MSI-9850

Ethernet Option

User Guide Supplement

Measurement Systems International

Integrated System Solutions for Industrial Weighing and Process Control

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Introduction

The MSI-9850 Ethernet option provides the ability to connect your CellScale network directly to your PC, corporate network or the Internet. The Ethernet option is available as either wired **10/100Base-T** or wireless **802.11b** network interface.

Communications with the scale is accomplished with simple TCP protocol, bypassing the more complex serial communications with RS-232.

Quick Start

1. Connect to the network by physical connection or link with unsecured 802.11.
2. Access the MSI Scale Discovery Utility.
3. Scan the network for your MSI-9850.
4. Configure IP settings (see your network administrator if you do not know this information).
5. For 802.11 systems open the web interface and configure network and security settings.
6. Reboot the Ethernet interface to apply settings (allow 1 minute for reboot).
7. Scan the network to confirm settings have applied.
8. Open a chat from the MSI Scale Discovery Utility, or from any TCP client (Windows Hyper-Terminal, telnet) to confirm communications.

Illustration 1: Quick Start - Connecting to the Network

Ethernet 10/100 Base-T Connection

The Ethernet interface defaults to use Dynamic Host Configuration Protocol (DHCP) for obtaining an IP address. It is not necessary to be running a DCHP server to discover the scale device on your network, because the MSI Scale Discovery Utility uses multicast IP to discover and configure the device.

Once the device has an IP address, further configuration can be done via the web page interface if necessary.

The Ethernet connection can be made to your network via a hub or switch etc., or can go directly to your computers Ethernet port using a swapped Ethernet cable. For details, please reference your networking hardware User Guide, or contact your network administrator.

Cabling

MSI provides a field installable mating connector (MSI #13587) that allows customers to interface with their own Ethernet cabling. The connector accepts cables up to 8mm.

Cable Assembly

1. First slide the pressure nut 1 and the housing 2 over the cable (Fig.1).
2. Strip the cable sheath over a length of approx. 28mm. Trim the braided shield to a length of approx. 12mm (Fig. 2).
3. See table 1 for the core assignment.
4. Guide the individual cores fully into the marked chambers. Pay attention to use the correct chambers and only
5. one core per chamber (Fig. 3).
6. Contact the cores by pressing the termination blocks 4 together according to Fig. 4 and Fig. 5. The termination blocks engage at the end stop.
7. Pull the housing 2 out as far as the plug insert 3 and hold it tight while you screw the plug insert onto it (Fig. 6).
8. Push the pressure nut 1 on the housing. Tighten the pressure nut firmly (Fig. 7).

Pin	TIA 568 B Color	Function
1	White/Orange	TD+
2	Orange	TD-
3	White/Green	RD+
4	Green	RD-

Fig. 1

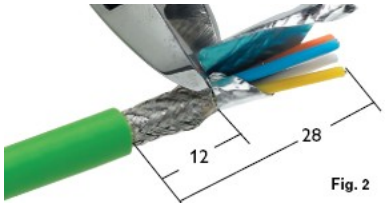


Fig. 2

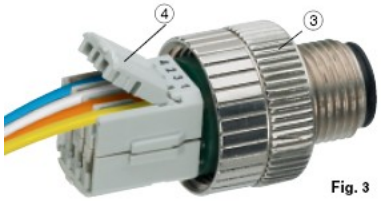


Fig. 3


Fig. 4


Fig. 5


Fig. 6


Fig. 7

802.11 Connection

The MSI-9850 802.11 interface defaults to an unsecured connection. This allows the device to connect to any unsecured network for configuration. Once connected to an unsecured network, any secure network settings can be applied and the unit will operate the secure network from that point on.

Information on configuring the wireless security settings can be found in the web interface, wireless settings. Please also refer to Appendix C – Wirelesss Troubleshooting.

Configuring Network Settings

Network settings can be configured from the MSI Scale Discovery Utility, or by opening a web page and pointing it at the scale device address. The network configuration is specific to every network. Please consult your network administrator for this information.

MSI Scale Discovery Utility

The Scale Discovery Utility can be accessed from http://direct.msiscales.com/products/software/utilities/scalediscovery/. The program requires Java 1.5 or greater to run. The Scale Discovery Utility uses UDP port 2362 and a multicast IP address of 224.0.5.128. You will need to enable these on your firewall for the Scale Discovery Utility to work.

The program is loaded from the web page via Java Web Start technology. This ensures whenever you start the program you are using the latest version each time. Following is the main program window.

