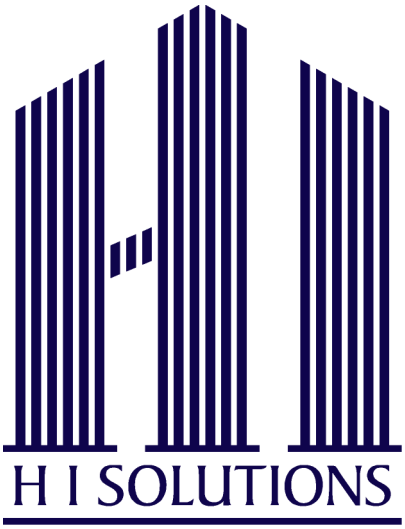
M803-6015A-01

June 2006

SOAP/XML Ethernet Interface



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1. Overview

The HIS 016-6504-S SOAP/XML Ethernet Interface (SOAP) device provides a fast Ethernet interface for transferring point status and commands. The advantages to the SOAP are that it can handle multiple clients at once and is much faster than the terminal server interface.

The SOAP device, shown below, has a four pin screw terminal connector on one end that is used for termination of power and Unitary LAN (ULAN) and an Ethernet port on the other.

Figure 1-1 SOAP top-view

The four pin screw terminal connector is centered between two diagnostic LEDs (*as shown in Figure 1-2,* the functions of these LEDs are:

LAN: Flashes when data is being transmitted or received across the ULAN
PWR: Solid red any time the SOAP has power (15 VDC)

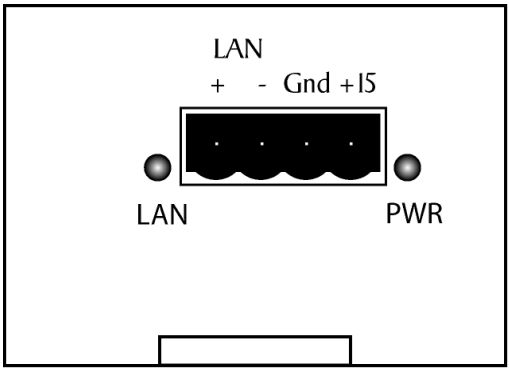


Figure 1-2 SOAP left-side view

The Ethernet port (RJ-45 connector) has two LEDs labeled LNK and ACT. Their functions are:

LNK: Solid green when the SOAP device is physically connected to a properly functioning Ethernet drop.

ACT: Flashes orange when communications are detected on the Ethernet port. Data does not have to be directed to this device for this LED to activate (i.e. this is an indicator of general network traffic).

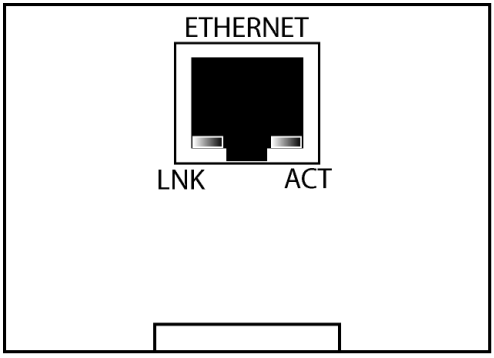


Figure 1-3 SOAP right side view

2. Installation

2.1 Installation Procedure

Items needed:

- Mounting equipment
- Power source with minimum 22-AWG wiring. Wiring must meet installation specifications as well as local codes (e.g. plenum rating, isolation, etc.)
- CAT-5 Ethernet cable
- 016-6504-S HIS SOAP/XML Ethernet Interface with firmware version 7.1 or later
- PC running PC Central with Ethernet support or a Smart Serial Cable
- The IP address and netmask assigned for this SOAP device. Obtain from IT/Network Administrator.

Installation Sequence:

1. Mount the SOAP/XML Ethernet Interface
2. Connect to ULAN and power through four-pin terminal block connector
3. Connect to Ethernet network using CAT-5 cable
4. Edit PC Central Site Definition to reference new SOAP device
5. Parameter configuration using either PC Central SiteView or Terminal Emulation

2.2 Mounting

The SOAP can be mounted on any flat surface using the screw-hole mounting tabs in each end of the device. One inch cabling clearance on each end of the device is recommended.

