:

In order for a host computer to easily communicate with serial devices connected to a A3000 a virtual serial port to Ethernet driver must be installed on the host computer. The virtual serial port driver is a software program that emulates a standard serial communications port in the computer. The virtual driver, internally in software, redirects the data to the computer Ethernet port. Likewise, any data that is returned from the A3000 is redirected back to the virtual software driver and reported back to the application program. This virtual software driver allows existing programs to read or write information through the Ethernet port without any hardware or computer programming modifications.

## Virtual Serial Port Driver Installation:

A virtual serial port driver is included on CD-ROM with the A3000 Ethernet converter. The driver can be easily installed by inserting the mini CD into the computer CD-ROM drive. The installation program should automatically start after the CD is inserted into the drive. Proceed thru the installation process until complete. After the installation process has completed, a brief check in the system Device Manager will indicate that at least one additional serial port has been added to the machine. The additional port will be designated as "NetCom COM Port (COMn)". See below.



### **Test the Connection:**

There are two ways to quickly test the Ethernet connection to your A3000 converter. The DGH Utility Software or the Windows Hyper-Terminal software program can be used to communicate with a DGH module that is connected to a Netcom113. The DGH Utility software is available on CD-ROM with a purchase order. It can also be downloaded from the DGH website ([www.dghcorp.com](http://www.dghcorp.com)).

Windows Hyper-Terminal can be used to manually communicate with a DGH module thru a A3000 converter. Hyper-Terminal is an optionally installed program that comes on the MS-Windows Operating System CD-Rom. You can check to see if Hyper-Terminal is installed on your machine by following these menu selections: select the Windows "Start" button, then "Programs", "Accessories", and the "Communications" menu selections. If Hyper-Terminal is installed then it will appear on the Communications menu. If it does not appear then the program should be installed before using the instructions below.

### **Windows Hyper-Terminal Instructions:**

The A3000 Ethernet converter can be tested using the Windows "Hyper-Terminal" terminal software program. Hyper-Terminal can be started by clicking on the Windows "Start" button. Followed by clicking on menu selections: "Programs", "Accessories", "Communications" and then Hyper-Terminal. Once the program is started and running, the serial port parameters must be properly configured by selecting "File" and "Properties". Next, the serial port properties dialog screen will open.

In order to communicate with a DGH module that is connected to a A3000, a "direct connection" to a computer serial port must be established within Hyper-Terminal. The Hyper-Terminal software communicates information through a serial communications port inside the host computer. Since the A3000 converter interfaces directly to an Ethernet network, and not a computer serial port, a virtual serial port software driver must be used to convert the Hyper-Terminal information into Ethernet packets. The software driver will transmit the information on to the network. The A3000 then receives the packets from the network and transmits the data out through the A3000 DB-9 serial port. Note: The software virtual COM port driver software must be installed on the host computer before proceeding beyond this point.

The Hyper-Terminal serial port connection includes setting a "direct connection" to the virtual serial port (COMn:). Then, the serial port parameters such as Baud Rate, Parity Type, Data bits, Stop bits, and Flow Control should be properly configured. The Baud Rate, Parity Type and Data Bits should be set to the same values that the DGH module has been configured for. The Stop Bits should be set to one bit and Flow Control should be set to 'none'. Apply all the new settings and make sure that the connection to the COMn: port was opened successfully.

Connect a DGH RS-485 module to the DB-9 serial port and apply power to both the module and the A3000. Type a typical DGH command into Hyper-Terminal, for example \$1RD<enter>, and view the response message. The "<enter>" is the Enter key on the computer keyboard. If the module responds properly then the connection has been successfully tested.

## **DGH Utility Software Instructions:**

The DGH Utility Software can be used to test the Ethernet connection between a computer and a remote A3000 converter. The Utility Software is distributed on CD-ROM with a purchase order. It can also be downloaded from the website ([www.dghcorp.com](http://www.dghcorp.com)). The Utility Software should be installed on a computer before proceeding with the instructions below.

Start the test by running the Utility Software. Ensure that power is applied to the A3000 and the DGH module. From the Utility Software main menu, click on "Tools" and then "ASCII Command Line Editor". A small dialog screen will appear. Click on the "Settings" Button to specify the correct computer "Serial Port" and then specify the communications parameters: Baud Rate, Parity Type, Data Bits, and Stop Bits. The Delay times on the right hand side should work in their original condition. Press the "Open" or "Update" button after all parameters are properly configured.

