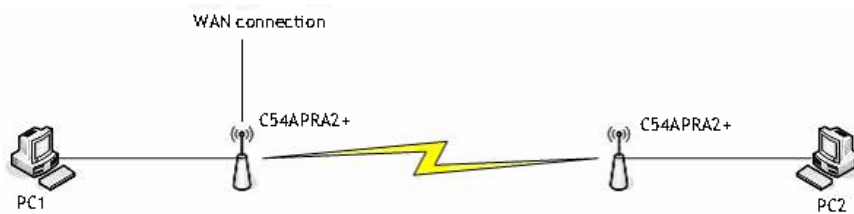


C54APRA2+/C54APRB2+ How to set WDS

This manual explains how to use the WDS (Wireless Distribution System) features of the C54APRA2+/C54APRB2+. There are 3 types of WDS settings that can be configured into the configuration. The 3 types are: WDS Bridge, WDS Repeater and WDS Crude. Please check Appendix I for a more detailed description of WDS settings and what they mean. You can also use this description to check which setting you need.

How to set WDS bridge

Topology:



(This is an example how the WDS Bridge can be connected)

To configure the WDS features you need to enter the webconfiguration page of the C54APRA2+/C54APRB2+. Go to <http://192.168.1.1> (default IP-address) and login into the webinterface. Click **Advanced** -> **Wireless Management**.

Root access point with internet connection

The screenshot shows the 'Wireless Management' web interface. The 'WDS' tab is selected. Under 'Wireless Distribution System', the following settings are visible:

- WDS Mode: Repeater (selected)
- WDS Name: WDS_Concept
- Activate as Root:
- WDS Privacy: Secret: [password field]
- Auto Channel Selection:
- Auto Configuration:

Below these settings is a table for 'Bridging Direction':

Bridging Direction	Enable	MAC address
Uplink:	<input type="checkbox"/>	
Downlink 1:	<input checked="" type="checkbox"/>	00-80-5A-59-E7-43
Downlink 2:	<input type="checkbox"/>	
Downlink 3:	<input type="checkbox"/>	
Downlink 4:	<input type="checkbox"/>	

At the bottom, there are 'Apply', 'Cancel', and 'Help' buttons. A note says 'Please save and reboot the device to take effect!'.

1. Click **WDS**
2. Select **Repeater**
3. Give a **WDS Name** for example **WDS_Conceptronic**
4. Select **Activate as Root**
5. Select **WDS Privacy** and fill in a **Secret** (Recommended)
6. Fill in the MAC address of the second (slave) C54APRA/B2+. Make sure you use the wireless LAN MAC address. When you do not know what the wireless MAC address is, please check Appendix II. Select **Enable** in front of the MAC address.

When you want to use more slaves you can use the other **Downlink (2-4)** fields
Click **Apply** -> **Tools** -> **System** -> **Save and Reboot** to save the configuration

Slave(s) access point

The screenshot shows the 'Wireless Management' interface with the 'WDS' radio button selected. The 'Wireless Distribution System' section is expanded. The 'WDS Mode' is set to 'Repeater'. The 'WDS Name' is 'WDS_Concept'. 'WDS Privacy' is checked. The 'Secret' field is filled with dots. The 'Bridging Direct' checkbox is checked. Below this, there are four 'Downlink' fields, each with a checkbox and a 'MAC address' input field. The 'Uplink' checkbox is checked and has the MAC address '00-80-5A-59-E7-41'. At the bottom, there are 'Apply', 'Cancel', and 'Help' buttons.

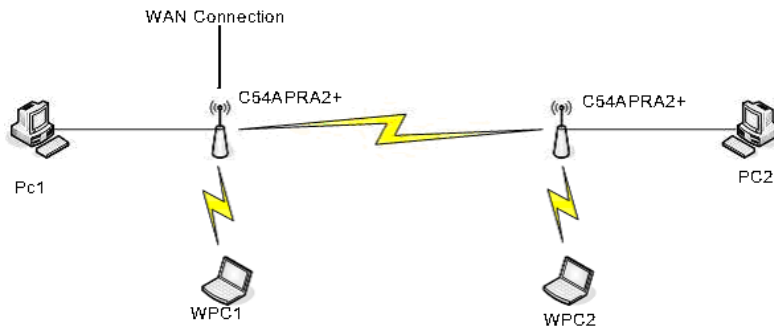
7. Click **WDS**
8. Select **Repeater**
9. Give a **WDS Name** for example **WDS_Conceptronic**
10. Select **WDS Privacy** and fill in the **Secret**, which you have configured into the Root access point.
11. Fill in the MAC address of the first (Root) C54APRA/B2+. Make sure you use the wireless LAN MAC address. When you do not know what the wireless MAC address is, please check Appendix II. Select **Enable** in front of the MAC address.

