

Industrial Wireless Access Point

DM500

User's Manual





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Preface

This manual supports you during the installation and configuring of the DM500 Industrial Wireless Access Point only, as well as it explains some technical options available with the mentioned product. As such, it contains some advanced network management knowledge, instructions, examples, guidelines and general theories designed to help users manage this device and its corresponding software; a background in general theory is a must when reading it. Please refer to the Glossary for technical terms and abbreviations.

Who Should Use This User Manual

This manual is to be used by qualified network personnel or support technicians who are familiar with network operations; it might be useful for system programmers or network planners as well. This manual also provides helpful and handy information for first time users. For any related problems please contact us.

Supported Platform

This manual is designed for the DM500 Industrial Wireless Access Point and that model only.



European Community, Switzerland, Norway, Iceland, and Liechtenstein

Model: DM500

Declaration of Conformity with regard to the R&TTE Directive 1999/5/EC

This equipment is in compliance with the essential requirements and other relevant provisions of 1999/5/EC.

The following standards were applied:

EMC	EN 301.489-1 v1.4.1; EN 301.489-17 v1.2.1
Health & Safety	EN60950-1: 2001; EN 50385: 2002
Radio	EN 300 328 v 1.7.1; EN 301.893 v 1.5.1

The conformity assessment procedure referred to in Article 10.4 and Annex III of Directive 1999/5/EC has been followed.

This device also conforms to the EMC requirements of the Medical Devices Directive 93/42/EEC.

Note: This equipment is intended to be used in all EU and EFTA countries. Outdoor use may be restricted to certain frequencies and/or may require a license for operation. For more details, contact Welotec Technical Support.

European Union

This system has been evaluated for RF exposure for humans in reference to the ICNIRP (International Commission on Non-Ionizing Radiation Protection) limits. The evaluation was based on the EN 50385 Product Standard to Demonstrate Compliance of Radio Base stations and Fixed Terminals for Wireless Telecommunications Systems with basic restrictions or reference levels related to Human Exposure to Radio Frequency Electromagnetic Fields from 300 MHz to 40 GHz. The minimum separation distance from the antenna to a general bystander is 20 cm (7.9 inches).



Caution

Beginning from here there will be extreme caution exercised.



Never install or work on electrical cabling during periods of lightning activity.
Never connect or disconnect power when hazardous gases are present.



WARNING: Disconnect the power and allow to cool 5 minutes before touching.

1. Introduction

1.1 Product Overview

The **DM500 Wireless Access Point** series is our new line of wireless products designed to provide a wireless connectivity to clients or mobile stations creating a complete solution for your industrial wireless networking.

As an example, you can connect PC's or IP Cameras to a switch and connect these two to a **Wireless Access Point** device; this example illustrates how to connect devices to a local area network or a backbone network, **Fehler! Verweisquelle konnte nicht gefunden werden..** The **DM500** series provide several functionalities to support mobile and wireless networking.

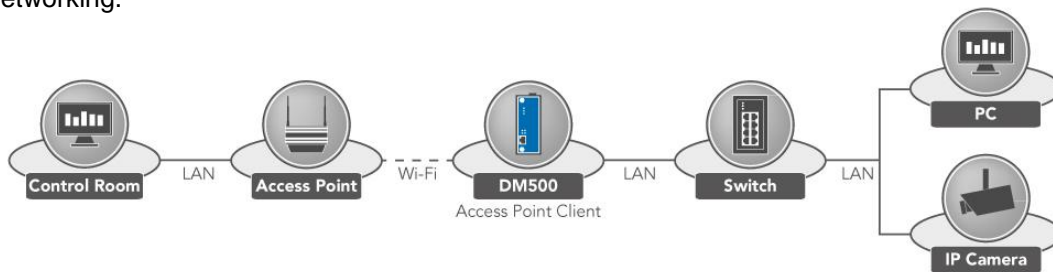


Fig. 1 DM500



1.2 Features

The **DM500** is our latest addition to our Industrial Wireless products; its small size but powerful architecture makes it a perfect choice for industrial/manufacturing needs in which size is a decisive factor. It rewards our customers with superb connectivity. Among its many characteristics, we could mention:

- Stream input/output with maximum link speed of 300 Mbps and throughput of 100 Mps (environment dependent).
- 5 GHz frequency support to reduce interference on 2.4 GHz with other wireless devices.
- Wireless Isolation to enhance security between wireless clients.
- Different modes of operation:
 - Regular AP
 - WDS Bridge
 - AP Client



