

HowTo: setup of WDS using DWC-x000 and f.e. DWL-6610AP (B-Rev/APE)

[Requirements]

- 1. DWC-x000 with latest firmware 4.7.2.x
- 2. compatible AP with latest firmware

NOT all APs do support WDS in managed mode, therefore please check in advance if the AP you want to use support this feature.

[Scenario]

2 managed APs should form a WDS bridge, so that a network behind the "satelite"-AP should be reachable.



[preparation]

- ⇒ Pre-configure your DWC-x000 System including AP Profile
- ⇒ ensure that the WIFI Signal strength between both AP should be 65-70% at a minimum



[manage both APs]

- 1.) connect both APs into the local network, so that they can be managed
- 2.) take both into Management



3.) also define the WLAN Channel for the Radio where you want to use WDS manuallya. in this Scenatio we use 5 GHz indoor Channel 36

Valid APs Configuration		
MAC Address	40:9B:CD:4C:6A:40	
AP Mode	Managed O Standalone O Rogue	
Location	Optional	
Authentication	OFF	
Profile	1-Default 🗸	
Primary 802.11a/n/ac		
Channel	36	
Power	Profile	
Force Roaming	OFF	
Secondary 802.11a/n/ac		
Channel	Auto 🗸	
Power	Drofile	

4.) repeat this step for the 2^{nd} AP

MAC Address	40:9B:CD:7E:44:60
AP Mode	Managed Standalone O Rogue
Location	Optional
Authentication	OFF
Profile	1-Default Y
rimary 802.11a/n/ac	
Channel	36
Power	Profile
Force Roaming	OFF
econdary 802.11a/n/ac	
Channel	Auto
Power	Des Bla



5.) check that both AP to be managed

Inified Controller	- DWC 2000	tion 💈 👩 🚺 5GHz RF L	Jtilization 2 000	Client RSSI 0	🔰 🌱 Na	vigator	System Search	Q
	🝘 Status	🛜 Wireless	💻 Network	Secu	rity 🗢			
Vireless » Access Po	pint » AP List » Ma	inaged						00
Not Managed	Managed Connec	ction Failed Authent	tication Failed	Peer Managed Va	ulid APs AP Pr	ovisioning		
(P managed by the lisabled. However,w adio on an AP. Managed APs Lis	Wireless Controller ve can enable Telne st	is listed by its MAC Ad t access by enabling tl	dress and locatio he Debug feature.	n. When the AP is i . We can also manu	n Managed mod ally change the	le, remote a RF channel	ccess to the A and power for	P is each
Show 10 \checkmark ent	ries				Go	to 1 ~		٩
Model Name ⊖ Locat	ion ⊖	MAC Address 🛛 🕀	IP Address ⊖	Profile	⊖ Channel ⊖	Power ⊖ (%)	Firmware 🖓	Debug €
DWL-6610A P-B1		40:9B:CD:7E:44:60	192.168.10.25	1 - Default	36/1	100/100	4.6.0.6B002C	Disable
DWL-6610A PE-B1		40:9B:CD:4C:6A:40	192.168.10.26	1 - Default	36/6	100/100	4.6.0.6B001C	Disable
Showing 1 to 2 of 2 e	ntries				K Fi	rst 👌 Previo	us 1 Next >	Last 刘

[defining the WDS-Group]

6.) define the WDS-Group

	🕢 Status	🛜 Wireless	💻 Network	Security	🗘° Maintenance	
Wireless » Access	Point » WDS Groups					00
WDS Groups	WDS Managed AP	WDS AP Link				
From this Page we managed APs to th	can create,configu ne cluster using over	re and delete WDS Man r-the-air WDS links thro	nged Group. The Wirel ough other managed Al	ess Distribution System Ps.	(WDS)-Managed AP feature	allows us to add
WDS Managed	AP Groups					
Show 10 \checkmark e	ntries [Right click on r	record to get more option	IS]			٩
ID	🔂 Group Name		⊖	Spanning Tree		Θ
			No data available in t	able		
Showing 0 to 0 of 0	entries				K First Previous	Next 🔪 🛛 Last 💥
Add New WDS	Group					

