Savi Signpost SP-65X Series Installation Guide

Version 1.0

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Introduction

Savi Signpost SP-65X Series are short-range transmitters that provide their identity information to all models of Savi® EchoPoint™ Series tags that are within range. A tag uses this information to relay positional information about itself to all models of Savi EchoPoint Series readers. The reader forwards the collected data to the Savi SmartChain® Site Manager or SmartChain Client Tools host platforms.

Savi Signpost SP-65X Series include a number of signpost models with different capabilities and connectivity ranges. This series comprises the basic signpost, signpost with network adapter, and signpost with network adapter, reader, and ultra-high frequency (UHF) antenna.

Working with Savi readers, Savi Signpost SP-65X Series provide a complete radio frequency identification (RFID) solution for real-time, end-to-end visibility of goods and critical assets moving through the supply chain.

Features

For specific models:

◆ A short-range, low frequency inductive loop field generator triggers a UHF transmission from Savi tags that pass through the field.

◆ An optional UHF reader plug-in provides most Savi reader functionality including UHF transmission of wake-up and command signals and reception Savi tags responses.

◆ An external ferrite rod antenna allows usage in compact, indoor areas and for special applications.

◆ An included network adapter allows the signpost to transmit reader data to a local server, display diagnostics, and perform network maintenance functions, such as firmware downloading. The network adapter is a microprocessor module with RS-232 and Ethernet ports and runs SaviNet, TCP/IP, and UDAP protocols.

Savi Signpost SP-65X Series Description

The following components comprise the Savi Signpost SP-65X Series:

◆ Controller and network adapter unit

◆ Antenna option that consists of:

❖ Short-range ferrite rod inside controller unit; 8-foot (2.45 meters) range

❖ Mid-range air coil; 10-foot (3.05 meters) range

❖ Long-range air coil; 12-foot (3.7 meters) range

◆ Optional UHF reader plug-in

◆ Optional external ferrite rod antenna

Model Number	Savi Signpost SP-65X Series Description
SP-650-011	✦ 123 KHz ✦ No low frequency (LF) antenna ✦ External ferrite rod antenna
SP-650-111	✦ 123 KHz ✦ 8-foot (2.45 meters) range antenna
SP-650-211	✦ 123 KHz ✦ 12-foot (3.7 meters) range antenna with attached controller
SP-650-311	✦ 123 KHz ✦ 10-foot (3.05 meters) range antenna with attached controller
SP-651-011	✦ 123 KHz ✦ No LF antenna ✦ Ethernet connection ✦ External ferrite rod antenna
SP-651-111	✦ 123 KHz ✦ 8-foot (2.45 meters) range antenna ✦ Ethernet connection

Model Number	Savi Signpost SP-65X Series Description
SP-651-211	✦ 123 KHz ✦ 12-foot (3.7 meters) range antenna with attached controller ✦ Ethernet connection
SP-651-311	✦ 123 KHz ✦ 10-foot (3.05 meters) range antenna with attached controller ✦ Ethernet connection
SP-652-011	✦ 123 KHz ✦ No LF antenna ✦ Ethernet connection ✦ UHF reader ✦ UHF antenna ✦ External ferrite rod antenna
SP-652-111	✦ 123 KHz ✦ 8-foot (2.45 meters) range antenna ✦ Ethernet connection ✦ UHF reader ✦ UHF antenna
SP-652-211	✦ 123 KHz ✦ 12-foot (3.7 meters) range antenna with attached controller ✦ Ethernet connection ✦ UHF reader ✦ UHF antenna
SP-652-311	✦ 123 KHz ✦ 10-foot (3.05 meters) range antenna with attached controller ✦ Ethernet connection ✦ UHF reader ✦ UHF antenna
SP-650-101	✦ 132 KHz ✦ 8-foot (2.45 meters) range antenna
SP-650-201	✦ 132 KHz ✦ 12-foot (3.7 meters) range antenna with attached controller

Model Number	Savi Signpost SP-65X Series Description
SP-651-101	✦ 132 KHz ✦ 8-foot (2.45 meters) range antenna ✦ Ethernet connection
SP-651-201	✦ 132 KHz ✦ 12-foot (3.7 meters) range antenna with attached controller ✦ Ethernet connection
SP-652-101	✦ 132 KHz ✦ 8-foot (2.45 meters) range antenna ✦ Ethernet connection ✦ UHF reader ✦ UHF antenna
SP-652-201	✦ 132 KHz ✦ 12-foot (3.7 meters) range antenna with attached controller ✦ Ethernet connection ✦ UHF reader ✦ UHF antenna