2. Getting started

2.1. Inside the Package

Inside the product purchased you will find the following items:

Item	Quantity	Description
DM500	1	Industrial Wireless Access Point
Antenna	2	3~5 dBi antenna
Terminal Block	1	3-pin lockable terminal block
Mounting Kit	1	DIN-rail kit, already mounted
Documentation + CD	1	Inside the CD you will find <ul style="list-style-type: none">• User's Manual• Installation Guide• Device View Utility

Tab. 1 Inside the package

Note: Please notify your sales representative if any of the above items is missing or damaged in any form upon delivery. If your sales representative is unable to satisfy your enquiries, please contact us directly.



2.2. Front & Power Panels

The Front (Fig 2) and Power panels (Fig 3) are as follow:



Fig. 2 DM500 Front panel



Fig. 3 DM500 Power panel



The rear panel (where you can mount the device on a rail or to the wall), looks as in Fig. 4, a simple mounting instruction is given there, too. For more information on hardware installation, please refer to the product's installation guide.

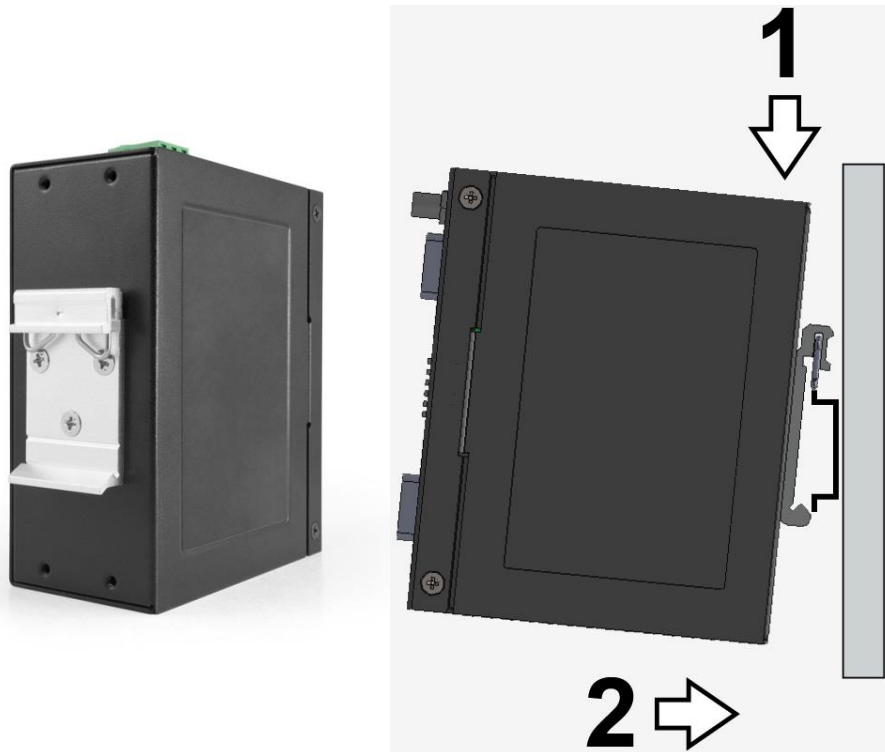


Fig. 4 DM 500 Rear panel and mounting instruction



2.3. First Time Installation

Before installing the device, please adhere to all safety procedures described below, Welotec will not be held liable for any damages to property or personal injuries resulting from the installation or overall use of the device. **Do not attempt to manipulate the product in any way if unsure of the steps described here, in such cases please contact your dealer immediately.**

- Prepare the necessary cables, DC adapter, power cord, LAN cable, etc.: do not connect the unit yet.
- Install both antennas to the SMA (f) connectors.
- Proceed then to plug the power source to the unit, starting from the ground and then the terminal block.
- Place the device in the desired location and connect it to the LAN via an Ethernet cable with a RJ45 connector.
- Connect your computer to the LAN network. Default configurations will be addressed later.

Note: remember to please consult your Hardware Installation Guide when attempting an installation. Also, please follow all safe procedures when doing so.