Click **Apply** -> **Tools** -> **System** -> **Save and Reboot** to save the configuration

When you want to use more slaves you can use the settings of the Slave access point again

How to set WDS repeater

Topology:



(This is an example how the WDS repeater can be connected)

To configure the WDS features you need to enter the web configuration page of the C54APRA2+/C54APRB2+. Go to <http://192.168.1.1> (default IP-address) and login into the webinterface. Click **Advanced** -> **Wireless Management**.

Root access point with internet connection

The screenshot shows the 'Wireless Management' web interface. The 'WDS' tab is selected. Under 'Wireless Distribution System', the following settings are visible:

- WDS Mode: Bridge (highlighted with a red circle 2)
- WDS Name: WDS_Concept (highlighted with a red circle 3)
- Activate as Root: (highlighted with a red circle 4)
- WDS Privacy: (highlighted with a red circle 5)
- Secret: [Redacted]
- Auto Channel Selection:
- Auto Configuration:

Below these settings is a table for 'Bridging Direction':

Bridging Direction	Enable	MAC address
Uplink:	<input type="checkbox"/>	
Downlink 1:	<input checked="" type="checkbox"/>	00-80-5A-59-E7-43
Downlink 2:	<input type="checkbox"/>	
Downlink 3:	<input type="checkbox"/>	
Downlink 4:	<input type="checkbox"/>	

The 'Downlink 1' 'Enable' checkbox and its corresponding MAC address field are highlighted with a red circle 6. At the bottom of the form, there are 'Apply', 'Cancel', and 'Help' buttons. A note at the bottom reads: 'Please save and reboot the device to take effect!'.

1. Click **WDS**
2. Select **Bridge**
3. Give a **WDS Name** for example **WDS_Conceptronic**
4. Select **Activate as Root**
5. Select **WDS Privacy** and fill in a **Secret** (Recommended)
6. Fill in the MAC address of the second (slave) **C54APRA/B2+**. Make sure you use the wireless LAN MAC address. When you do not know what the wireless MAC address is, please check Appendix II. Select **Enable** in front of the MAC address.

When you want to use more slaves you can use the other **Downlink (2-4)** fields

Click **Apply** -> **Tools** -> **System** -> **Save and Reboot** to save the configuration

Slave(s) access point

Wireless Management

Access List
 Associated Stations
 Multiple SSID
 WDS

Wireless Distribution System

WDS Mode: **8** → Bridge
WDS Name: WDS_Conce... **9**
Activate as Root:
WDS Privacy: **10** → Secret:
Auto Channel Selection:
Auto Configuration:

Bridging Direction **11** → **enable** **MAC address**
Uplink: 00-80-5A-59-E7-41
Downlink 1:
Downlink 2:
Downlink 3:
Downlink 4:

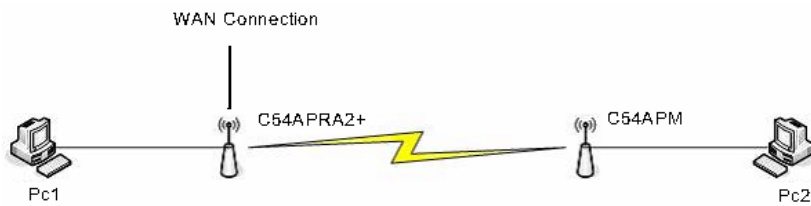
Please save and reboot the device to take effect!

7. Click **WDS**
8. Select **Bridge**
9. Give a **WDS Name** for example **WDS_Conceptronic**
10. Select **WDS Privacy** and fill in the **Secret**, which you have configured into the Root access point.
11. Fill in the MAC address of the first (Root) C54APRA/B2+. Make sure you use the wireless LAN MAC address. When you do not know what the wireless MAC address is, please check Appendix II. Select Enable in front of the MAC address.

Click **Apply** -> **Tools** -> **System** -> **Save and Reboot** to save the configuration
 When you want to use more slaves you can use the settings of the Slave access point again

How to set WDS Crude

Topology:



(This is an example how the WDS repeater can be connected)

To configure the WDS features you need to enter the webconfiguration page of the C54APRA2+/C54APRB2+. Go to <http://192.168.1.1> (default IP-address) and login into the webinterface. Click **Advanced** -> **Wireless Management**.

Root access point with internet connection

The screenshot shows the 'Wireless Management' web interface. At the top, there are radio buttons for 'Access List', 'Associated Stations', 'Multiple SSID', and 'WDS'. The 'WDS' option is selected and highlighted with a red circle and arrow labeled '1'. Below this is the 'Wireless Distribution System' section. The 'WDS Mode' is set to 'Crude' (highlighted with a red circle and arrow labeled '2'). The 'WDS Name' is 'WDS_Concept'. There are checkboxes for 'Activate as Root', 'WDS Privacy', 'Auto Channel Selection', and 'Auto Configuration'. Below this is a table for 'Bridging Direction' with columns for 'Enable' and 'MAC address'. The 'Downlink 1' row has 'Enable' checked and 'MAC address' set to '00-80-5A-4B-12-EF' (highlighted with a red circle and arrow labeled '3'). At the bottom, there are 'Apply', 'Cancel', and 'Help' buttons. A note at the bottom says 'Please save and reboot the device to take effect!'.

