DaintreeNetworks

Binding and group commissioning using the Daintree Networks Sensor Network Analyzer

Application Note AN019

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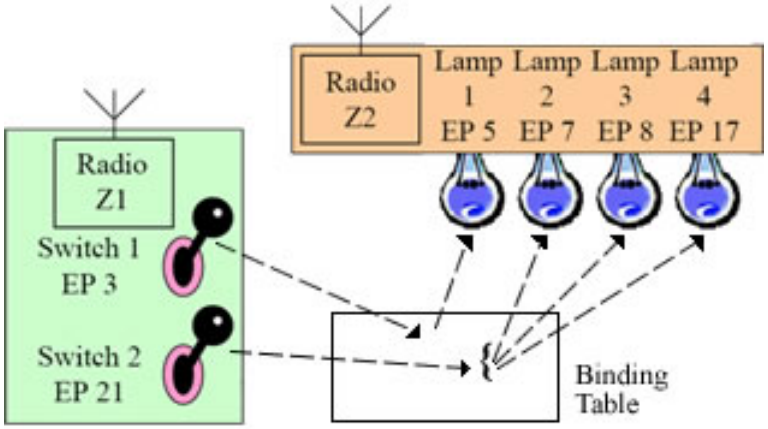
Sensor Network Analyzer Release 2.2 (2008-02-29)

About bindings

Bindings are connections between end devices in a ZigBee network, such as a connection between a light switch and the light that it operates. Each binding supports a specific Application Profile, and each message type is represented by a Cluster (within that profile).



You can create bindings between endpoints that use the same Application Profile and that have associated Output/Input Clusters (for example, one with an On/off Output Cluster, and another one with an On/off Input Cluster).

This application note provides instructions of how to use the Sensor Network Analyzer to perform bindings between individual endpoints. It also describes how to group together similar endpoints and bind them as a single entity.

About Daintree's Sensor Network Analyzer (SNA)

The SNA combines a powerful protocol analyzer with network visualization, measurements and diagnostics for IEEE 802.15.4™ and ZigBee® applications. It provides automatic display of network formation, topology changes, and router and coordinator state changes allowing rapid detection of incorrect network behavior and identification of device or network failures.

It also provides a powerful commissioning tool that helps to hide the complexity of the underlying technology, and provides straight-forward configuration, testing and troubleshooting capabilities. Its graphical representations makes if fast and easy for installers to monitor network formation and measure key parameters such as link quality and bindings.

Visit www.daintree.net to find out more about Daintree's SNA.

How do bindings work?

It takes two steps to perform a binding between two endpoints:

1. Perform a service discovery to find the application profile and clusters supported by each device. This tells you which devices can be bound together.
2. Create bindings between endpoints (or groups) that use the same Application Profile and have associated Output/Input Clusters (for example, one with an On/off Output Cluster, and another one with an On/off Input Cluster).

Performing a service discovery

During a service discovery, the SNA finds and displays details about each device's capabilities, and displays the following results on the Device Manager Binding tab:

- Endpoint ID
- Address
- Description
- Application Profile ID
- Output and Input Clusters

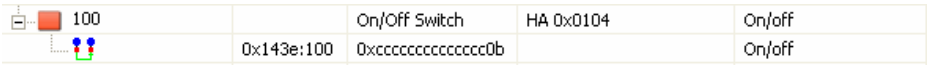
Using the SNA, you can perform a service discovery either manually or automatically:

1. From the SNA's **Settings** menu, select **Device Manager**, or click the Device Manager icon from the main SNA toolbar. This opens the Device Manager dialog box.

2. On the Device Manager dialog box, click the **Binding** tab.
3. On the Device Manager > Binding tab, select to perform either a manual or automatic service discovery:
   - **Manual:** Click  and then select to perform a service discovery (for all endpoints or only those currently selected).
   - **Automatic:** Click  and then select **Automatically perform service discover on new devices**. This causes the SNA to automatically discover services for all new devices as they are added to the network, and removes the need to perform manual service discoveries in future.

Managing bindings for individual devices

1. If you have not already done so, perform a service discovery.
2. If you have joined an existing network, click the icon on the Device Manager Binding tab to find details about any bindings that already exist. Binding details are shown under the source endpoint.