2.3.1. Web Configuration Overview

DM500 series' Web Configuration is designed into three different modes for ease of use to suit customer needs. The Web Configuration appears as follows in Fig. 5:

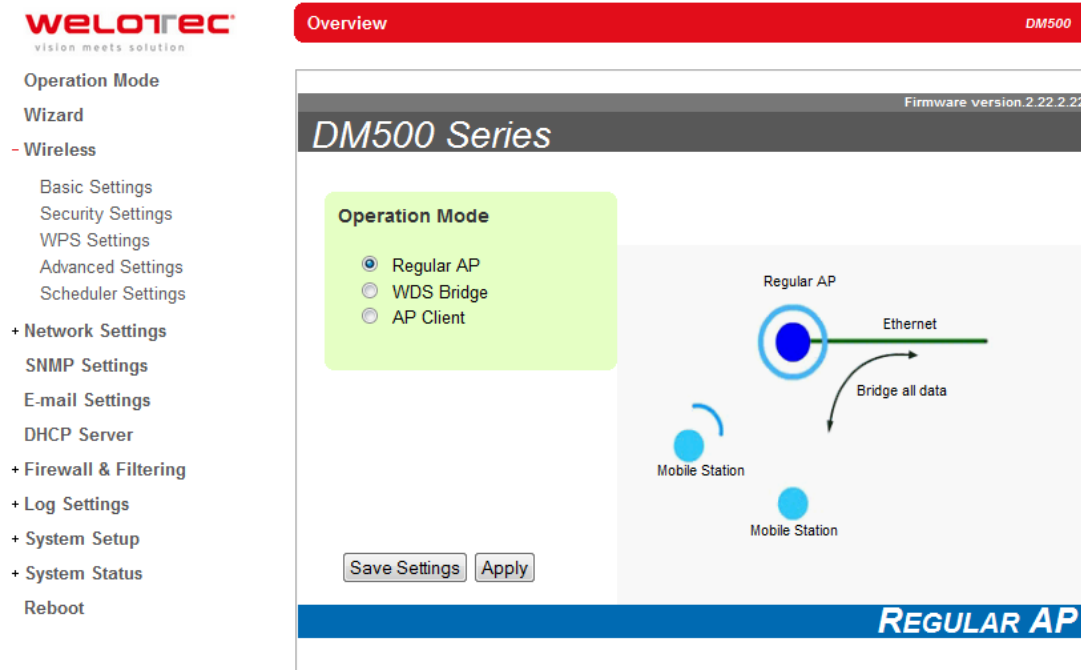


Fig. 2 Web Configuration

On the left side, a menu-tree appears with all the modes and options available (Fig 6), while on the right side of your screen the contents of each mode/option will be displayed in a graphical state. Since each mode of operation is different, the content will differ, for more information on each selection please refer to each option's section throughout the manual.





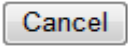
- Operation Mode
- Wizard
- Wireless
 - Basic Settings
 - Security Settings
 - WPS Settings
 - Advanced Settings
 - Scheduler Settings
- Network Settings
 - LAN & WLAN Interfaces
- SNMP Settings
- E-mail Settings
- DHCP Server
- Firewall & Filtering
 - Wired MAC Filtering
 - Wireless MAC Filtering
 - Ethernet Type Filtering
 - IP Filtering
 - Management List
- Log Settings
 - System Log Settings
 - Event Log
- System Setup
 - Admin Settings
 - Date/Time Settings
 - Alert Event
 - Firmware Upgrade
 - Backup & Restore Configuration
- System Status
 - System Information
 - Site Monitor
 - Wireless Client Table
 - Traffic Log & Statistics
 - DHCP Status
 - Ping
- Reboot

Fig. 3 Available options

Note: It is worth noting that as a first step to reach your device, you could use **Device View** © (the utility provided in the CD); please refer to [Sec. 3.1](#) for more details.



In general, there will be three buttons which will be present at the end of almost each configuration:

Button	Function
	Saves the current configuration input on the page only, the configuration itself will not be applied to the device. We recommend users to use this button before the configuration process is completed and then press "Apply" at the last step.
	Save and apply the current configuration input on the page. On some pages, the device may need to reboot, we strongly advice to save the device's settings before reboot.
	Cancel the current configuration input and shows the original settings.