1. Click **WDS**
2. Select **Crude**
3. Fill in the MAC address of the second (slave) access point. For example a C54APM.

When you want to use more slaves you can use the other **Downlink (2-4)** fields
Click **Apply** -> **Tools** -> **System** -> **Save and Reboot** to save the configuration

Slave(s) access point

To enter the configuration page of the C54APM you need to set a fixed IP-address.

Click **Start** -> **Run**

Type **ncpa.cpl** and click **OK**

Right click on **Local Area Connection** (Windows 2000) or **LAN connection** (Windows XP) and select **Properties**

Select **Internet Protocol (TCP/IP)** and click **Properties**

Select **Use the following IP-address**

Fill in the following values:

IP address: 10.0.0.10

Subnet mask: 255.0.0.0

Click **OK** -> **OK**

Go to <http://10.0.0.1> and login in with username **admin** and password **admin**

4. Click **Basic settings**
5. Select as mode **Station-Infrastructure**
6. Click **Apply**
7. Click **Continue**
8. Click **Select Site Survey**
9. Select the correct Access Point for example **Conceptronic** and click **Connect**
10. Click **Apply**
11. Click **Apply**

When the C54APM is rebooted you can remove the fixed IP-address of the computer.

Click **Start** -> **Run**

Type **ncpa.cpl** and click **OK**

Right click on **Local Area Connection** (Windows 2000) or **LAN connection** (Windows XP) and select **Properties**

Select **Internet Protocol (TCP/IP)** and click **Properties**

Select **Obtain an IP-address automatically**

Click **OK** -> **OK**

You should now receive an IP-address from the C54APRA2+/C54APRB2+

Appendix I

WDS explained

The Router's access point supports Wireless Distribution System (WDS) to enable interconnection with other access points through the wireless network. WDS facilitates roaming between different access points and connectivity to the Ethernet and Internet. WDS is also used to connect two distant Ethernet LAN groups that may be difficult or impractical to connect to each other with cable. The access point can perform different functions in the WDS depending on the mode that is chosen. To use WDS, first select the **WDS Mode** the access point will use from the pull-down menu, and configure the available parameters for the selected mode. See the table below for a description of the different modes and parameters used to configure the access point.

Wireless Management - WDS menu

When WDS is enabled, the Router's access point will operate in one of three modes, **Bridge**, **Repeater** or **Crude**. Use the table below as a guide to how each mode functions in the WDS.

WDS Mode	Parameters
Bridge Mode	In bridge mode, the access point communicates only with other access points. No wireless clients can associate with an access point in bridge mode. In bridge mode, the access point has the option of acting as a Root (click the Activate as Root box to enable). In Root mode the AP becomes a primary link for the Wireless LAN to the Ethernet and Internet. As the Root access point, there cannot be a wireless Uplink through the AP. Only wireless Downlinks may be designated. To designate a Downlink, enable up to 4 downlinks (Downlink 1 – 4) and type the MAC address of the AP used for downlink in the space provided. Use Bridge mode if you are using the access point to connect to a distant Ethernet LAN.
Repeater Mode	In repeater mode the access point can communicate with other access points and wireless clients. Note that repeater mode will limit the amount of throughput of wireless clients to the Ethernet. As with bridge mode, repeater mode allows the AP to function as the Root.
Crude Mode	Crude Mode is recommended for wireless LANs using multiple vendors wireless chip solutions. If wireless stations are using T1 chips, use Bridge or Repeater mode.

Appendix II

MAC addresses

Every network product has its own unique MAC address. This is a combination of 12 numbers and characters. Only the numbers 0-9 and the letters a-f or A-F are valid. The MAC address (which is mentioned on the bottom of the C54APRA2+/C54APRB2+) is the MAC address of the LAN side. When you want to have the MAC address of the Wireless you need to add 1 at the last number or character.

The sequence of the numbers and characters is:

0, 1, 2, 3, 4, 5, 6, 7, 8, 9, a, b, c, d, e, f or

0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F

For example:

The MAC address 00:80:5A:59:E7:40 is mentioned on the bottom of your C54APRA2+/C54APRB2+, then your WLAN MAC address is $00:80:5A:59:E7:40 + 1 = 00:80:5A:59:E7:41$.

When your MAC address is 00:80:5A:59:E7:4F then the F will be 0 and the number in front of the F will be added with 1. So your MAC address is 00:80:5A:59:E7:50

Another example:

When your MAC address is 00:80:5A:59:E7:FF then both F's will be 0 and the 7 in front of the F's will be added with 1. Your WLAN MAC address is then 00:80:5A:59:E8:00

Examples of places where you can find the MAC address:



Bottom of the C54APRA2+/C54APRB2+

Please note: WLAN MAC is Plus 1



Status page of the webinterface