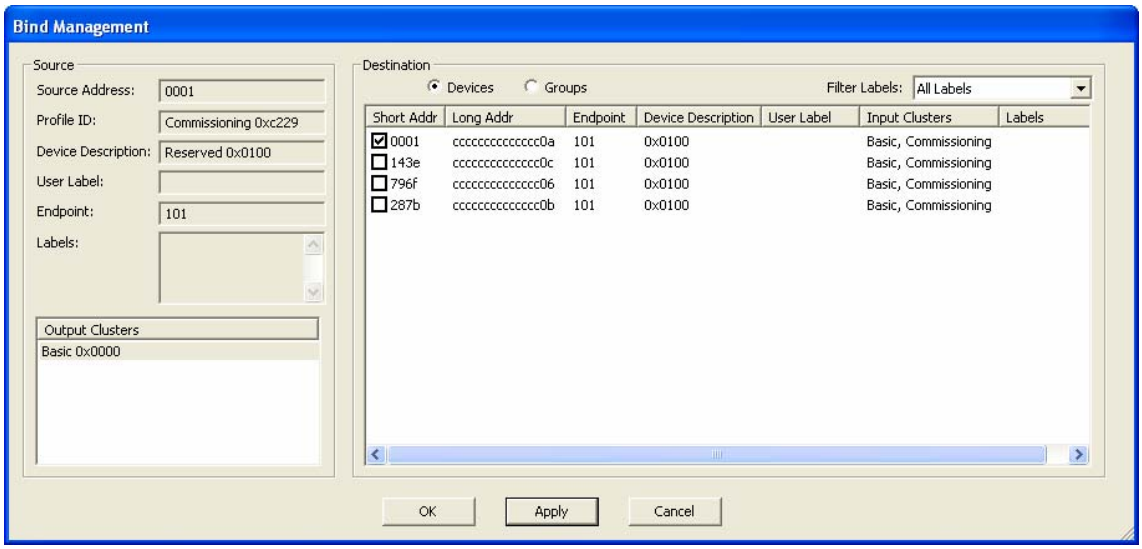


3. Select the endpoint for which you want to create a binding, and then click to open the Bind Management dialog box.

   Binding can exist between devices that use the same Application Profile and have compatible output/input clusters.

4. On the Bind Management dialog box, select the Output Cluster for which you want to create the bindings. (If the device contains only one Cluster, it is automatically selected for you.)

   The SNA lists all of the available endpoints that match the selected Application Profile and Output Cluster. It also shows any bindings that already exist for the selected endpoint and Cluster.



5. To **add** a new binding, click the box next to its Short Address. To **remove** an existing binding, clear the box next to its Short Address.
6. Click **OK** to save the bindings, and display their details on the Device Manager Binding tab and also in the Visual Device Tree window.

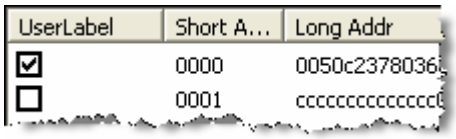
Removing bindings

Note that if you want to remove a binding, you can also right-click the binding on the Device Manager > Binding tab, and then select **Remove Binding**.

Managing bindings for groups of devices

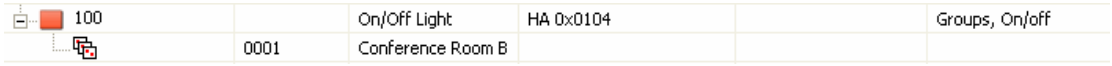
In addition to binding individual endpoints, you can also group together a number of endpoints and bind them as a single entity. For example, you may want to use a single endpoint to control all lights in a conference room or all heating units on a single floor.

1. On the Device Manager > Binding tab, click  to open the Group Management dialog box.
2. On the Group Management dialog box, click  (under the list of Groups) to find and display details about all endpoints that are already members of a group.
3. To create a new group, click  and type an ID and name for the new group. Then with the new group selected, click the **UserLabel** box for every endpoint that you want to add to that group.

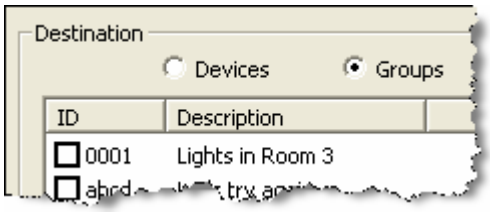
   

   You can also click the  icon to select all, or click the  icon to de-select all.
4. To edit an existing group, click the group to select it, and then select or deselect the endpoints to include in the group.

   You can also click  to edit the group's ID and name, or  to delete the group.
5. Click **OK** when you finish adding and managing groups. The Device Manager Binding tab shows Groups under the endpoints to which they relate.