Specifications

Specification	Description
Power	**AC source**: 100-240VAC, 50-60 Hz, 0.3A **DC source**: 12.8 - 30 VDC
Weight	**8-foot (2.45 meters) range model**: 2 lbs **10-foot (3.05 meters) range model**: 9.2lbs **12-foot (3.7 meters) range model**: 12.3 lbs
Dimensions for 8-foot (2.45 meters) range model	**Length**: 7.5 inches (19 cm) **Width**: 7.5 inches (19 cm) **Height:** 3 inches (7.6 cm)
Dimensions for 10-foot (3.05 meters) range model	**Length**: 18 inches (46 cm) **Width**: 33 inches (84 cm) **Height**: 5 inches (13 cm)
Dimensions for 12-foot (3.7 meters) range model	**Length**: 28 inches (71 cm) **Width**: 48 inches (122 cm) **Height**: 5 inches (13 cm)

Contacting Customer Support

If you cannot find the information you need in this guide, contact Savi Customer Support.

◆ Call 1-888-994-SAVI (North America only) or 1-408-743-8888 between 9 a.m. and 5 p.m. Pacific time.

◆ Send email to help@savi.com.

◆ Check http://www.savi.com/support for information.

When you contact Savi Customer Support by telephone or email, have the following information available:

◆ Contact information (company name, your name, email, and phone number)
◆ Problem description
◆ Product type and location
◆ Device model number
◆ Software version
◆ Serial number or license information

Hardware Installation

This chapter covers installing the Savi Signpost SP-65X Series hardware, including the required tools and materials, site preparation, and making the physical installation and power connections.

Materials and Equipment

Signpost Model	Material, Equipment, and Tools
SP-650-211, SP-650-311, SP-651-211, SP-651-311, SP-652-211, SP-652-311, SP-650-201, SP-651-201, SP-652-201	**Power source:** ✦ **AC source**: 100-240VAC, 50-60 Hz, 0.3A ✦ **DC source**: 12.8 - 30 VDC **Mounting type:** ✦ Mounting hardware is required **Cable types:** ✦ RS-232 and synchronization cables **Hardware and software:** ✦ Computer with signpost configuration software installed
SP-650-011, SP-650-111, SP-651-011, SP-651-111, SP-652-011, SP-652-111, SP-650-101, SP-651-101, SP-652-101	**Power source:** ✦ **AC source**: 100-240VAC, 50-60 Hz, 0.3A ✦ **DC source**: 12.8 - 30 VDC **Mounting type:** ✦ Mounting feet are required **Cable types:** ✦ RS-232 and synchronization cables **Hardware and software:** ✦ Computer with signpost configuration software installed

Signpost Connectors and LEDs

Connectors and LEDs	Description
Power	Input power connector. Power cord is supplied with the product. The plug to the power cord is compatible with AC power mains for the country where the installation occurs.
RS-232	Used to connect to a computer for setup and diagnostics by installers and technicians. Cables must be ordered separately.
Low frequency antenna	External loop antenna for 10-foot (3.05 meters) range and 12-foot (3.7 meters) range signposts. External ferrite rod antenna for Savi Signpost SP-65X Series models SP-650-011, SP-651-011, and SP-652-011. Externa ferrite rod antenna must be ordered separately.
UHF antenna	Two SMA-reverse polarity connectors are provided with Savi Signpost SP-65X Series models SP-652-011, SP-652-111, SP-652-211, SP-652-311, SP-652-101, and SP-652-201.
Ethernet	Used for Ethernet connection. Cables must be ordered separately.
Sync In	Used to synchronize 2 to 4 signposts to cover an area larger than is possible with a single signpost. Cables must be ordered separately.
Sync Out	Used to synchronize 2 to 4 signposts to cover an area larger than is possible with a single signpost. Cables must be ordered separately.
Status	This LED indicates when power is applied and the signpost mode of operation: On ½ second, off ½ second indicates normal operation On 1 second, off 1 second indicates the signpost is off but powered On continuously indicates the signpost is transmitting a CW signal

Preparing the Site

The criteria for placement and the preparation include the considerations listed in the following table.