M	vent 👩 AP 2 👩 2.4GHz RF Utilization 2	5GHz RF Utilization 2	👩 👩 Client RSSI 💿 💼 👩	🖌 🖌 Navigator	System Search
	WDS Managed AP Group Confi	guration			×
_	WDS Group Name	Test			
/irele	Spanning Tree	ON			
	Edit Password	ON			
	WDS Group Password	•••••	[Password Length: 8	- 63]	
rom i anag					
VDS					
Show					
ID					
Show					
Ad					
					Save

- a. in this example we use following settings: i. WDS Group Name = Tes ii. Spanning Tree = Ena iii. WDS Group Password = 123 = Test
 - - = Enabled
 - = 1234567890



			Operation !	Suc	ceeded	
WDS Gr	oups V	/DS Managed AP WDS A	AP Link			
From this Pag managed APs	ge we ca to the o	n create,configure and d luster using over-the-air	elete WDS Manged Group. The ' WDS links through other manag	Wire ed /	less Distribution System (Ps.	WDS)-Managed AP feature allows us to add
WDS Mana	ged AP	Groups				
Show 10	~ entri	es [Right click on record to	get more options]			٩
ID	÷	Group Name		۲	Spanning Tree	⇔
1		Test			Enabled	
Showing 1 to	1 of 1 en	ries				H First Previous 1 Next Last

7.) define the WDS-Managed APs for this Group

Wireless » Access Point » WDS Groups » WDS	Managed AP	0 0
WDS Groups WDS Managed AP WDS	AP Link	
This Page allows you to view the APs that are you create a WDS-Managed AP group, use the and change STP Priority values for existing me	members of the group, add new membe WDS Managed AP Configuration page to embers.	rs, and change STP Priority values for existing members. After view the APs that are members of the group, add new members,
WDS Managed AP List		
Show 10 \checkmark entries [Right click on record to	get more options]	Q.
ID ↔ AP MAC ↔	AP Hardware Type	⊖ STP Priority ⊖
	No data available in table	2
Showing 0 to 0 of 0 entries		, First Previous Next > Last >
Add New WDS Managed AP		



WDS Managed AP Configuration	חו	
WDS Managed Group Id	1 ~	
Valid AP MAC Address	40:9B:CD:7E:44:60	
Hardware Type String	DWL-6610AP-B1 Dual Radio a/b/g/n/ac	
WDS AP MAC Address	40:9B:CD:7E:44:60	
STP Priority	1 [Length: 0 - 64]	
		Save
a. in this exam	ple we use following settings:	

- i. WDS Managed Group ID
 ii. Valid AP MAC Address
 iii. Valid AP MAC Address
 iii. Valid AP MAC Address
 - the AP) iii. WDS AP MAC Address = this entrie defines which Radio/SSID will be used for WDS, in this example it is the 5 GHz SSID1 MAC

b. repeat the same step for the 2^{nd} AP

/DS Managed Group Id	1 ~	
alid AP MAC Address	40:9B:CD:4C:6A:40	
ardware Type String	40:9B:CD:4C:6A:40 p/g/n/ac	
DS AP MAC Address	40:9B:CD:7E:44:60 40:9B:CD:4C:6A:40	
TP Priority	1 [Length: 0 - 64]	



8.) check the settings

		Operation Succ	ceeded	
WDS G	roups WDS Managed AP	WDS AP Link		
This Page al you create and change WDS Mana	llows you to view the APs th a WDS-Managed AP group, u STP Priority values for exis aged AP List	at are members of the group, add new men ise the WDS Managed AP Configuration page ting members.	nbers, and change STP Priority values for existing membe : to view the APs that are members of the group, add ne	ers. After w members,
Show 10	entries [Right click on response of the second s	cord to get more options]		٩
ID 🗘	AP MAC	⊖ AP Hardware Type	⊖ STP Priority	⇔
1	40:9B:CD:4C:6A:40	DWL-6610AP-B1 Dual Radio a/b/g/n/ac	1	
1	40:9B:CD:7E:44:60	DWL-6610AP-B1 Dual Radio a/b/g/n/ac	1	
Showing 1 t	to 2 of 2 entries		K First Previous 1 Next	Last