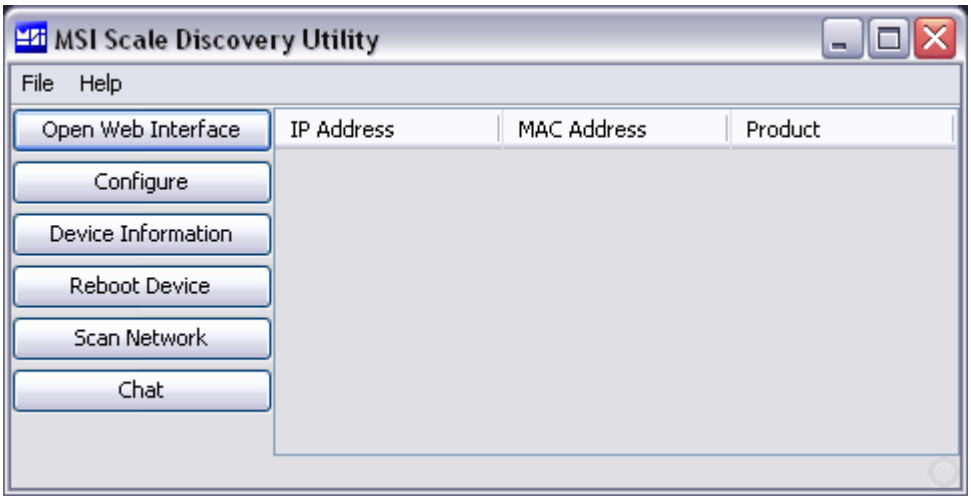


Illustration 2: MSI Scale Discovery Utility

The first step when using the Scale Discovery Utility is to "**Scan Network"** for your scale. The scan should take five seconds, when complete will show a list of the scales found. Note that when the scale first turns on, the network interface should be allowed 1 minute to boot up and acquire an address.

To view information about the scale Ethernet interface use "**Device Information"**.

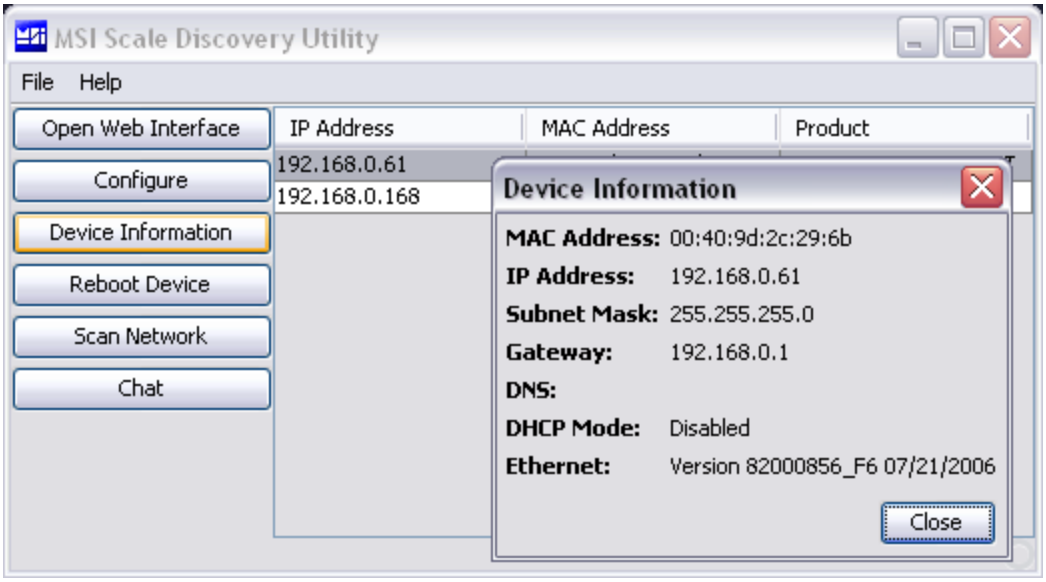


Illustration 3: Scale Discovery Utility - Device Information

To configure the device use the "**Configure"** button to open a dialog where you can adjust the network settings to use DHCP or manually enter a the IP address information.