Tab. 2 Buttons



2.4. Factory Default Settings

Upon arrival, the device will be set as Regular AP, the rest of the settings are as follow:

Mode	Regular AP	WDS Bridge	AP Client
Wireless			
Basic Settings			
Radio On	AP1 Enabled		N.A.
SSID	DM500		
SSID Broadcast	Enabled		
Wireless Mode	802.11b/g/n		
Channel	1 (Automatic Channel Selection enabled)		
Bandwidth	40 MHz		
Secondary Channel	None (disabled)		
Transmit Rate	Best (auto)		
WDS Mode		Root AP	
Security Settings			
Security Mode	Disabled	N.A.	N.A.
WDS Settings			
Encryption Type	N.A.	None	N.A.
Root AP		Blank	
WPS Settings			
WPS	Disabled	N.A.	
WPS BUTTON			
PIN Number			

Tab. 3 Wireless and security setting



Advanced Settings		
Regulatory Domain	EU	
Tx Power	100%	
Short GI	Enabled	
WMM	Enabled	
WPA Group Rekey Interval	600	
STP	Disabled	
Fast Handoff	Disabled	
Fast Roaming	N.A.	Disabled
Fast Roaming Threshold		50%
Mobile Station		
SSID	N.A.	DM500
BSSID (MAC Address)		Disabled
Topology		Infrastructure
Band mode		Auto
TxRate		
Channel		
Bandwidth		
Secondary Channel		OPEN
Authentication Mode		
Encryption Type		None
WEP Key		Disabled
WPA-PSK/WPA2-PSK (Passphrase)		
WPA-PSK/WPA2-PSK (with RADIUS)		
User		
Password		
Wireless Scheduler		
Status	Disabled	

Tab. 4 Advances settings



Network Settings	
DHCP	Manual (box unchecked)
IP Address	192.168.2.2
Subnet Mask	255.255.255.0
Default Gateway	192.168.2.1
Preferred DNS	192.168.2.1
Alternate DNS	None
SNMP Settings	
System Contact	Contact
System Location	Location
Read Community	None (SNMP disabled)
Write Community	
SNMP Trap Server	0.0.0.0
Email Settings	
Sender	Blank
Receiver	
SMTP Server	
Authentication	Disabled
User name	
Password	
DHCP Server	
DHCP	Disabled (unchecked)
From IP Address	None (if above unchecked)
To IP Address	
Netmask	
Lease Time (minutes)	
Static Connection	

Tab. 5 Network-, SNMP- and Email Settings



Firewall and Filtering (a total of 64 entries available per option)		
Wired MAC Filtering	Disabled MAC Filtering	N.A.
· Access Control List	None (if above checked)	
Wireless MAC Filtering	Disabled	
· Access Control List	None (if above checked)	
Ether Type Filtering	Disabled	
· Ethernet Type Filtering List	None (if above checked)	
IP Filtering	Disabled	
· IP Filtering List	None (if above checked)	
Management List	Disabled	
System Setup		
Username	adm	
Old Password	123456	
New Password		
Repeat new password		
Web Mode	HTTP	
Device name	Device's MAC Address	
NTP	Unchecked	
NTP Server	None (if above unchecked)	
Time Zone		
Manual Time Settings	2006/1/1 00:00	
Alert Event	All unchecked	
Firmware Upgrade	Path directed to Desktop	
Backup & Restore Configuration		
System Status		
System Information		
Site Monitor		
Wireless client table	Default table according to connection	N.A.
Traffic Log & Statistics		
Refresh Rate	No refresh	
DHCP Status	No DHCP entry	
Ping	Blank	

Tab. 6 Firewall- and System Setup



3. Web Console Configuration

3.1. Administrator Login

As soon as the device is connected to the web, the user can proceed to navigate through its configuration using **Device View** ©, (utility that comes with the CD); as noted in Fig. 7 below, important information such as the IP, MAC address, etc is going to be displayed.