9.) Create the WDS AP Link

Wireless » Access Point >	» WDS Groups >	WDS AP Link						00
WDS Groups WDS	Managed AP	WDS AP Link						
This Page allows you to o WDS AP Link Configuratio	configure the V on page to conf	/DS links between th igure the WDS links	betv	Ps that are members o ween the APs that are	of the group.After you members of the group	create a WDS-Manag o.	ged AP gr	oup, use the
WDS AP Link List								
Show 10 \checkmark entries [[Right click on re	cord to get more optio	ns]			(٩
IE Source AP ⊕ S MAC R	ource AP Radio ⊖	Source AP Hardware Type	⊜	$\stackrel{\text{Destination AP}}{\text{MAC}} \ominus$	Destination AP Radio ⊖	Destination AP Hardware Type	⇔	STP Link Cost
				No data available in table	e			
Showing 0 to 0 of 0 entries						H First H Prev	ious Nex	t 🔰 Last 刘
Add new WDS AP Lir	nk							



WDS Managed Group Id	1	~
Source AP MAC Address	40:9B:CD:7E:44:60	
Source AP Radio	Primary 802.11a/n/ac	~
Destination AP MAC Address	40:9B:CD:4C:6A:40	
Destination AP Radio	Primary 802.11a/n/ac	~
Link Cost	1 [Range:) - 255]

- a. in this example we use following settings:
 i. Source AP MAC Address = the MAC Address of the ROOT AP
 - ii. Destination AP MAC Address = the MAC Address of the **SATELITE AP**

10.) check the settings

Wireless » Access Point » WDS Groups » WDS AP Link										
W	'DS Groups WDS	Managed AP	WDS AP Link							
This P WDS A WDS	age allows you to o P Link Configuratio AP Link List	configure the WD on page to config	DS links between the APs gure the WDS links betwe	that are members of t en the APs that are m	he group.After you cr embers of the group.	eate a WDS-Managed AP gro	oup, use the			
Show	10 V entries [Right click on reco	ord to get more options]				٩			
	Source AP MAC ⇔	Source AP Radio ⊖	Source AP Hardware Type ↔	$\begin{array}{c} \text{Destination AP} \\ \text{MAC} \end{array} \\ \end{array}$	Destination AP Radio	Destination AP Hardware Type ⊖	STP Link _⊖ Cost			
1	40:9B:CD:7E:44:60	1	DWL-6610AP-B1 Dual Radio a/b/g/n/ac	40:9B:CD:4C:6A:40	1	DWL-6610AP-B1 Dual Radio a/b/g/n/ac	1			
Show	ing 1 to 1 of 1 entries					First Previous 1 Next	> Last >			



Now connect to ROOT AP by serial console OR telnet/SSH

11.) enable Debug Mode on both APs (valid until you disable it, or reboot AP)

Wireless » Access Point » AP List » Managed						00			
Not Managed Managed Connection	ailed Authentication Failed	Peer Managed Valid	APs AP Pro	visioning					
AP managed by the Wireless Controller is listed by its MAC Address and location. When the AP is in Managed mode, remote access to the AP is disabled. However,we can enable Telnet access by enabling the Debug feature. We can also manually change the RF channel and power for each radio on an AP.									
Managed APs List									
Show 10 🗸 entries			Go to	1 ~		٩			
Model Name ⊖ Location ⊖ MA	Address ↔ IP Address ↔	Profile ↔	Channel 😔	Power (%) ⊖	Firmware 🕀	Debug ⊖			
DWL-6610A 40:5	CD: Select All	1 - Default	36/1	100/100	4.6.0.6B002C	Disable			
DWL-6610A 40:9	E Details & Statistics	1 - Default	36/6	100/100	4.6.0.6B001C	Disable			
Showing 1 to 2 of 2 entries	Reboot & Factory Default Channel & Power		KJ Firs	t 🚽 Previou	us 1 Next >	Last 刘			
	Firmware Upgrade	•							
	Disassociate Clients								
	🔚 AP Debug								
	Network Setting								

NAC Address	40:9B:CD:7E:44:60	
Location		
P Address	192.168.10.25	
Status	Not Started	
Enable Debug	ON III	
Password	•••••	

Save

a. in this example we use following settings:

- i. Enable Debug = ON
- ii. Password = admin
- iii. Confirm Password = admin

Repeat the same for the 2^{nd} AP.