Consideration	Description
Safety	Avoid selecting a signpost installation location where harm to the equipment or personnel is possible.
Power	Select an installation location where power is accessible.
Space	Allow sufficient space to install the signpost.
Coverage	Make sure that the installation location is appropriate for capturing data. Note: The exact size and shape of these patterns is dependent on several parameters, such as initial power settings during installation, ambient noise levels, and nearby obstructions. When installing, you need to experiment to determine actual performance based on needs.
Placement	Signposts should be placed adjacent to a portal or other chokepoint, covering an area where the assets must pass or be stored.
Locations not permitted	Signposts must not be used in areas not permitted by government regulation. Savi can help with determining applicable countries and locations.

Mounting the Savi Signpost SP-65X Series

This section describes how to mount signposts with mounting hardware and signposts with mounting feet.

Mounting the Signpost with Hardware

Savi Signpost SP-65X Series models SP-650-211, SP-650-311, SP-651-211, SP-651-311, SP-652-211, SP-652-311, SP-650-201, SP-651-201, SP-652-201 can be hung adjacent to a portal or other chokepoint and must use the supplied installation hanger kit.

1. Attach a removable 1/8 inch (.33 cm) link to each of the four mounting brackets at the four corners of the unit.

Figure 2-1   Removable link
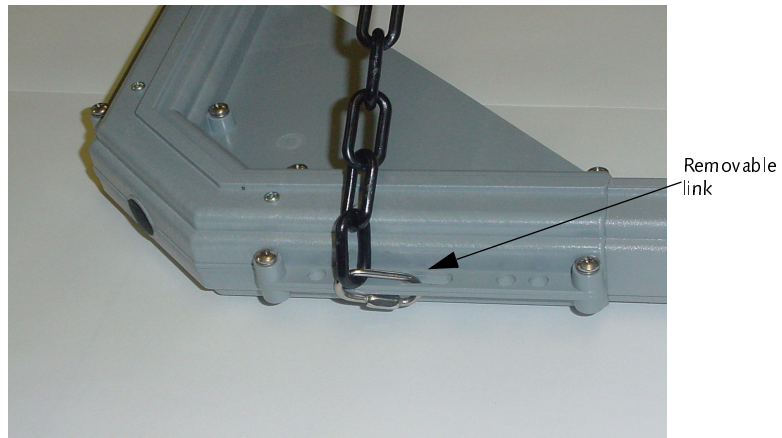
Removable link

2. Using two lengths of plastic chain, attach each at both ends to the four removable links, as shown in Figure 2-1 and Figure 2-2.

Figure 2-2 Attaching chain

3. Attach another removable link to the center of the chain, as shown in Figure 2-2.

4. Attach the top removable link to an appropriate rope, cable, or chain and fasten to a 3/8 inch (.95 cm) eye screw or eye bolt (minimum 1-½ inch (3.8 cm) penetration into solid material or through bolt).
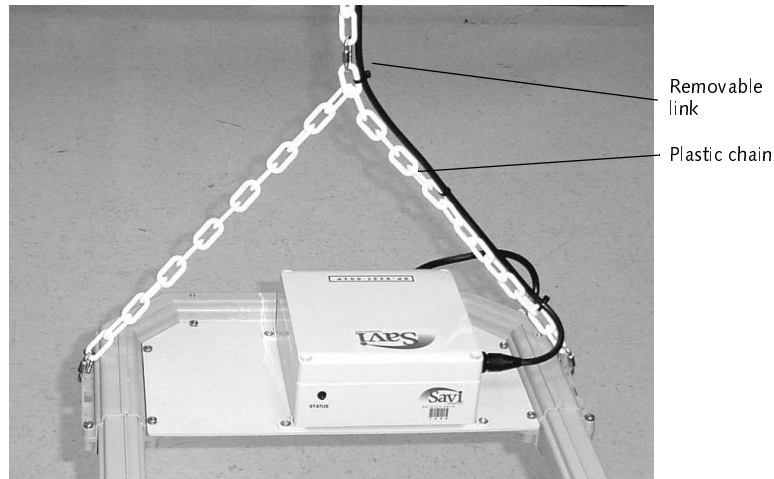
5. Secure the power cord to the chain and route, as required.