No.	Caution	Model	IP Address	MAC Address	Host Name	Kernel
14		SE5116A	192.168.3.1			V4.1
15		SE5116A	192.168.2.1			V4.1
16		SE5116A	192.168.1.1			V4.1
17		SE5116A	10.0.50.100			V4.1
18		SE5002	10.0.161.108		name123	V2.62
19		MB5404x	10.0.189.46			V1.0
20		GW26A-104	10.0.9.1		^_atop	V2.22
21		GW21S-MAXI-WD	10.0.163.2		RD2-1503-2	V2.45
22		GW21S-MAXI-WD	10.0.77.102		name	V2.54
23		GW21S-MAXI-WD	10.0.71.102			V2.45
24		GW21S-256	10.0.78.1			V1.45
25		GW21S-256	10.0.76.3			V1.45
26		GW21L	10.0.163.1			V1.82
27		GW21C-MAXI-WD	10.0.162.101		name	V2.43
28		EH7510	10.0.153.253		EH7510	V1.21
29		EH7510	10.0.151.124		EH7510	V1.21
30		EH7510	10.0.151.35		EH7510 VPN	V1.20
31		DT4000	192.168.0.157			V1.2
32		DT4000	192.168.0.156			V1.2
33		CORE-NetworkModu	10.0.51.106			V1.4
34		AW5500	10.0.50.200			V1.12
35		AW5500	10.0.5.3			V1.12
36		AW5300	10.0.195.98			V1.0
37		AW5300	10.0.195.97			V1.0
38		ATW300	10.0.78.34			V2.18
39		ATW300	10.0.78.33			V2.18
40			10.0.9.2			V1.6

Fig. 4 Device View

If your device's name is double-clicked, a window (Fig. 8) will pop-out that will prompt you to enter username and password (see Factory Default Settings for more information), proceed then to click "OK".



Fig. 8 Security Window

The settings can then be accessed (as in **Fehler! Verweisquelle konnte nicht gefunden werden.** 9), by introducing first the username and password; as mentioned before, it will be in Regular AP by default.

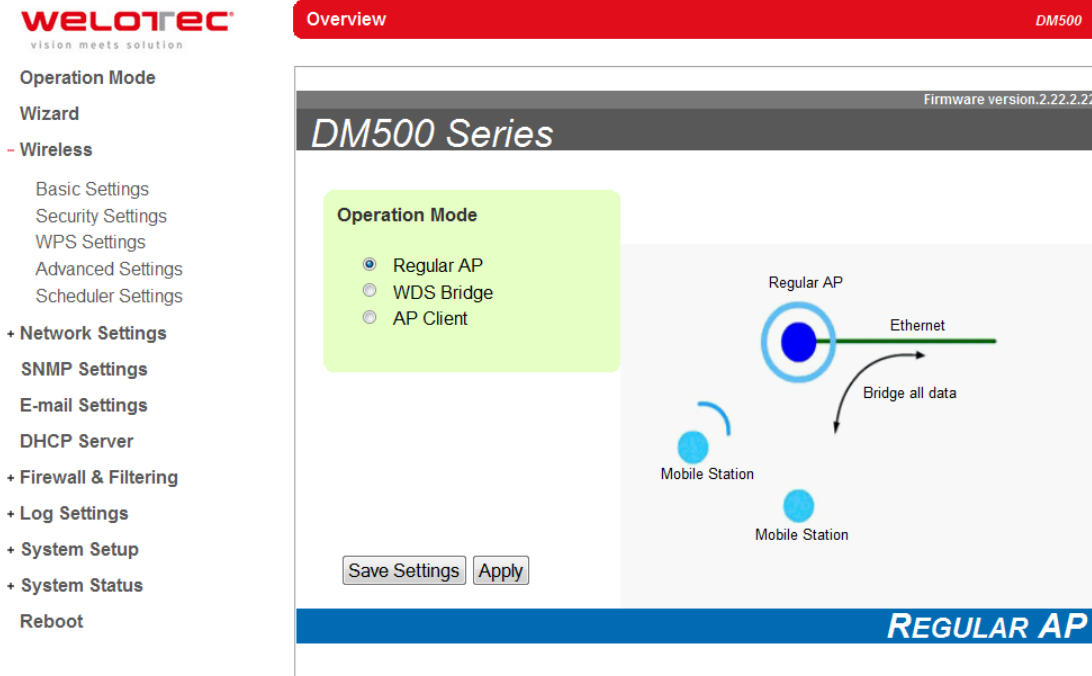


Fig. 5 Overview

3.2. Overview Information

DM500 is an Industrial Wireless solution for applications in harsh environments. The DM500 is tough enough, expected to operate at temperatures ranging from -10°C~60°C. The ease of installation makes it attractive as it uses a DIN-Rail for fixing itself to virtually any surface in your workplace. Reliability is a key factor when wireless solutions are needed, that is why DM500's size makes it ideal for small places when considering its positioning without affecting real-time, control and overall performance.