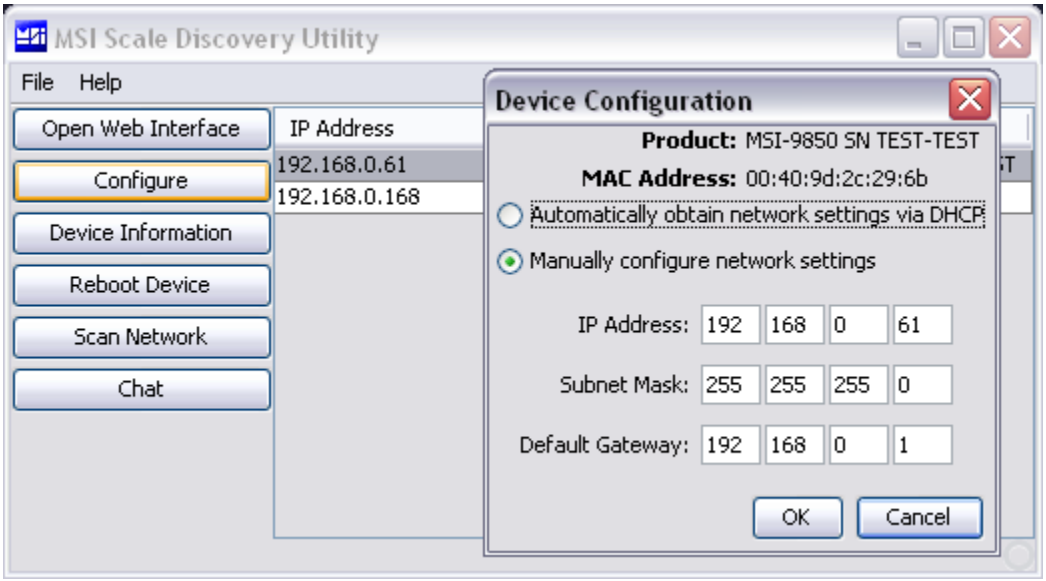


Illustration 4: Scale Discovery Utility - Configure

After entering the desired network configuration select OK to send the configuration to the scale. After sending the configuration, you will have to apply the settings with the "**Reboot Device"** button.

After the scale Ethernet interface settings have been set you can rescan the network to find the device with the new settings. Then use the "**Chat"** button to open a dialog that demonstrates simple communications with the scale.

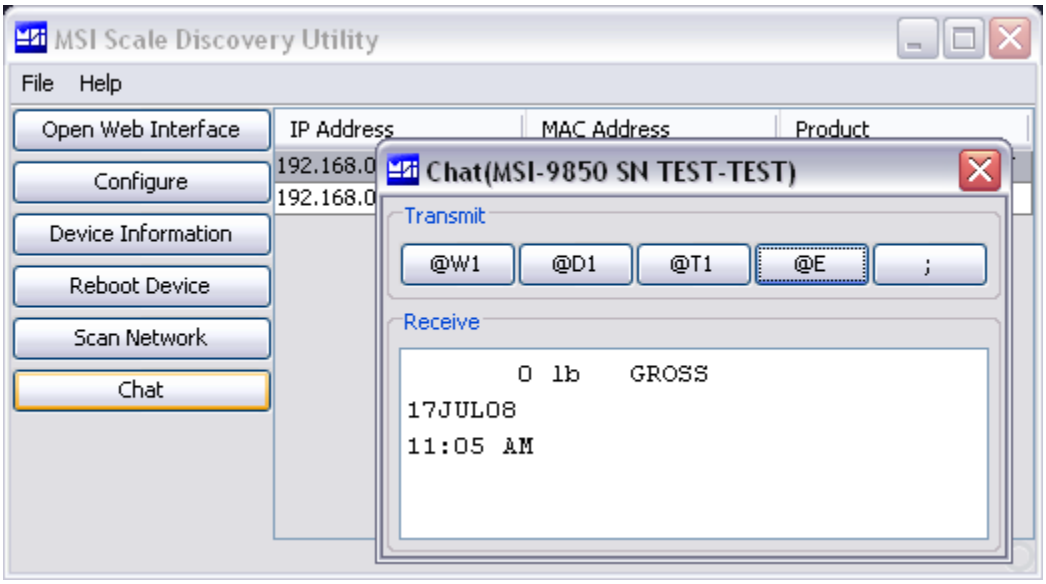


Illustration 5: Scale Discovery Utility - Chat

The transmit buttons are quick links to sending a few of the most common host commands available. The "**@W1"** command requests the current weight from the scale. The "**@D1"** command requests the current date from the scale. The "**@T1"** command requests the current time from the scale. The "**@E"** command prints the programmed end of line string (defaults to carriage return, line feed). The "**;**" semicolon command is a special command the instructs the scale to reset it's command parser. If using the other host commands do not get responses, use the "**;**" semicolon command to reset the scale parser.