Mounting the Signpost with Mounting Feet

Savi Signpost SP-65X Series models SP-650-011, SP-650-111, SP-651-011, SP-651-111, SP-652-011, SP-652-111, SP-650-101, SP-651-101, SP-652-101 must be mounted with the supplied mounting feet.

1. Attach the mounting feet.

Figure 2-3 shows the mounting feet with the self-tapping screws that attach them to the signpost.

Figure 2-4 shows a single mounting foot attached to the signpost. In this case it is mounted at an angle, but the foot can be turned at different angles.

Figure 2-3   Mounting foot and attachment screw

Figure 2-4   Mounting foot attached to signpost

Attached
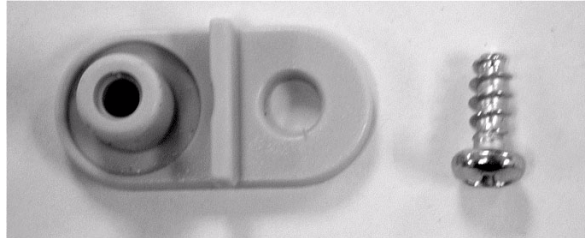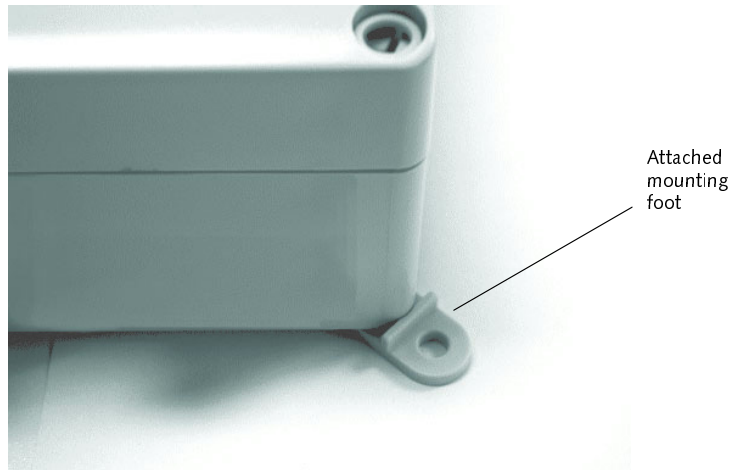mounting
foot

2. Attach the mounting feet to the mounting surface.

Note: DO NOT attach the mounting feet to drywall only, unless the drywall is backed by solid structural material. If you must use this method, screws need to penetrate a minimum of 3/4 inch (1.9 cm) into solid material.

Installing External Ferrite Antennas

Savi Signpost SP-65X Series models SP-650-011, SP-651-011, and SP-652-011 may be equipped with external ferrite rod antennas for indoor use in compact areas or for special applications. If you are using two or more external ferrite antennas, mount them at least 10 inches (25.4 cm) apart. You mount the external ferrite antenna on a C-cross-section aluminum (or other non-ferrous metal) rod, such as a handrail.

Connecting Power Cables to Savi Signpost SP-65X Series

Before you connect the Savi Signpost SP-65X Series power cable, be sure to check relevant configuration, wiring diagrams, or applicable safety regulations. The following table details the connectors and LEDs on all models of the Savi Signpost SP-65X Series.

This section does not include connecting the signpost to a computer with a serial cable for signpost software configuration. See Chapter 3, "Signpost Configuration."

Figure 3   Signpost connections with mounting hardware

Power, RS-232, sync in, and sync out cable connections; RS-232 used for diagnostics only