2.3 Power

The SOAP/XML interface requires an external power supply that provides 15 VDC. Typical power draw is about 60 mA for a 15VDC supply. Maximum draw is 150mA.

Power must be supplied to the board through the four-pin screw terminal connector. Wire terminations should be made according to the label located on top of the SOAP device (*as shown in Figure 1-1*). The PWR LED should illuminate once power is connected.

2.4 Unitary LAN

The RS-485 ULAN terminates to the four pin screw connector (*as shown in Figure 1-1*). See the Unitary section of the "Field Commander Operation and User's Manual" for more details about setting up an H I Solutions Unitary LAN. When the SOAP device is connected to a ULAN (RS-485 network), and communication is established with *other H I Solutions devices*, the LAN LED should begin to blink.

2.5 Ethernet LAN

The Ethernet/CAT 5 cable will plug into the Ethernet port on the SOAP device (*shown in Figure 1:3*). The green LNK LED should light, showing a working Ethernet connection. The orange ACT LED should blink occasionally as traffic occurs on the LAN.

2.6 PC Central Site Definition

For PC Central Color Graphics to take advantage of the SOAP device, its IP address must be added to the site definition. The following procedure must be completed on each PC that is running PC Central and will be accessing this site.

Open PC Central choose SiteView from the Menu. Right-click on the icon for this site and choose "Properties" from the pop-up menu. The Edit Site dialog will appear. Click on the button labeled "Additional". The "Additional Site Parameters" dialog will be displayed (shown below).

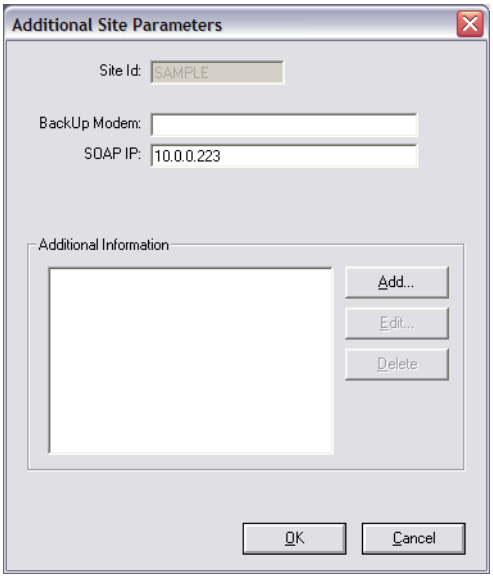


Figure 2-1Edit Site - Additional Site Paramters

In the blank labeled “SOAP IP:”, type in the IP address that has been assigned for use with this SOAP device. It should be entered in the format nnn.nnn.nnn.nnn, where nnn is a number between 0 and 255. For example, 10.0.0.223 is the address used in the sample dialog above.

The SOAP protocol defaults to communicating over port 80, which is the standard port number for World Wide Web traffic. H I Solutions recommends using port 80 unless the site Network Administrator explicitly requires another port be used. If a port other than 80 is being used, add it to the end of the IP address preceeded by a colon, ex. nnn.nnn.nnn.nnn:999. Press OK on the Additional Site Parameters dialog and on the Edit Site dialog.

The SOAP is now installed. Continue to Section 3 “Parameter Configuration - Graphical” to configure the SOAP graphically using SiteView (recommended). Go to Section 4 “Parameter Configuration - Command Line” to configure the SOAP from the command line using Terminal Emulation.

3. Parameter Configuration - Graphical

Each SOAP device must be programmed for its specific installation before remote connection can be established. Parameters for the site (e.g. IP address, port number, gateway, etc) must be established prior to using the device.

The following procedure may be used to configure a SOAP. Note that this procedure requires release SP2.5 or later of PC Central. For earlier releases, use the procedure in section 4 “Parameter Configuration”.

1. Connect to the SOAP device through ULAN using PC Central’s SiteView program or Terminal Emulation Program.
2. Verify ULAN and firmware information
3. Configure network settings
4. Configure optional settings

3.1 PC Central Connection

Launch PC Central and choose SiteView from the Menu. If this PC has a site defined for this location, and is connected to the network, select this site from the Site List and connect to it. If a Smart Serial Cable is being used to connect to the site, go to the “Tools” menu, select “Cable Connection”, verify the correct (PC) port configuration for the smart serial cable (in “Step 1”), and click “OK” to accept the configuration and move to the “Site Menu” screen, click “CONNECT” to establish a connection with the site. See the “PC Central User Guide” if additional assistance is required to connect from PC Central.