Finally, the Scale Discovery Utility provides a quick link to "**Open Web Interface"** to the scale. The following section details the web interface.

Web Interface

The web interface can be accessed after a device has already been configured. Point your web browser to the URL http://{ipaddress}/ The first page will be the login screen. Login with the username 'msi' and the password “0199”.

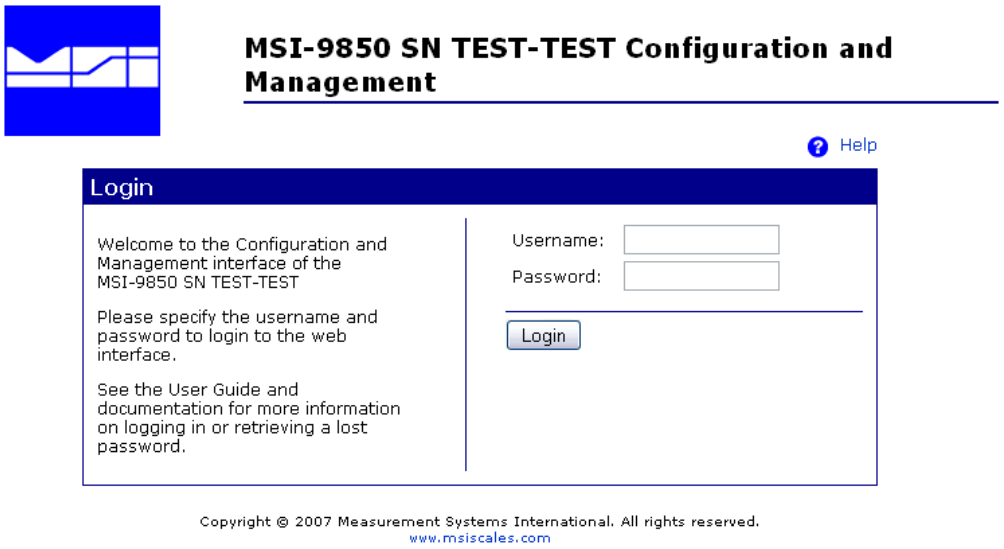


Illustration 6: Web Interface Login

After logging in you will see the homepage.

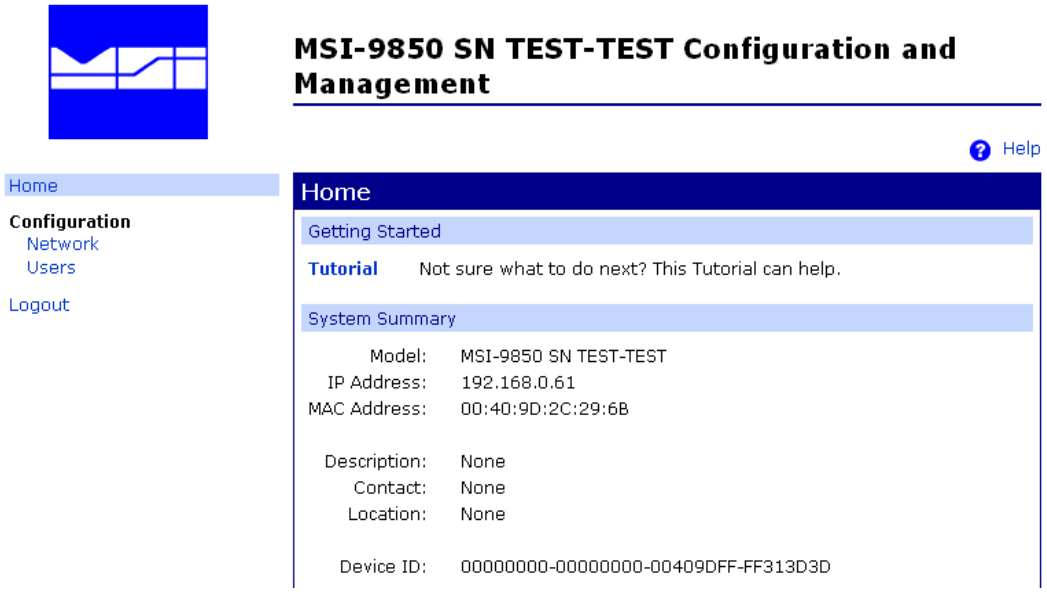


Illustration 7: Web Interface Homepage

IP Settings

To configure the network interface, select “Network” from the menu on the left to see the following page.