RJ45 cable connection

Antenna connection
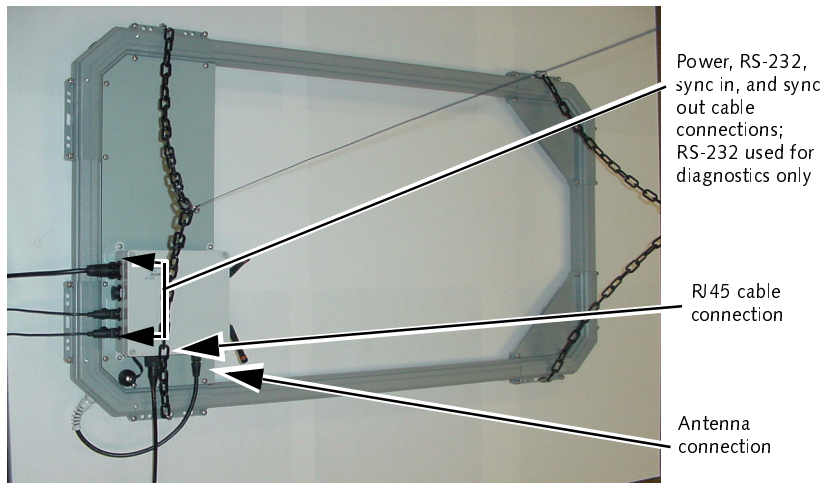
1. Run the appropriate power cable to the signpost.

2. Connect the power cable to the signpost power connector, as shown in Figure 3-1.

Note: The socket-outlet shall be installed near the equipment and shall be easily accessible.

Figure 3-1   Signpost power connection

3. Continue with configuration using the signpost configuration software. See "Configuring Operation Settings Using Configuration Software" on page 26.

Connecting Sync Cables to Savi Signpost SP-65X Series

You connect sync cables to synchronize two to four signposts to cover an area larger than is possible with a single signpost. Sync cables are ordered separately.

1. Connect the female end of the cable to the Sync In connector of the signpost.

2. Connect the male end of the cable to the Sync Out connector of another signpost in the synchronized group.

3. Create group number assignments.

   See "Configuring Operation Settings Using Configuration Software" on page 26.

Signpost Configuration

You configure a signpost using SmartChain Site Manager and modify specific signpost parameters with a signpost configuration software application for Savi Signpost SP-65X Series. This chapter provides steps for:

◆ Communicating with the signpost using RS-232

◆ Adding and configuring the signpost in SmartChain Site Manager

◆ Configuring the signpost settings using the configuration software

◆ Configuring the UHF reader module for specific signposts in SmartChain Site Manager

Before you connect and configure a signpost, you must install the signpost configuration software application on the service computer.

Communicating with the Signpost Using RS-232

You use an RS-232 cable to connect the RS-232 port on the signpost to the service computer. Disconnect this cable from the signpost and service computer after you complete signpost configuration. Figure 3-1 shows the RS-232 serial port for the Savi Signpost SP-65X Series.

Figure 3-1   Signpost RS-232 port
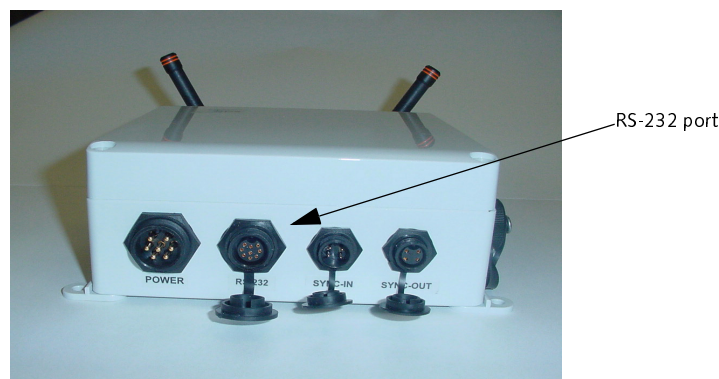
Adding and Configuring the Signpost in SmartChain Site Manager

To add a device to the network, you can use auto-discovery or add a signpost manually. Whenever possible, Savi recommends using auto-discovery to add a device.

Discovering a Signpost

Ethernet Connection

The RJ-45 connector provides Ethernet connection for the Savi Signpost SP-65X Series.

Note: Replace and tighten the protective cap when the RJ-45 port is not used.

A signpost that is plugged into an Ethernet broadcasts discovery packets. When you start a SmartChain Site Manager that is connected to the Ethernet, it recognizes these broadcasts and responds to the signpost that a SmartChain Site Manager at a given IP address is available for connection. The signpost must reside on the same subnet mask as the SmartChain Site Manager to be managed properly.

When a DHCP domain server is connected to the same network as the SmartChain Site Manager and signpost, the signpost initiates a DHCP operation to obtain a valid IP address to replace its default IP address (10.7.19.11). If you are installing multiple signposts, it is a good idea to connect one signpost to the network at a time to avoid IP address conflicts.