Once connection is established with the site, double-click “Devices” to gain access to the Device List. The SOAP device should show up at the end of the list, identified as “SOAP”. Double-click on the SOAP device. The Device Menu will be displayed, with a single item – “System Table”. Click on the System Table. The System Table dialog will be displayed with four tabs labeled General, Network, Options, and Constants, respectively, as shown below.

3.2 Verify ULAN and firmware information

The **General** tab displays unchangeable information about the SOAP controller, including the name (SOAP), software configuration type (3), controller address (122), and hardware and software information.

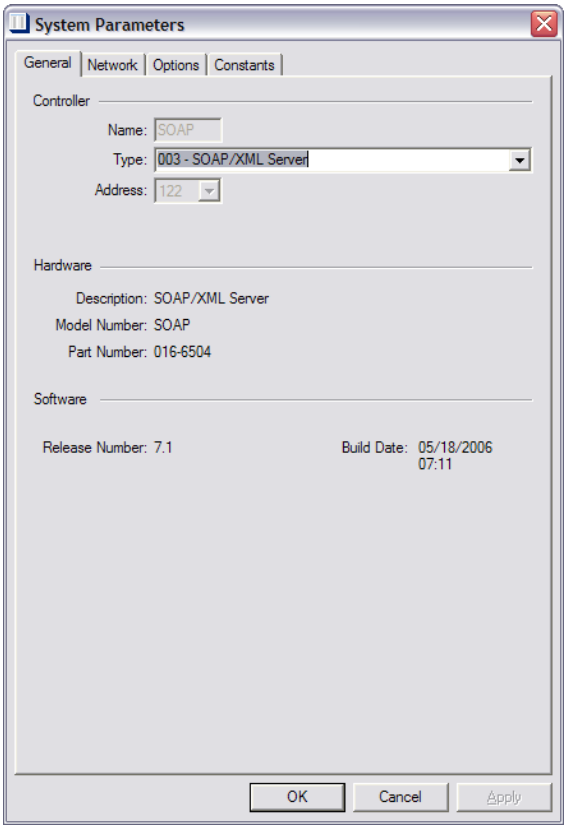


Figure 3-1 System Table General Tab

3.3 Configure Network Settings

The **Network** tab provides inputs for the IP Address, Port, and Netmask of the connection. It also displays the Ethernet MAC address for

troubleshooting purposes. The IP Address and Netmask values should be supplied by the site's IT/Network Administrator. The Port value defaults to 80. If a different port number has been assigned by the Network Administrator (see Section 2.6 PC Central Site Definition), enter that number in the "Port" field.

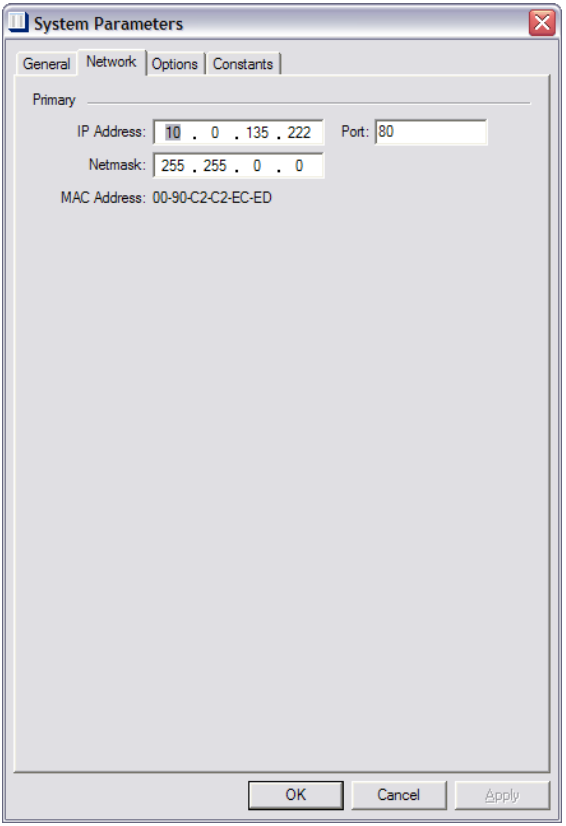


Figure 3-2 System Table Network Tab

3.4 Configure Optional Settings

The **Options** tab provides various fields for customization. These choices include:

- *Enable maintenance port*: This setting is for future use.
- *Enable SOAP connection*: For troubleshooting use. Should be left checked (on) unless directed by H I customer service personnel.
- *Message logging*: Causes any device commands sent over the SOAP/XML interface to be logged as a message to the Field Commander. Selecting “None” disables message logging. Selecting “Source IP” sends a message containing the IP address of the client, and “Source IP” sends a message containing both the IP address of the client and the command that was executed.
- *Backup Logging Address*: When message logging is enabled and the Field Commander cannot be contacted, the message can either be broadcast to all unitaries or sent to a specific device. Select “Broadcast” or the specific unitary address from the pull-down menu.
- *Analog polling*: This setting is for backwards compatibility with older unitary devices. It should be left on “Faster Analog Polling” except in the specific case of color graphics that are displaying the IN/OUT-of-service status of analog points on unitaries with firmware versions older than X3+.

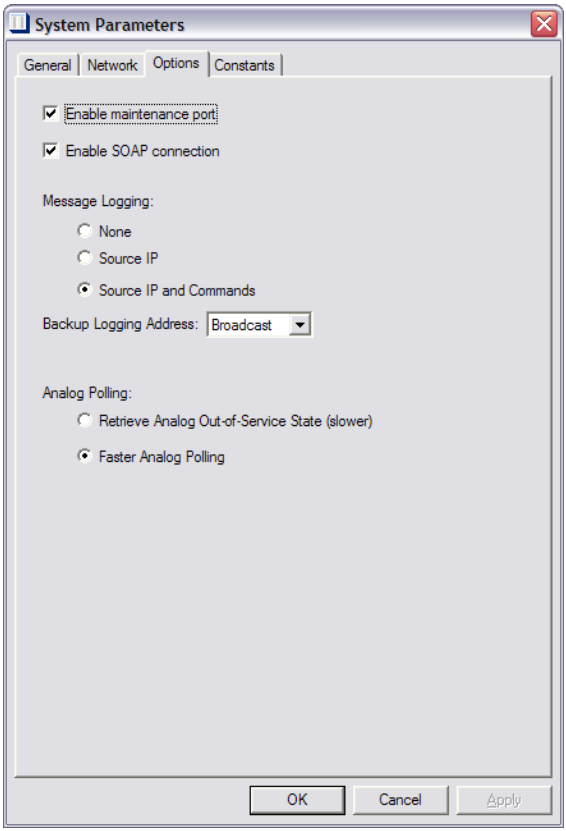
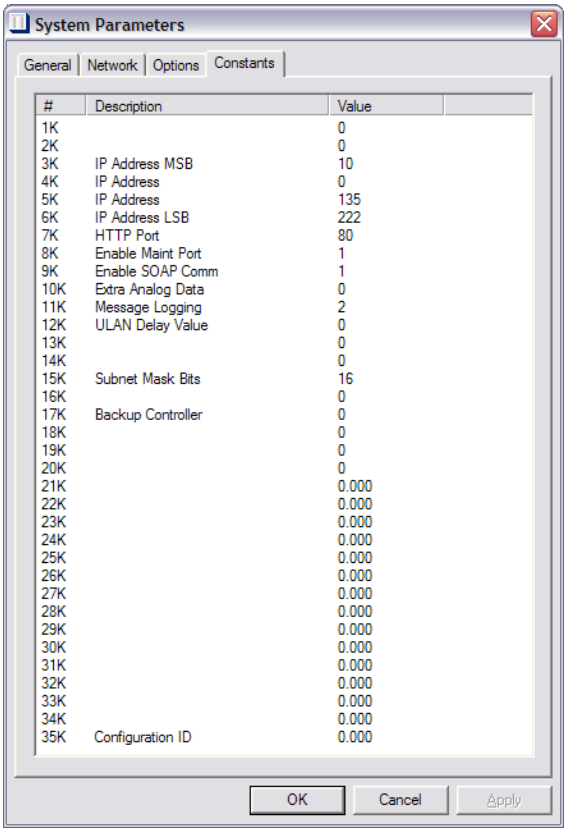


Figure 3-3 System Table Options Tab

3.5 Constants Display

The **Constants** tab displays the network and options information in their native format as K values. These values can be changed from this tab, but using the Network and Options tabs is recommended.



