



DOME™ Building Automation Starter Kit
Installation Guide

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DOME™ Building Automation Starter Kit — Installation Guide

1. Installation Overview

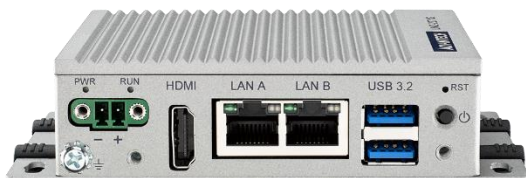
This guide explains how to install and configure the DOME system including the DOME Interface Appliance™ (DIA™) and DOME Sentry™ (Sentry) devices to secure a building automation network. It is written for a system integrator and assumes you have already performed the site survey as per the *DOME Building Automation Starter Kit – Site Survey Guide*, completed the associated *DOME Site Prequalification* checklist, and determined where your devices will go and how network access and power will be obtained.

1.1. Overall Process

DOME makes installing at a site simple. First, you install and configure the DIA. Then, you install the Sentry devices and connect its power and network, placing the Sentry between the OT network and each BACnet/IP device. The Sentry will automatically configure itself based on the information it discovers from the BACnet device sitting behind it.

2. Installing the DIA

The DIA has a power port, an HDMI port, two Ethernet ports, and two USB ports. The DIA is shipped with a power supply and cables. You will need to supply a USB Keyboard and HDMI monitor to configure the system.



DIA Enclosure



Polarized power connector

To install the DIA:

- 2.1 Unpack the DIA, power adapter, and cables from the box.
- 2.2 Place the DIA and connect a monitor (HDMI port) and keyboard (USB port).
- 2.3 Connect “LAN A” to the Internet Uplink network to give the DIA access to the Internet.
- 2.4 Connect “LAN B” to the OT network (that will become the Secure OT network after you complete the “Installing DOME Sentry” procedure below).
- 2.5 Connect the green polarized power connector to the DIA and AC power to the power adapter. Push the power button to turn the DIA on.
- 2.6 Configure the DIA (see 3. *Configuring the DIA* below).

NOTE: The DIA enclosure may get very warm to the touch.

3. Configuring the DIA

Once the DIA is turned on it will boot into the configurator after 20-30 seconds. To configure the DIA:

- 3.1 Assign a building/installation name. If a device name has not been set, you will be prompted to enter one. This name should be identifiable, e.g., “building.region.enterprise.com”

```
DOME Interface Appliance (DIA) Configuration
Version: d860f03f - 2022-07-18
DIA UUID: 6707dbc2-d48d-42c9-a8ba-d3f502ca1112

You need to create a name for this installation. Generally this
should be a unique name that includes the building identity and
your company name. While not required to be in Domain Name form,
a reasonable name would be:  building.region.company.com

Note that once set, this name cannot be changed.

Enter Installation Name:
```

- 3.2 Confirm the name. Once you confirm the building name you cannot change it. This is the name that will be used for the DOME Certificate Authority for the building.

```
DOME Interface Appliance (DIA) Configuration
Version: d860f03f - 2022-07-18
DIA UUID: 6707dbc2-d48d-42c9-a8ba-d3f502ca1112

You need to create a name for this installation. Generally this
should be a unique name that includes the building identity and
your company name. While not required to be in Domain Name form,
a reasonable name would be:  building.region.company.com

Note that once set, this name cannot be changed.

Enter Installation Name: Building-27.My.Company.Name
You entered: Building-27.My.Company.Name
Once confirmed, this value cannot be changed.
Are you sure? (y/N):
```

- 3.3 After confirming the name, the DIA will generate the building keys that will be used to protect that building. Next, you will get to the main configuration menu where you can configure the following: IP Network for LAN A and LAN B, the OT Network configuration, the Sentry firewall configuration, and the ability to turn on and off Sentry provisioning mode. Set the menu items for your installation as directed in sections 3.4 to 3.7 below. In section 3.8 you will select menu option 5 to restart the DIA.

The following details the configuration menus:

```
Are you sure? (y/N): y
System keys generated successfully.

DOME Interface Appliance (DIA) Configuration

Please choose from the following options:
1) IP Network Configuration
2) OT Network Configuration
3) Sentry Firewall Open/Closed
4) Enable/Disable Sentry Onboarding Mode
5) Restart DIA Services
6) Display DIA Information
7) Reboot System

Enter an option from 1-7: _
```

Menu Options include:

1) IP Network Configuration	Configure the IP Network for LAN A and LAN B ports on the DIA and DNS servers.
2) OT Network Configuration	This option lets you configure the IP Network information for all your OT Networks to allow Sentries to autoconfigure properly. Misconfiguration here will prevent the Sentries from configuring onto the network.
3) Sentry Firewall Open/Close	This configuration option configures the Sentry to either allow all traffic through or block everything except protected BACnet traffic.
4) Enable/Disable Sentry Onboarding Mode	This option lets you configure when the DIA will accept new Sentry devices. This is used for adding or replacing Sentry devices on the network.
5) Restart DIA Services	Restarts the DIA services to ensure configuration changes are loaded and running.
6) Display DIA Information	Device name and identification
7) Reboot System	Alternative to Restart DIA Services

3.4 IP Network Configuration

Here you configure the IP Network for LAN A and LAN B ports on the DIA and DNS servers.

```
Enter an option from 1-7: 1
IP Network Configuration

Choose an option:
1) Configure LAN A
2) Configure LAN B
3) Configure DNS
4) Return to main menu

Enter an option from 1-4:
```

- 3.4.1 LAN A can be set for DHCP or static IP. If it is static, you can also assign the Gateway address. When configuring a static IP, you need to enter the address in CIDR format (e.g., 192.168.10.5/24). The gateway address is just the IP Address.

```
Enter an option from 1-4: 1
Configure LAN A
IP Address: DHCP

Choose an option:
1) Enable DHCP
2) Static IP
3)
4) Return to IP Network menu

Enter an option from 1-4: _
```

- 3.4.2 LAN B can only be configured as a static address. You can assign it, or it can be empty for no configuration. When assigning it, you need to enter it in CIDR format (e.g., 172.16.5.100/16).

```
IP Network Configuration

Choose an option:
1) Configure LAN A
2) Configure LAN B
3) Configure DNS
4) Return to main menu

Enter an option from 1-4: 2
Configure LAN B
IP Address: DHCP

Choose an option:
1) Enable DHCP
2) Static IP
3)
4) Return to IP Network menu

Enter an option from 1-4: 2
Enter IP Address (a.b.c.d/n): 1.2.3.4/24
Configure LAN B
IP Address: 1.2.3.4/24

Choose an option:
1) Enable DHCP
2) Static IP
3)
4) Return to IP Network menu

Enter an option from 1-4: _
```

- 3.4.3 DNS Servers can be statically assigned if DHCP is not used. If in DHCP mode, the DNS servers assigned here are added to whatever is received by DHCP.

3.5 OT Network Configuration

Here you configure the list of OT Networks that the DIA serves. For each entry you need to supply the network in CIDR form (e.g., 10.1.30.0/24) and, optionally, a gateway for that network. The gateway is only required if you have multiple BACnet/IP subnets that all need to communicate, or if you need to reach your BACnet devices from a different subnet.

```
Enter an option from 1-7: 2
OT Network Configuration

Choose an option:
1) Add Network
2) Delete Network
3) Return to main menu

Enter an option from 1-3: 1
Enter OT Network (a.b.c.d/n): 1.2.3.4/24
Note: Adjusted your network to 1.2.3.0/24
assigning network1
Enter Gateway Address (optional) (a.b.c.d):
OT Network Configuration

# | Network          | Gateway (optional)
1 | 1.2.3.0/24      |

```

```
Choose an option:
1) Add Network
2) Delete Network
3) Return to main menu

Enter an option from 1-3:
```

3.6 Sentry Firewall Open/Closed

The Sentry automatically captures and protects all BACnet/IP packets, but it can be configured to allow or disallow everything else. This configuration option configures the Sentry to either allow all traffic through or block everything.

```
Enter an option from 1-7: 3

Current Firewall Mode: none

Choose an option:
1) Toggle firewall mode (any/none)
2) Return to main menu
3) Help

Enter your option 1-3: _
```

3.7 Enable/Disable Sentry Onboarding Mode

By default, the DIA will allow any Sentry that comes on the network to configure itself. This option lets you configure when the DIA will accept new Sentry devices. Turn this option off when you are done configuring your network to prevent a new Sentry from coming online and joining the network. Turn it back on when you need to replace or otherwise reconfigure a Sentry.

```
Enter an option from 1-7: 4

Current Onboarding Mode: enabled

Choose an option:
1) Toggle onboarding mode (enabled/disabled)
2) Return to main menu
3) Help

Enter your option 1-3: _
```

3.8 Restart DIA Services

If you've made changes to the configuration, use this to restart the DIA services to ensure the new configuration is loaded and running. You must run this option or the reboot option to get the DIA to run with the new configuration. Upon a successful restart, you will see the Options list displayed.

3.9 Display DIA Information

This option will display the configuration information of the DIA for each viewing.

3.10 Reboot System

As an alternative solution to restarting DIA services, you can reboot the DIA completely.

After configuration is complete, the keyboard and mouse can be removed, and the Sentry devices can be installed.