3.2.1. Secure Wireless Network

DM500 is designed to provide you security support when building a network. We recommend using WPA2-PSK with AES as a minimum when securing your network; also remember to set it at 802.11n for a full speed performance. For more information on this and more please read Chap 3, Sec. 3.3.2.



3.3. Wireless Settings

Wireless Settings include the basic Wi-Fi settings and wireless security. There are however, some concepts to be mentioned before going one step forward on the wireless settings. As you know, 802.11 is a set of standards for WLAN communication at the 2.4, 3.6 and 5 GHz frequencies. The DM500 works only with the 2.4 and 5 GHz range. It follows the below mentioned standards:

- **802.11a**; (also known as 802.11a-1999), is a 54 Mbps (around 20 Mbps net throughput), 5 GHz signaling standard; since 2.4 GHz is used by a big number of different devices interference here is less than in 802.11b. However, signals will not penetrate as much as 802.11b because they are absorbed more readily by walls and other solid objects (when on a single path), but not when use in multi-path environments i.e., indoors, office.
- **802.11b**; the first of the standards to be created; an 11 Mbps (4~5 Mbps net throughput), 2.4 GHz signaling standard. Although it performs much better than traditional dial-up networking, its performance is still significantly less than 802.11a and other, newer standards.
- **802.11g**; very similar to 802.11b, the main difference being that it is done in a maximum raw data rate of 54 Mbps (20 Mbps net throughput), at the same 2.4 GHz bandwidth
- **802.11n**; Improves the amount of bandwidth utilized by using multiple wireless signals and antennas (MIMO technology) instead of one. Link speed on a 2x2 solution is 300 Mbps on our models.

3.3.1. Wizard

The DM500 comes with a Quick Setup Wizard that will guide you through most of the common settings. You might find it suffice to follow the wizard and setup the Access Point without the need to proceed with this manual, (again, this is only applicable for the most basic setups in each mode).

3.3.2. Basic Settings

To set up a wireless network, several parameters are needed. Link Speed can be optimized up to 300 Mbps by choosing 802.11 b/g/n or 802.11a/n; again, remember that 2.4 GHz frequency is easily interfered by other devices that operate in the same region (namely Bluetooth, Zigbee, Microwave, etc.) so it is better to choose the 802.11a/n which operates in the 5 GHz when your network allows it. Below there is a table which shows **Basic Settings** for the device, Table 7.



Caption	Default
Radio On (AP1)	Enabled
Radio On (AP2)	Disabled
Radio On (AP3)	Disabled
SSID	DM500
SSID Broadcast	Enabled
Wireless Mode	802.11b/g
Channel	1 (Automatic Channel Selection box selected)
Bandwidth	40 MHz
Secondary Channel	5
Transmit Rate	Best (auto)

Tab. 7 Basic settings

The basic settings are explained in detail below:

- **Radio On:** DM500 supports up to three multiple SSIDs (AP1, AP2, and AP3). AP1 must be enabled before you can proceed to AP2 and AP3. AP2 and AP3's settings are only shown when they are enabled. When all three APs are disabled, wireless radio would turn off completely.
- **SSID:** specifies the device's wireless network name that other wireless devices should use in order to associate with this AP. Each AP (AP1, AP2, and AP3) can have their own SSID for better wireless network management. You can use the "**Scan network**" function to learn about the different SSIDs and channel numbers in the device's surroundings, please be patient as this process might take as long as 10 seconds as shown below. Once it has finished scanning, names and basic properties of neighboring networks will be shown as in Fig 9. When no neighbors have been found the answer is as follows Fig 10. Keep in mind that the SSID should be unique unless wireless roaming is required.



SSID	MAC Address	T	Mode	Channel	Authentication	Encryption	Mbps	Signal%
Visitor_24	E0:46:9A:1B:B0:D3	Infra	b/g	13	WPA2-PSK	AES	54	25
Visitor_5	E0:46:9A:1B:B0:D2	Infra	a	48	WPA2-PSK	AES	54	39

T is Topology (Infra = Infrastructure, Adhoc)

Fig. 6 Result of scanning

SSID	MAC Address	T	Mode	Channel	Authentication	Encryption	Mbps	Signal%
There is no wireless network detected.								