Wireless » Access Point » AP List » Managed										
Not Managed Managed Connec	tion Failed Authenti	cation Failed F	Peer Managed Valid	APs AP Pro	visioning					
AP managed by the Wireless Controller is listed by its MAC Address and location. When the AP is in Managed mode, remote access to the AP is disabled. However,we can enable Telnet access by enabling the Debug feature. We can also manually change the RF channel and power for each radio on an AP. Managed APs List										
Show 10 🗸 entries				Go to	1 ~		٩			
Model ⊖ Location ⊖	MAC Address ⊖	IP Address ⊖	Profile 🕀	Channel ⊖	Power ⊖ (%)	Firmware 🕀	Debug ⊖			
DWL-6610A P-B1	40:9B:CD:7E:44:60	192.168.10.25	1 - Default	36/1	100/100	4.6.0.6B002C	Enable			
DWL-6610A PE-B1	40:9B:CD:4C:6A:40	192.168.10.26	1 - Default	36/6	100/100	4.6.0.6B001C	Enable			
Showing 1 to 2 of 2 entries				K Firs	t 👌 Previou	s 1 Next >	Last 渊			

Connect by Console or Telnet/SSH to the AP (in this example we use putty)



Login with the credentials "admin" & "admin" as we just before defined.



P 192.168.10.25 - PuTTY	2		×
login as: admin			\sim
admin@192.168.10.25's password:			
To retain the configuration between reboots, make sure you copy	the run	nning c	onf
iguration file to the startup configuration file after you have ur changes.	complet	ed all:	Уо
Enter 'help' for help.			
DLINK-WLAN-AP#			
			\sim

For the ROOT AP please run this 4 commands:

set managed-ap wds-eth0-port-mode up

set managed-ap wds-group-password 1234567890

set managed-ap wds-satellite-mode down

save-running



With"reboot" you reboot the AP. This also disabled the Debug-Mode on the AP.



For the SATELITE AP please run this 4 commands:

set managed-ap wds-eth0-port-mode up set managed-ap wds-group-password 1234567890 set managed-ap wds-satellite-mode up save-running

🗬 192.168.10.26 - P	uTTY					×
login as: admin admin@192.168.3	n 10.26's password	i:				
To retain the o iguration file ur changes. Enter 'help' fo	configuration be to the startup or help.	etween reboots, make configuration file	e sure you copy after you have	the run complet	ning c ed all:	onf yo
DLINK-WLAN-AP# DLINK-WLAN-AP# DLINK-WLAN-AP# DLINK-WLAN-AP# DLINK-WLAN-AP#	set managed-ap set managed-ap set managed-ap save-running	wds-eth0-port-mode wds-group-password wds-satellite-mode	up 1234567890 down			

Remove the Satelite AP now from your local network and place it in it's remote location, so that the WDS can be established and no loop is being formed.



Check the DWC-x000 about the WDS connection:

Status	» Wireless Information »	WDS Groups Status					0 0
V	VDS Groups Status WD	OS Group AP Status	WDS AP Status	WDS Link Stat	us WDS Link Statisti	cs	
This p	bage displays summary inf	formation about config	ured WDS links.				
WDS	Groups Status						
Shov	v 10 🗸 entries [This i	nformation is view only]					٩
ID	Configured AP	Connected Root	⊖ Connected	d Satellite 😝	Configured WDS Link	Geter	cted WDS Links ⊖
1	2	1	1		1	1	
Shov	ving 1 to 1 of 1 entries					KI First A Previo	us 1 Next > Last >
Statu	us » Wireless Information	» WDS Groups Status »	WDS Group AP Stat	tus			00
1	WDS Groups Status	DS Group AP Status	WDS AP Status	WDS Link Statu	us WDS Link Statistic	s	
_							
This	page displays detailed in	formation about the co	onfigured APs and	d links in the WDS	Group.		
WD	S AP Status						
	ID	Γ	1 ~				
	Configured AP Count	2					
	Connected AP Count	2					
	Source AP Count	1					
	Destination AP Count	1					
	Source Bridge AP MAC	4	0:9B:CD:7E:44:60				
	Source Device Type	R	loot AP				
	Config WDS Link Count	1					
	Detect WDS Link Count	1					
	Blocked WDS Link Count	0					
	WDS Group Password Cha	ange Status N	lot Started				
	Edit Password	[OFF				
		I	Save	Cancel			