#	Description	Value
1K		0
2K		0
3K	IP Address MSB	10
4K	IP Address	0
5K	IP Address	135
6K	IP Address LSB	222
7K	HTTP Port	80
8K	Enable Maint Port	1
9K	Enable SOAP Comm	1
10K	Extra Analog Data	0
11K	Message Logging	2
12K	ULAN Delay Value	0
13K		0
14K		0
15K	Subnet Mask Bits	16
16K		0
17K	Backup Controller	0
18K		0
19K		0
20K		0
21K		0.000
22K		0.000
23K		0.000
24K		0.000
25K		0.000
26K		0.000
27K		0.000
28K		0.000
29K		0.000
30K		0.000
31K		0.000
32K		0.000
33K		0.000
34K		0.000
35K	Configuration ID	0.000

Figure 3-4 System Table Constants Tab

4. Parameter Configuration - Command Line

To configure a SOAP device via the command line instead of the graphical tools, use the following steps.

Launch PC Central and choose SiteView from the Menu. Select the site defined for this location and double-click to connect to it. Double-click on the Terminal Emulation tool. Terminal Emulation will launch and connect to the site. See the "PC Central User Guide" if additional assistance is required to connect from PC Central.

Type **`UNITARY`** and press enter.

Type **`C 122`** and press enter to connect to the SOAP (the SOAP controller's address is always 122).

Type **`MO SY`** (short for Modify System) and press enter.

The System Table will appear as shown below.

The IP address of the system should be in the four-byte format nnn.nnn.nnn.nnn where each nnn is a number between 0 and 255. Use the arrow keys to navigate to the 3K value, labeled "IP Address MSB". Type in the first byte of the IP address and press enter. The cursor will move to 4K. Type in the second byte and press enter. Enter the 3rd and 4th bytes of the IP address into 5K and 6K respectively.

The Port value (7K) defaults to 80, which is the standard port number for World Wide Web traffic. H I Solutions recommends using port 80 unless the site Network Administrator explicitly requires another port be used. If a different port number is used, that number will need to be configured in the site definition for all PC Central clients that will be connecting to this site. If a port different than 80 is being used, enter it in 7K and press enter.

The maintenance port setting (8K) is for future use, do not change it.

The "Enable SOAP Comm" setting (9K) is for troubleshooting purposes only. It should be left as '1' unless directed by H I customer service personnel.

The "Extra Analog Data" setting (10K) is for backwards compatibility with

older unitary devices. It should be left as ‘0’ except in the specific case of color graphics that are displaying the IN/OUT-of-service status of analog points on unitaries with firmware versions older than X3+.

The “Message Logging” setting (11K) controls logging of device commands sent through the SOAP interface. If logging is enabled, a message is created and sent to the Field Commander any time a device command (turn on/off of a point) is received. Setting to ‘0’ disables logging. Setting to ‘1’ logs only the IP address that the command originated from. Setting to ‘2’ logs the IP address and the command that was executed.

The “ULAN Delay Value” (12K) is used to optimize SOAP behavior in busy ULAN networks. Leave this value as ‘0’ unless directed by H I customer service personnel or your distributor.

The “Subnet Mask Bits” (15K) setting is for the IP address netmask as provided by the IT/Network Administrator. If the IP address was provided in the format nnn.nnn.nnn.nnn/y, the netmask number is the /y. If a separate netmask value was provided in the format 255.255.nnn.nnn, please request the Network Administrator to provide it in the nnn.nnn.nnn.nnn/y format. Type in the value and press enter.

The “Backup Controller” setting (17K) is used in conjunction with the Message Logging function (11K). If message logging is enabled, messages go to the Field Commander by default. If the Field Commander is not reachable, this setting determines where the message is sent. If it is left as ‘0’, the message will be broadcast to all unitaries. Setting it to any other value from ‘1’ to ‘120’ will cause the message to be sent to that unitary.

When complete, press the **ESC** key, then enter **EXIT** and finally **LO** to log out and close the window.