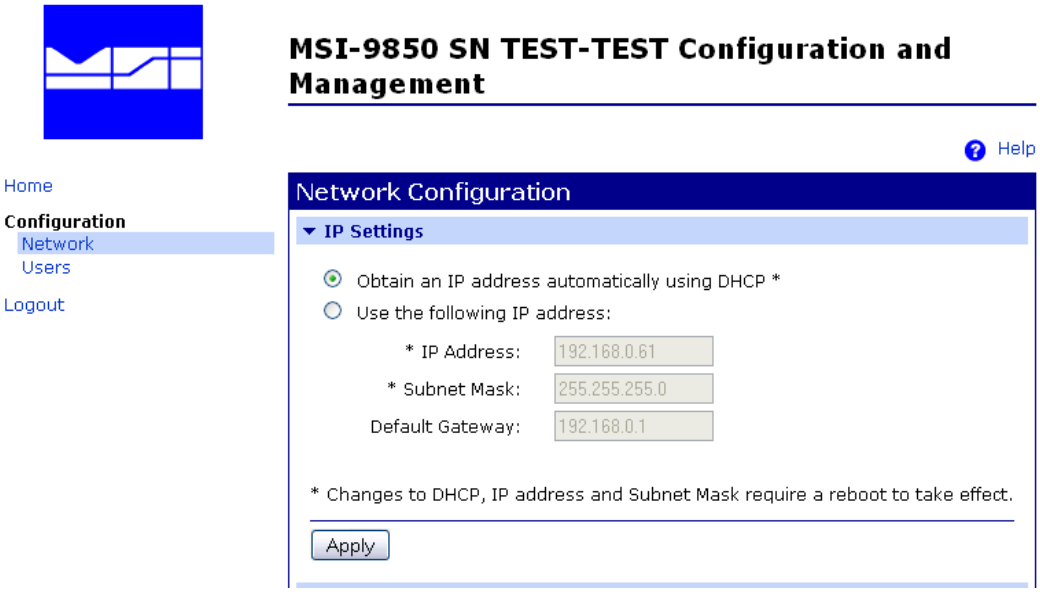


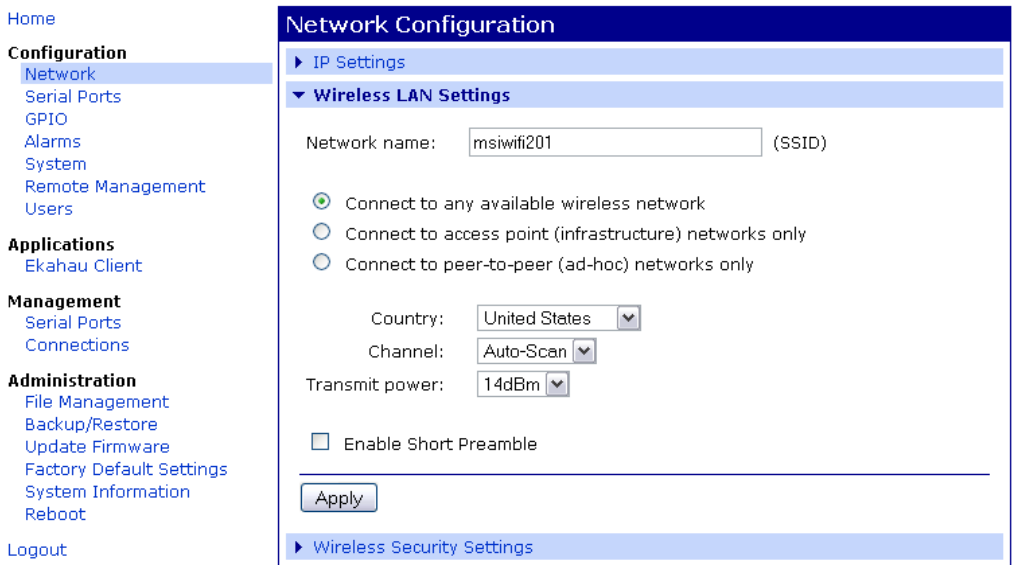
Illustration 8: Web Interface Network Configuration

Enter the network settings and select “Apply” when complete. The device will prompt to reboot. After rebooting, the new settings will take effect.

Wireless Settings

Wireless settings are configured on three pages that are accessible via the web interface.