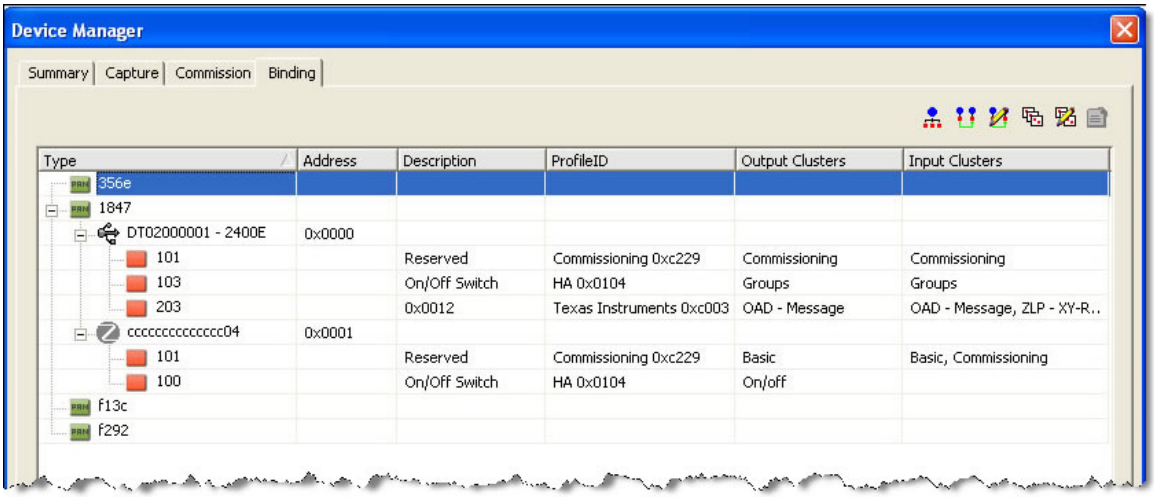
6. Select the endpoint for which you want to create a binding, and then click  to open the Bind Management dialog box.
7. On the Bind Management dialog box, select the Output Cluster for which you want to create the bindings. (If the device contains only one Cluster, it is automatically selected for you.)
8. Make sure a Destination type of **Groups** is selected, and then select the group (or groups) to include in the binding. You can also de-select a group to remove it from an existing binding.

9. Click **OK** to save the group bindings, and display their details on the Device Manager Binding tab and also in the Visual Device Tree window.

About the Device Manager Binding tab

On the **Binding** tab you'll see details of bindings that exist between devices. It also provides options for creating new bindings, performing service discovery, and commissioning groups.



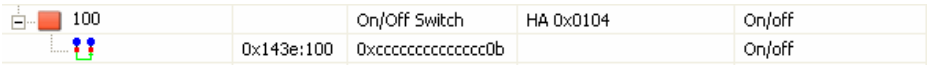
- **Type** shows an icon to identify the device type together with the identifier or address for each device.
- **Address**
- **Description** shows a description (if available) for the device or endpoint.
- **ProfileID** shows which Application Profile the endpoint is using.
- **Output** and **Input Clusters** lists the output or input clusters (from the above Application Profile) that the endpoint is using, with multiple clusters separated by commas.

If the value for any field is too long to be displayed in full, it is truncated and shown with an ellipsis (...). To see any value in full, simply move your cursor over that field.

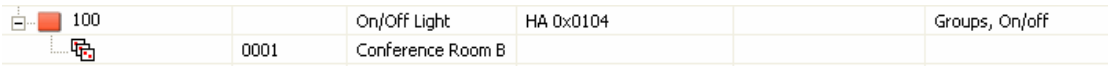
	Perform a service discovery to find details about which Application Profile and Clusters being used by individual devices or the entire network.
	Perform a binding discover to find details about bindings that already exist.
	Open the Binding Management dialog box, through which you can add and remove bindings for the selected endpoint.
	Perform a group discovery, to find details about groups that already exist. These details are shown on the Binding tab and also in the Group Management dialog box.
	Open the Group Management dialog box, through which you can add, edit and remove groups (of devices).
	Set up the SNA to automatically perform service discovery and binding discovery for all new devices that are added to the network.

Bindings and Groups are shown under the endpoint(s) to which they relate.

- The  icon is used to indicate bindings, and includes details of either the device or the group to which the endpoint is bound.



- The  icon is used to indicate Group membership, and includes details of the group for which the endpoint is a member.



Required ZDO commands and ZCL clusters

The SNA's binding and groups commissioning features rely on the following standard ZDO commands and ZCL clusters:

Service Discovery

- ZDO_Active_EP_request
- ZDO_Simple_Desc_request

Binding

- ZDO_Bind_request

Binding Discovery

- ZDO_Mgmt_Bind_Request

Groups

- ZCL Groups Cluster