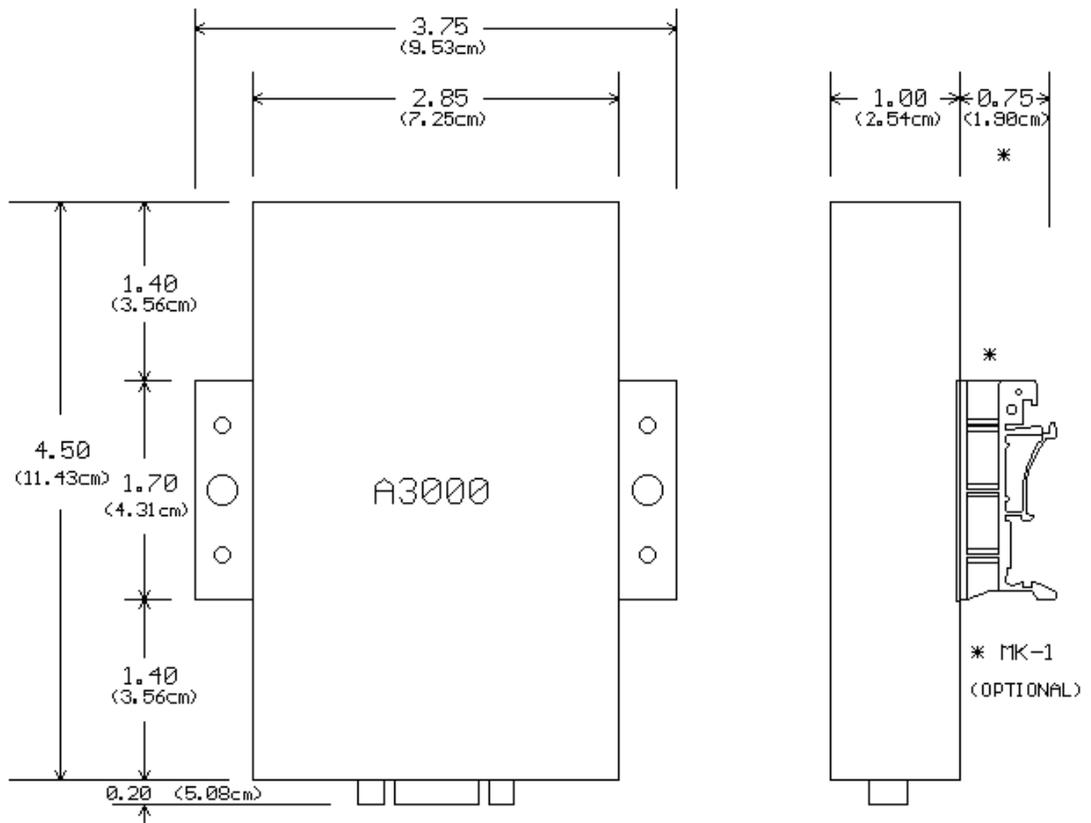
After the port parameters have been applied, DGH protocol commands can be sent through the serial port, Ethernet link to the A3000. The A3000 will then convert the commands to serial data and transmit the command characters onto the RS-485 data lines (on the DB-9 connector). After receiving the characters, the DGH module will respond with information/data that pertains to the specific command. The response characters are then transmitted back to the computer through the A3000 and the Ethernet connection.

The response data is then displayed on the computer screen in the "Response" line area of the dialog screen. If data values are displayed then the connection has been successfully tested. If the word "TIMEOUT" appears then there was no response from the remote module and this means that the device did not respond.

### A3000 Specifications:

- One Serial Port (RS-232/RS-422/RS-485)
- Fast Ethernet auto-detecting
- Serial port baud rates up to 460Kbps
- Drivers for virtual serial ports on XP, Win2000, NT 4.0, Linux
- TCP Raw connection Server/Client Mode
- UDP Data Transfer
- Configuration with web browser
- Protocols: TCP/IP, UDP, HTTP, Telnet, SNMP, DHCP, ICMP, DNS

### Mechanical Dimensions:



**Notes:**