Wireless LAN Settings



For efficient connections, the Network name, and Channel should be entered for the network the scale will be connecting to.

Wireless Security Settings are configured via the web interface. Following is a summary of the supported wireless security capabilities.

- WEP (Wired Equivalent Privacy)
  - 64/128-bit encryption (RC4)
- WPA/WPA2/802.11i
  - Strong SSL 3.0/TLS 1.0 based encryption
    - DES (56-bit), 3DES (168-bit), AES (128/256-bit)
  - 128-bit TKIP/CCMP encryption
  - 802.1x EAP authentication
    - LEAP (WEP only), PEAP, TTLS, TLS
    - GTC, MD5, OTP, PAP, CHAP, MSCHAP, MSCHAPv2, TTLS-MSCHAPv2
  - Enterprise and Pre-Shared Key (PSK) mode

Wireless 802.1x Authentication Settings

After the wireless interface is configured, IP settings can be reconfigured as above with the MSI Scale Discovery Utility.

Now What?

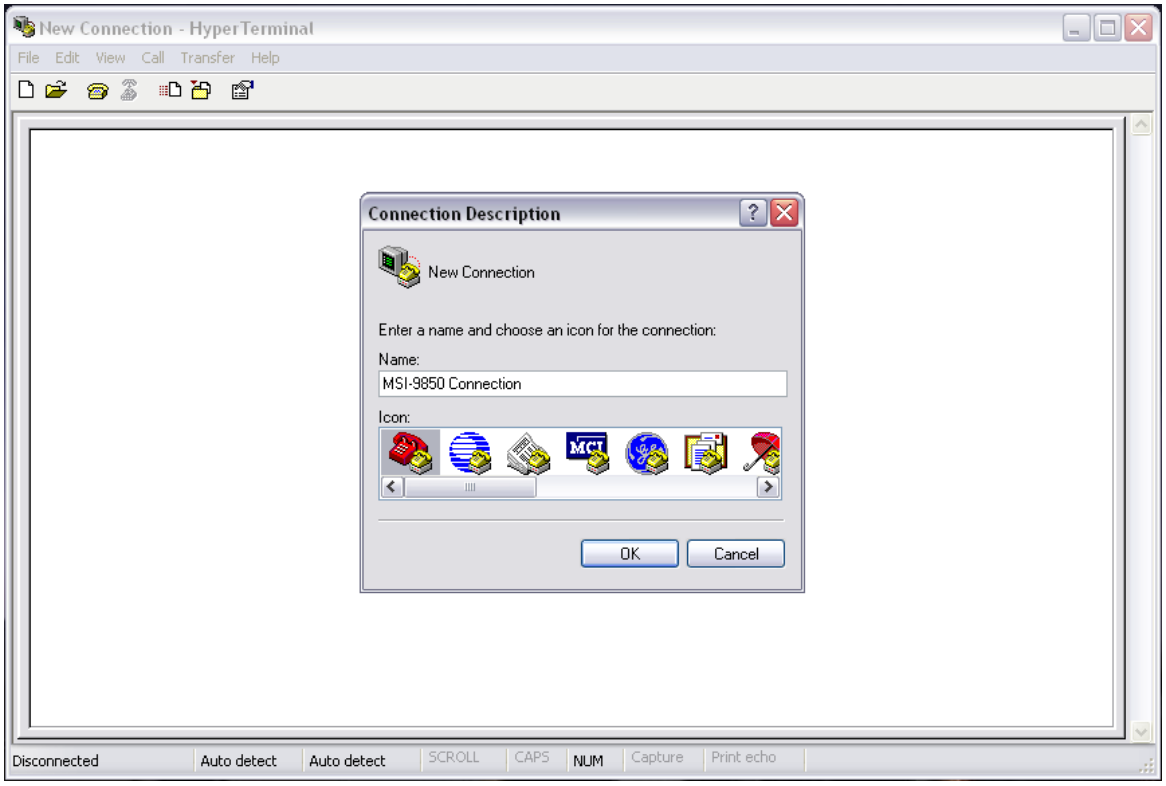
Now that you have configured the MSI-9850 on your network you are able to access the scale for host communications via port 2101. The host commands provide the ability to read all aspects of weight data ranging from Current, Gross, Net, Tare weight to Total weight, statistics. Additionally, the host command language provides the ability to configure settings in the MSI-9850 meter.

Complete details about host communications can be found in the MSI-9850 User Guide.