When a BOOTP domain server is connected to the same network as the SmartChain Site Manager and signpost, the BOOTP server automatically assigns an IP address to the signpost. The following four parameters must be changed in SmartChain Site Manager to set up the BOOTP server.

Name (Key)	Type	Range	Default	Description
Bootp	Integer	0 or 1	0	Determines whether BOOTP server is enabled or not 0 = No 1 = Yes
BootpIpAddress	String		0.0.0.0	Beginning IP address for BOOTP IP address assignments. The BOOTP server begins assigning IP addresses with this address and increments by one for each additional address to be assigned
BootpSubnetMask	String		255.255.128.0	Subnet mask to be assigned to devices that are also assigned an IP address through the BOOTP server
BootpGatewayIP	String		0.0.0.0	IP address of the default gateway to be assigned to devices that are also assigned an IP address through the BOOTP server

To change the parameters for the BOOTP server:

1. Change the value of BootP from 0 to 1

This activates the BOOTP server.

2. Obtain an IP address or group of IP addresses from your Network Administrator to change the value(s) of the BootpIpAddress(es) for your signpost(s).

3. Set the subnet mask and gateway IP.

Adding a Signpost Manually Using an Ethernet Connection

You can manually add a signpost that is plugged into an Ethernet by assigning a static IP address. SmartChain Site Manager must have a TCP/IP subnet that is compatible with the signpost's default IP address (10.7.19.11). The signpost should be connected to SmartChain Site Manager through a hub, switch, or cross-over cable.

1. On the Windows desktop, click the **Site Manager Console** icon.

2. In the Network area of the console, right-click a protocol and select **Add Device**.

3. Fill in the device properties.

Configuring Operation Settings Using Configuration Software

Before configuring signpost operation settings, you must connect a service computer to the signpost. See "Communicating with the Signpost Using RS-232" on page 23.

1. Configure the Signpost ID (1 to 65535).

   The Signpost ID is a unique number in the facility. The signpost can be identified in the system by associating this number with a description in the SmartChain Site Manager configuration.

2. Program the transmit group number (0 to 3) for the signpost.

   The factory setting is 0. The signpost will not synchronize when the group number is set to 0. When you program a number from 1 to 3, signposts having the same group number will transmit simultaneously. Signposts having different group numbers will transmit independently.

3. Set the beacon control on/off.

   You use the beacon control on/off option to program the beacon mode of a tag. When this option is disabled, you cannot change the tag beacon mode. When the option is enabled, you can change the tag beacon mode.

4. Set the low frequency power level.

    For Savi Signpost SP-65X Series models SP-650-211, SP-651-211, and SP-652-211 with the large air core antennas, you use the maximum setting of 724, in compliance with international emissions standards. For all other Savi Signpost SP-65X Series models, you use the maximum setting of 1023.

5. Set the Tx mode to normal mode.

6. Verify the status of the signpost and that all signposts are compatible with the system.

Configuring the UHF Reader Module in SmartChain Site Manager

Savi Signpost SP-65X Series models SP-652-011, SP-652-111, SP-652-211, SP-652-311, SP-652-101, and SP-652-201 must be configured over the Ethernet connection and connected to SmartChain Site Manager.

The UHF reader module in all of these signpost models:

◆ Allows you to send data from tags it receives once the host IP address is set and the time is synchronized

◆ Responds to tags that are triggered by the low frequency signpost signal after a UDAP command is sent

Setting the Host IP Address and Synchronizing Time

You can use the Network Manager to configure some properties of UDAP devices that are also signposts embedded with the UHF reader module. You can set the host and local IP addresses and other network information and time synchronization parameters. You can also send some simple commands such as `reset` and `clear`. To send more complex commands, use the Send Commands dialog. See

To set the host IP address and synchronize time:

1. On the desktop, click the **Site Manager Console** icon.

2. Click the **Network Management** button.

3. Select the device you want to configure.

4. Click **Actions** > **Configure**.

> **Note:** If the device was detected by auto-discovery, be sure to change the host IP address. This must be the IP address of the SmartChain Site Manager.

5. Click each tab and change the properties as necessary.

**6.** Click **Apply** or **OK** to record your changes.

Sending UDAP Commands

You can send UDAP commands to a selected device. The domain of UDAP commands for a given device is defined in the device's description document.