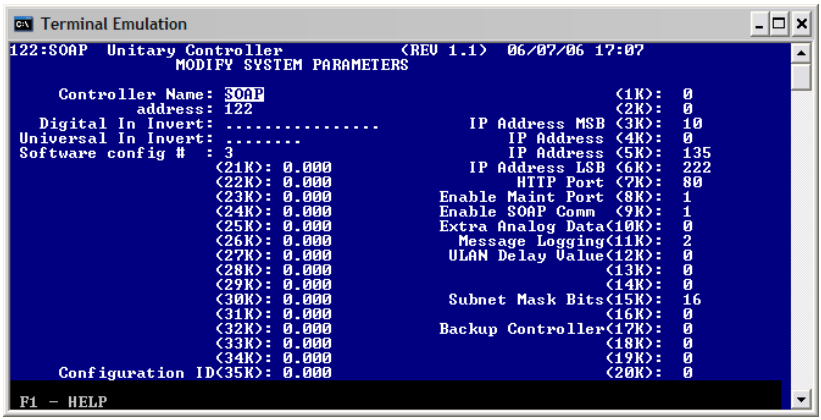


Figure 4-1 SOAP Command Line System Table

5. Troubleshooting

Color graphics display but cannot get connected to my system.

First verify the SOAP/IP address entered in the Site definition (See page 4) matches the IP address entered into the Network Tab of the System Table (See page 7).

Second Verify the ports also match.

See if the device responds to Ethernet Ping packets. From the Windows Command Prompt command-line interface type Ping followed by the IP address (less port number). For our examples in this manual the command would look like:

```
C:\>ping 10.0.0.223

Pinging 10.0.0.223 with 32 bytes of data:

Reply from 10.0. 0.223: bytes=32 time<1ms TTL=64
Reply from 10.0. 0.223: bytes=32 time<1ms TTL=64
Reply from 10.0. 0.223: bytes=32 time<1ms TTL=64
Reply from 10.0. 0.223: bytes=32 time<1ms TTL=64

Ping statistics for 10.0. 0.223:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

If you get “Request timed out” responses instead of the “Reply from…” results shown above, the device is not responding to Ethernet connections.

The next step would be to verify the computers IP address and Subnet mask to be certain they are compatible. Consult you Windows Help for checking these network settings for you version of Windows OS.

My graphics connect to the system but it takes forever to update the data.

The SOAP device is another controller vying for network bandwidth. If you have many points on one screen then it will take time to update (fill-in) all

the fields. It is generally good practice to design the graphic screens to achieve a compromise between simple navigation and massive data presentation to avoid graphics screens from requesting large refreshes. It is also likely that heavy normal network traffic will inhibit or slow the transfer of data to, or from, the SOAP device. Remember the SOAP device is another entry point sharing bandwidth with the Filed Commander and all Unitary Controllers on the network. See the following topic for another possible explanation of reduced performance.

My Unitary LAN runs fine before I connect the SOAP device.

This is likely due to the use of a pre "A1" revision SOAP device. The earlier devices had small amounts of LAN Bias and Termination built in. Try moving the SOAP device to either end of the uLAN or remove the terminating resistor from the unitary, or the jumper from the Field Commander. If this does not fix the problem, contact your distributor about getting a revision "A1" or later SOAP device.

The network Administrator provided a long-hand net-mask and didn't know how to convert it to the SOAP devices shorthand format.

The notation while quite common is not universal by any means. When a net-mask is provided in the nnn.nnn.nnn.nnn format, each three-digit number represents 8 binary bits of data. If all eight bits are set (=1) then the value is 255, all clear (=0) the value is zero. This implies there are 256 different combinations for each number in the net-mask. The SOAP device uses a simplified net-mask that merely states the number of consecutive "1" bits from the left side of the net-mask. For example:

```
255.0.0.0       = 11111111.00000000.00000000.00000000 = 8

255.240.0.0     = 11111111.11110000.00000000.00000000 = 12

255.255.0.0     = 11111111.11111111.00000000.00000000 = 16

255.255.255.15 = 11111111.11111111.11111111.00001111 = 24
```

Notice the last example cannot be 28 (the total number of 1s because the 1s MUST be consecutive starting from the left). Having an improper or incompatible net-mask can inhibit communication with the device. Make certain the Network Administrator is aware of the device requirements when asking for the fixed, or static, IP address.

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