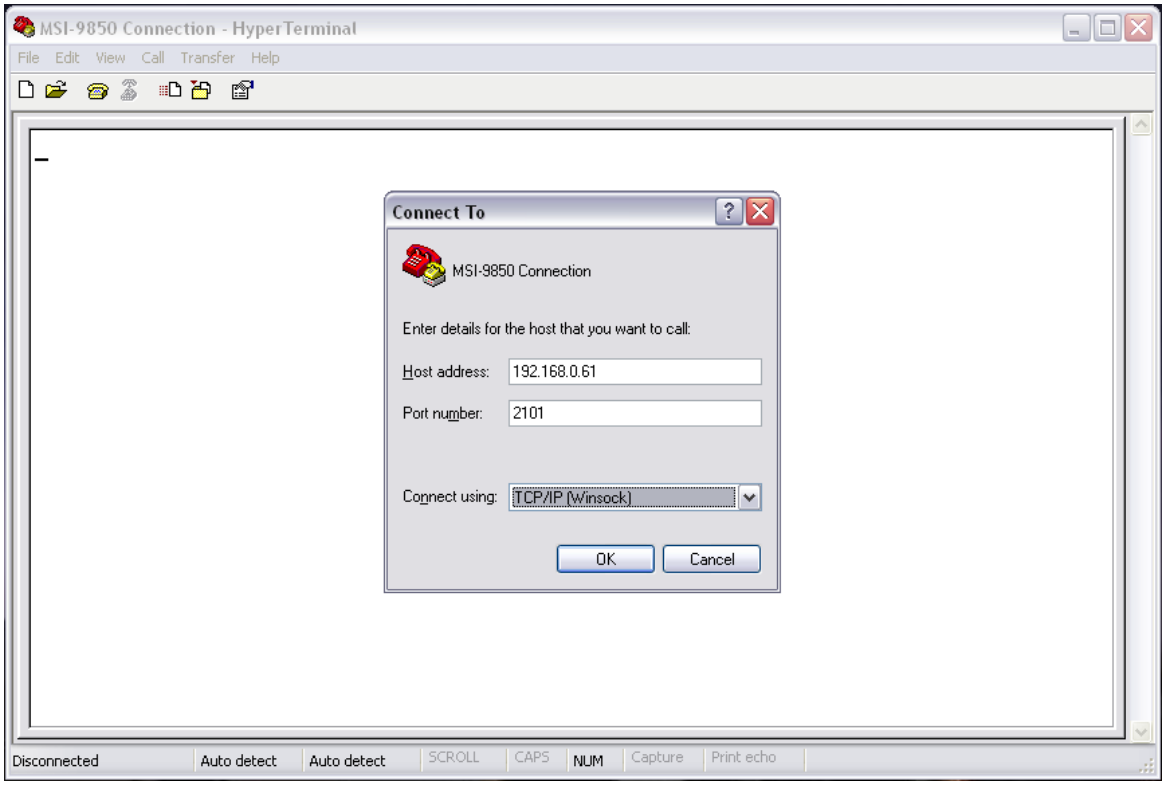
Appendix A – Using Hyper-terminal

Hyper-Terminal is a communications program that is commonly available on Microsoft Windows operating systems. This program can be used to connect to an MSI-9850 Ethernet interface for communications and testing.

1. Start Hyper-terminal
2. Enter a name for the connection and select an Icon



3. Configure the connection to use TCP/IP
4. Enter the device address and port number 2101
5. The connection is now established. Use the host commands to talk to the scale or observe the continuous print string if the MSI-9850 is configured so.



6. To end the session close Hyper-terminal. The program will prompt to save the connection, for convenience, saving is recommended.

Appendix B – FAQ

Question Can I write my own program to talk to the scale and record weight information?

Answer Yes, the MSI-9850 provides a host communication language to access all aspects of weight data and scale configuration. For full details see the MSI-9850 User Guide.

Question Can I connect multiple computers to the scale at once via the Ethernet interface?

Answer No, the MSI-9850 supports a single TCP/IP connection at a time.

Question Can I access a web page to view the scale weight?

Answer No, the MSI-9850 web page interface provides a secondary means of configuring the network settings only.

Question The Scale Discovery Utility does not find my MSI-9850 even though it is connected to the network?

Answer There may be some network firewall settings between the Scale Discovery Utility and your MSI-9850 that are preventing communications. Have your network administrator check the network firewall settings to ensure UDP port 2362 and multicast IP address 224.0.5.128 are not being blocked.

Question I get an error dialog message in the Scale Discovery Utility when I press “Chat”?