T is Topology (Infra = Infrastructure, Adhoc)
Channel is listed as Primary Channel, Secondary Channel

Fig. 7 Result of scanning

- **SSID Broadcast:** Allows any wireless client to search for this access point presence, it is enabled by default. When the **SSID Broadcast** is disabled, wireless clients need to manually input the SSID in their wireless client configuration, increasing network security to prevent an access from unsolicited clients.
- **Wireless Mode:** The modes are separated into two parts by different colors. The modes colored in green denotes the modes that runs on the 2.4 GHz frequency and the modes colored in red denotes the modes that runs on the 5 GHz frequency. Please note that the 2.4 GHz frequency is very crowded and usually does not reflect the real performance of the device, please consider using the 5 GHz frequency when possible.
- **Channel:** Select "**Automatic Channel Select**" to let the device automatically assign the best available channel number. When setting the channels manually, bear in mind that channels 1, 6, and 11 are the non-overlapping channels for 2.4 GHz **Fehler! Verweisquelle konnte nicht gefunden werden.** Again, you can use "**Scan network**" to see which channels are already occupied.
- **Bandwidth:** When 40 MHz is used, DM500 will double the channel width to 40 MHz as compared to the standard 20 MHz to transmit its data; this is not recommended for 802.11b/g/n since it will leave only one non-overlapping channel for other APs. HT40 (40 MHz), is recommended for 802.11a/n because it offers a wider frequency range and it is easier for DM500 to find empty channels as well.

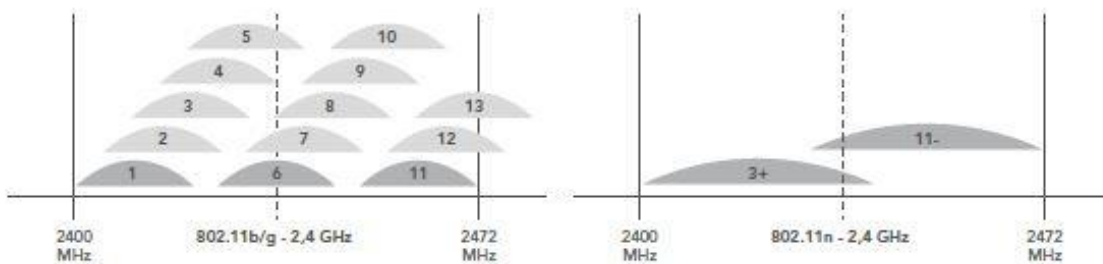


Fig. 8 Non-Overlapping Channels for 2.4 GHz WLAN



Fig. 9 Non-Overlapping Channels for 5 GHz WLAN



Wireless > Basic Settings
DM500

Basic Settings

AP Enabled	<input checked="" type="checkbox"/> AP1 <input checked="" type="checkbox"/> AP2 <input checked="" type="checkbox"/> AP3		
AP1 Settings			
SSID	<input type="text" value="DM500"/>	<input type="button" value="scan network"/>	
SSID Broadcast	<input checked="" type="radio"/> Enabled <input type="radio"/> Disabled		
Wireless Mode	802.11b/g/n		
BandWidth	Auto 20/40 MHz		
Channel	1	<input checked="" type="checkbox"/> Automatic Channel Selection	
AP2 Settings			
SSID	<input type="text" value="DM500_2"/>		
SSID Broadcast	<input checked="" type="radio"/> Enabled <input type="radio"/> Disabled		
AP3 Settings			
SSID	<input type="text" value="DM500_3"/>		
SSID Broadcast	<input checked="" type="radio"/> Enabled <input type="radio"/> Disabled		

Fig. 10 Basic Settings

- Secondary Channel:** the second channel that DM500 uses when the 40 MHz bandwidth is enabled, a better description is given on Table 8 and Table 9.