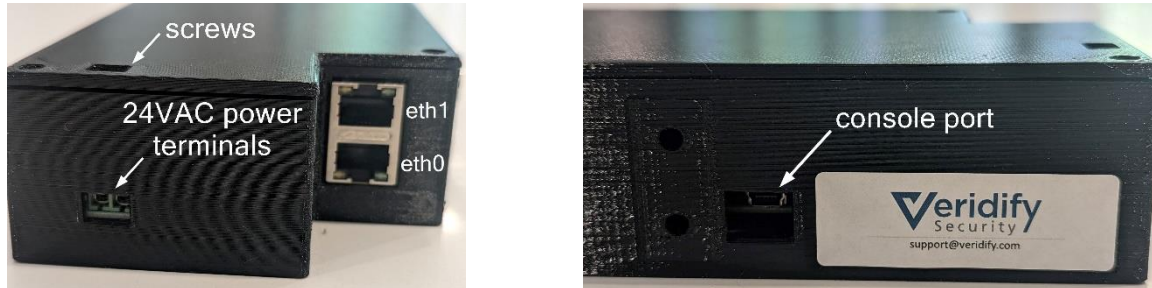
Note that while the building name cannot be changed, all other configuration options can be changed by re-running the configuration, changing the settings, and restarting DIA services.

Changing the Sentry firewall setting only affects the configuration on Sentries that provision after the setting was changed. It does not reconfigure a currently running Sentry. To change the setting on a running Sentry you must change it here, ensure onboarding is turned on, and then go to the Sentry and reset it. Refer to section 4.2.

4 Installing the DOME Sentry

The Sentry is designed to auto-configure itself when it is connected. It requires the DIA to already be online and running, and it depends on the DIA to provide some network configuration information as well as the required security information the Sentry needs to connect to the network.

The Sentry has a 24VAC power connector, console port, and two Ethernet ports. The 24VAC power supply is not included. The 24VAC wires enter the side of the Sentry, the screws to tighten that connection are accessed from a cut-out in the top cover.



4.1 Installation Procedure

Once the DIA is online, install each of the two Sentry devices using the following procedure:

- 4.1.1 Locate where the Sentry is going to be installed.
- 4.1.2 Connect the OT network to Sentry port “eth0”.
- 4.1.3 Connect the existing BACnet/IP device to Sentry port “eth1”.
- 4.1.4 Make sure the OT device is up and fully configured. Record its IP Address for later.
- 4.1.5 Connect the power to the Sentry.
- 4.1.6 Clip the Sentry to the DIN rail.

The Sentry will automatically discover the BACnet/IP device behind it and contact the DIA for its provisioning information, including network keys, operational certificates, and firewall settings.

Later, you will need to log in to the DOME Dashboard and provide names and locations for the Sentry devices. At this point you will need to use the IP address of each device and look up the Sentry that reports from that IP Address in the Dashboard. Then you can edit the device and give it a name and location to make it easier to remember which OT device it protects and where it is located.

4.2 Reconfiguring a Sentry or changing the protected device(s)

Sometimes thermostats or other devices need to be replaced. Because the Sentry is tied to the BACnet/IP device behind it, if you need to change the protected device you will need to reconfigure the Sentry to allow that change. Similarly, if the protected device is a router and you add or remove BACnet devices behind the router, the Sentry will need to be reconfigured to allow those devices to communicate.

Note that as of this time the only way to reconfigure a Sentry is to connect a USB mini cable to the console port, connect to it via a terminal emulator like PuTTY, and login to the Sentry using username “reset” and password “reset”. This will cause the Sentry to reboot and reconfigure itself. The DIA must be in “Sentry Onboarding Mode” before you execute this operation, otherwise the reconfiguration process will fail. The DIA starts in this “Sentry Onboarding Mode” so this is a reminder that if was previously turned off, that it needs to be turned back on to reconfigure the Sentry.

When you reconfigure a Sentry, it will not lose its name/mapping in the DOME Server, it will just obtain new security credentials locally, re-discover the BACnet/IP device behind it, and find all BACnet devices that the Sentry is protecting.

4.3 Viewing Sentry Logs and Configuration

To view the Sentry configuration, connect to the console port and login as user “showconfig”. When it asks for the password, just hit enter (there is no password). This will display information including the software version, device UUID, current IP Address information, and the list of protected devices. After a few seconds the system will return to the login screen.

To view the (live) Sentry logs, connect to the console port and login as user “showlogs”. When it asks for the password, just hit enter (there is no password). This will display the real-time logs of the device, starting from a dozen entries before you logged in. The logs will continue to display for as long as you remain logged in. To exit log-viewing mode, enter a Control-C character, and the system will return to the login screen.

End of installation procedure. Please refer to the Testing and Troubleshooting Guide next.

5 Technical Support

Please direct all technical support inquiries to: suport@veridify.com or by phone 203-227-3151 (Option 6)