Status » Wireless Information » WDS Groups Status » WDS AP Status									
WDS Groups St	tatus WDS Group AF	Status WDS	AP Status W	'DS Link Status	WDS Link Statisti	cs			
This page displays summary information about the APs in a configured WDS Group. WDS AP Status Summary WDS Group ID 1 - Test									
Show 10 🗸 entr	ries [This information is	view only]				(٩		
AP MAC Address	AP Connection ⊖ Status	Satellite Mode ⊖	STP Root ⊖ Mode	Root Path⊖ Cost	Ethernet Port STP State ↔	Ethernet Port _⊖ Mode	Ethernet Port Link State ⊖		
40:9B:CD:4C:6A:40	Connected	Satellite	STP Root	0	Forwarding	Enabled	Up		
40:9B:CD:7E:44:60	Connected	Wired	STP Root	0	Forwarding	Enabled	Up		
Showing 1 to 2 of 2 e	ntries					First Previous	1 Next > Last >		



V	VDS Groups Status	WDS Group	o AP Status	WDS AP Status	5 WD	S Link Statu	s WDS Link St	atistics		
This page displays summary information about the link configuration and link state in a WDS Group. WDS Link Statistics										
Shov	v 10 \checkmark entries	[This information	on is view only]	1						٩
	Source AP MAC ↔	Source AP _⊖ Radio	Destinatio AP MAC	n ⊖ Destina AP Radi	tion _⊖	Source AP End- Point	Destination AP End- ⊖ Point	Aggregation _⊖ Mode	Source AP STP ⊖	Destination _⊖ AP STP
1	40:9B:CD:7E:44:60	802.11a/n/ac	40:9B:CD:4C:6	A:40 802.11a/n/	/ac	YES	YES	NO	Forwarding	Forwarding
Shov	Showing 1 to 1 of 1 entries 1 Next > Last >									

v	/DS Groups Statu:	s WDS Group	p AP Status W	/DS AP Status V	VDS Link Status	WDS Link Statis	tics			
This Page displays summary information about the packets sent and received on the WDS links. WDS Link Statistics										
Show	Show 10 v entries [This information is view only]									
ID	Source AP MAC ↔	Source Radio ⊕	Destination AP MAC	⊖ Destination Radio	Source AP Packets / Bytes Sent	Source AP Packets / Bytes Received	۲	Destination AP Packets / Byte⊕ Sent	Destination AP Packet / Bytes Received	
1	40:9B:CD:7E:44:60	802.11a/n/ac	40:9B:CD:4C:6A:40	0 802.11a/n/ac	3783213/25792694	7 24051/2686686	i i	3664675/250414272	31798/2414947	
Showing 1 to 1 of 1 entries 1 Next > Last >										

If you change afterwards within your DWC-x000 the SSID (which you use for WDS) you might run the CLI commands on both units again!

40:98:CD:7E:44:60 5,180 MHz 36 WDS-SSID1-24 -33 d8m	ac		102.4 ms	
48:98:CD:7E:44:70 2,437 MHz 6 WDS-SSID1-24 -34 d8m			102.4 ms	
48:9B:CD:4C:6A:50 2,462 MHz 11 WDS-SSID1-24 -42 dBm			102.4 ms	1m
40:9B:CD:4C:6A:40 5,180 MHz 36 WDS-SSID1-24 -43 dBm			102.4 ms	

The AP in this example now is configured in WDS Mode for 5 GHz and SSID Mode in 2.4 Ghz.