1. On the Windows desktop, click the **Site Manager Console** icon.

2. To select a device, do one of the following:

- In the Network area of the console, right-click a device name and select **Send Command**.

- Click the **Network Management** button, right-click a device name, and select **Send Command**.
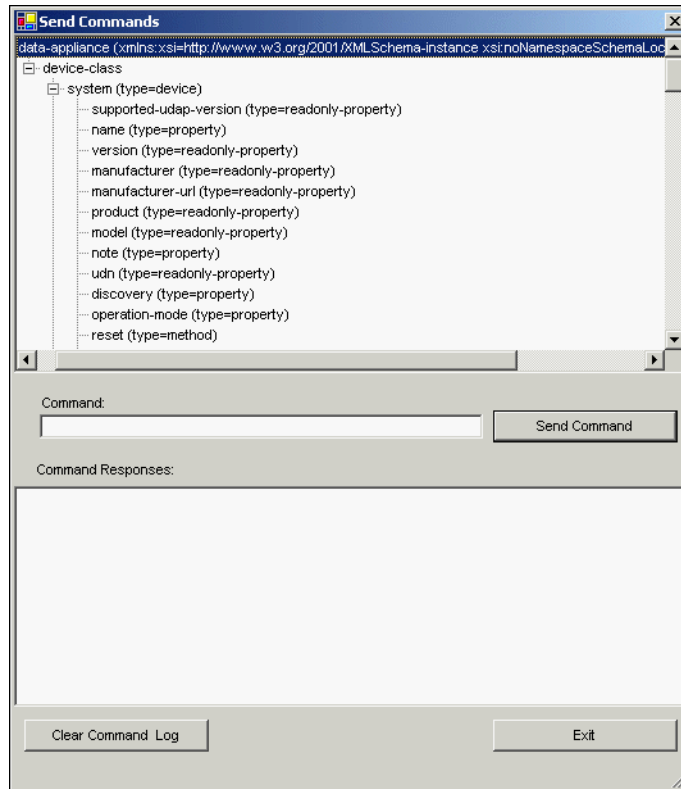
The top pane shows the device's description document and the properties and methods you can access by sending a UDAP command. This provides a template for the UDAP command that you want to send. For example, highlighting the method named `collection` automatically creates a template of the command in the Command field.
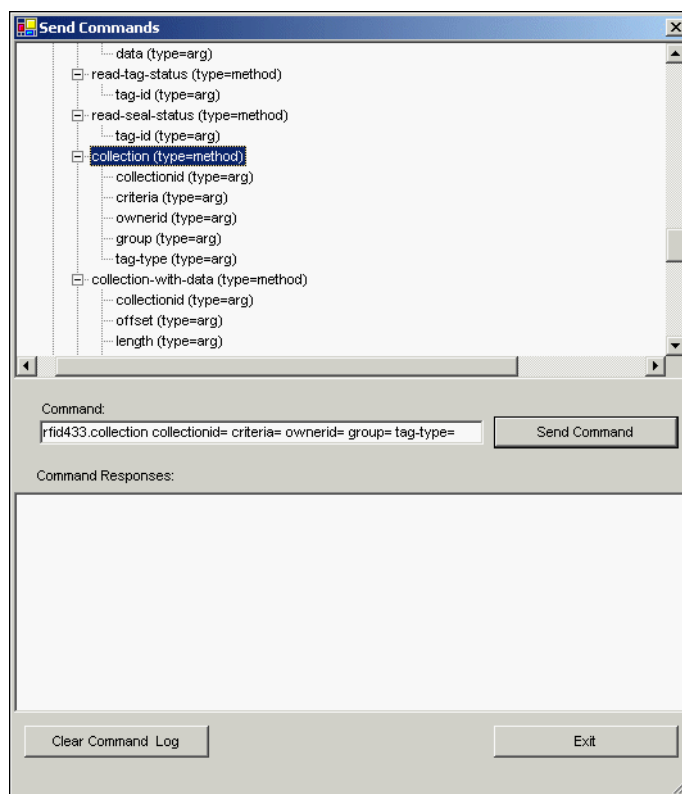
3. Type the UDAP command you want to send in the Send Commands dialog; for example, `service?`

4. Click **Send Command**.

The command response appears in the Send Command dialog.