Answer Only one active connection to the scale Chat or host interface can be active at a time. Likely there is another program running (perhaps on another computer) that is already talking to the scale.

Appendix C – Wireless Troubleshooting

The main challenge is getting the 802.11 equipped MSI-9850 to associate with a Wireless Access Point (WAP). Once this is accomplished the MSI-9850 can be further configured by using the Scale Discovery Utility.

The settings below are the default settings that the MSI-9850 will attempt to look for in an access point. Once the MSI-9850 is associated these settings can be changed, provided they are changed on the MSI-9850 AND the access point. At this point, encryption and authentication can be setup.

ACCESS POINT SETTINGS (case sensitive):
SSID: Connect
Authentication: none (i.e. open)
Encryption: none
Channel: Auto (1, 6, 11 preferred)
Mode: Infrastructure (as opposed to Ad Hoc)
DHCP server: enabled

The MSI-9850 by default will look for an access point with an SSID of "Connect". If it can't find "Connect" it will then look for an Ad Hoc network with and SSID of "Connect". If that fails it will then associate with the strongest unencrypted access point signal regardless of SSID. If there are more than one access point the MSI-9850 will attempt to associate with the SSID of "Connect", regardless of signal strength. The MSI-9850 needs an access point without authentication or encryption. It will not be able to associate if either of them is enabled. It can associate with any channel but 1, 6, or 11 are preferred (assuming North America). The MSI-9850 by default will look for an access point in Infrastructure mode. It will come up in "BSS_Join" mode.

Once the MSI-9850 has successfully associated with the access point, assuming that the module has not been assigned a static IP address, it will attempt to acquire a dynamic IP address from any available DHCP server on the network.

OTHER TROUBLESHOOTING TIPS

- Make sure the AP is running in mixed or "B mode" (802.11b). If it is running in "G Mode" (802.11G) only the MSI-9850 module will not be able to associate with it as it can only do B mode (11 Mbps).
- If you continue to have problems, then try to force the MSI-9850 to associate with the desired access point. Remove the antenna from the MSI-9850 and move it within a few inches of the desired access point. Check the above settings on the access point. If you have any other access points in the area you might want to power them off.
- Make sure the access point is not blocking multicast IP traffic. The Scale Discovery Utility uses multicast IP to find and configure scale network settings.
- Make sure the access point being used has the newest firmware loaded onto it. In rare circumstances, errors in the access points firmware can impede communications.

Glossary

802.3

The IEEE standard for wired Ethernet.

802.11

The IEEE standard for wireless Local Area Networks.

DHCP

See Dynamic Host Configuration Protocol

Dynamic Host Configuration Protocol (DHCP)

An Internet protocol for automating the configuration of computers that use TCP/IP. DHCP can be used to automatically assign IP addresses, to deliver TCP/IP stack configuration parameters such as the subnet mask and default router, and to provide other configuration information.

Hyper-Text Transfer Protocol (HTTP)

An application protocol in the TCP/IP suite that defines the rules for transferring files (text, graphic images, sound, video, and other multimedia files) on the World Wide Web (WWW).

MAC address

A unique network identifier. All network devices are required to have their own unique MAC address. The MAC address is on a sticker on your Digi device server. The number is displayed as 12 hexadecimal digits, usually starting with 00:40:9D.

Multicast IP

A method of forwarding IP datagrams to a group of interested receivers.

TCP

See Transmission Control Protocol.

Transmission Control Protocol (TCP)

A set of rules (protocol) used along with the Internet Protocol (IP) to send data in the form of message units between computers over the Internet. While IP handles the actual delivery of the data, TCP handles keeping track of the individual units of data (called packets) that a message is divided into for efficient routing through the Internet.

For example, when an HTML file is sent to you from a Web server, the Transmission Control Protocol (TCP) program layer in that server divides the file into one or more packets, numbers the packets, and then forwards them individually to the IP program layer. Although each packet has the same destination IP address, it may get routed differently through the network. At the other end (the client program in your computer), TCP reassembles the individual packets and waits until they have arrived to forward them to you as a single file.

TCP is known as a connection-oriented protocol, which means that a connection is established and maintained until such time as the message or messages to be exchanged by the application programs at each end have been exchanged. TCP is responsible for ensuring that a message is divided into the packets that IP manages and for reassembling the packets back into the

complete message at the other end. In the Open Systems Interconnection (OSI) communication model, TCP is in layer 4, the Transport Layer.

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