2.4 GHz Primary channel	20 MHz Blocks	40MHz upper			40 MHz lower		
		2 nd ch.	Center	Block s	2 nd ch.	Center	Block
1	1-3	5	3	1-7	Not Available		
2	1-4	6	4	1-8			
3	1-5	7	5	1-9			
4	2-6	8	6	2-10			
5	3-7	9	7	3-11	1	3	1-7
6	4-8	10	8	4-12	2	4	1-8
7	5-9	11	9	5-13	3	5	1-9
8	6-10	12	10	6-13	4	6	2-10
9	7-11	13	11	7-13	5	7	3-11
10	8-12	Not Available			6	8	4-12
11	9-13				7	9	5-13
12	10-13				8	10	6-13
13	11-13				9	11	7-13

Tab. 8 Settings for Secondary Channel for 2.4 GHz



5 GHz Primary channel	40MHz upper	40 MHz lower
	2 nd channel	2 nd channel
36	40	-
40	-	36
44	48	-
48	-	44
60	64	-
64	-	60
149	153	-
153	-	149
157	161	-
161	-	157

Tab. 9 Settings for Secondary Channel for 5 GHz

- **Transmit Rate:** a maximum data transmission of 300 Mbps is supported, however, data transmission could be reduced in exchange for a more stable connection (refer to Table 10). Each AP (AP1, AP2 and AP3) can have their own transmission rate to prevent congestion on the network.

MCS index	Spatial streams	Modulation type	Data rate (Mbit/sec)			
			200 MHz channel		40 MHz channel	
			800 ns GI	400 ns GI	800 ns GI	400 ns GI
0	1	BPSK	6.50	7.20	13.50	15.00
1	1	QPSK	13.00	14.40	27.00	30.00
2	1	QPSK	19.50	21.70	40.50	45.00
3	1	16-QAM	26.00	28.90	54.00	60.00
4	1	16-QAM	39.00	43.30	81.00	90.00
5	1	64-QAM	52.00	57.80	108.00	120.00
6	1	64-QAM	58.50	65.00	121.50	135.00
7	1	64-QAM	65.00	72.20	135.00	150.00
8	2	BPSK	13.00	14.40	27.00	30.00
9	2	QPSK	26.00	28.90	54.00	60.00
10	2	QPSK	39.00	43.30	81.00	90.00
11	2	16-QAM	52.00	57.80	108.00	120.00
12	2	16-QAM	78.00	86.70	162.00	180.00
13	2	64-QAM	104.00	115.60	216.00	240.00
14	2	64-QAM	117.00	130.00	243.00	270.00
15	2	64-QAM	130.00	144.40	270.00	300.00

Tab. 10 Transmit Rate

3.3.3. Security Settings

These settings provide an overall network security (according to the user's needs), by default Wireless Security is Disabled, **Fehler! Verweisquelle konnte nicht gefunden werden.** Each AP (SSID) can have its own wireless security. For example, you can create a temporary SSID with OPEN security for guest access. Note that WEP will not be available if you have enabled more than one AP (SSID).

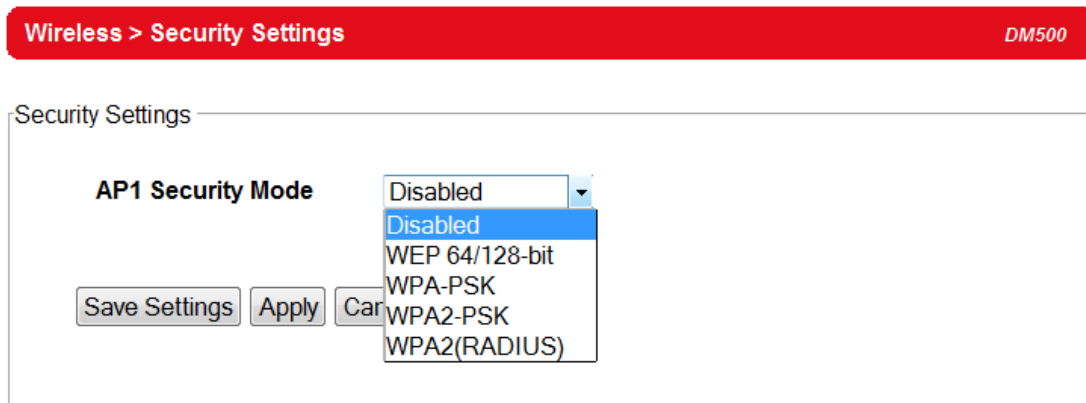


Fig. 11 Security Settings for AP1

A number of Security Settings are available for you:

- **WEP 64/128-bit Hex:** stands for **W**ired **E**quivalent **P**rivacy. Which is a moderately weak security algorithm, and although it implies security in a wired connection, it is weaker than **WPA** protocols. It is not recommended unless a really large network is being administered. Up to 4 different hexadecimal or ASCII keys can be entered in this section, Fig.15.

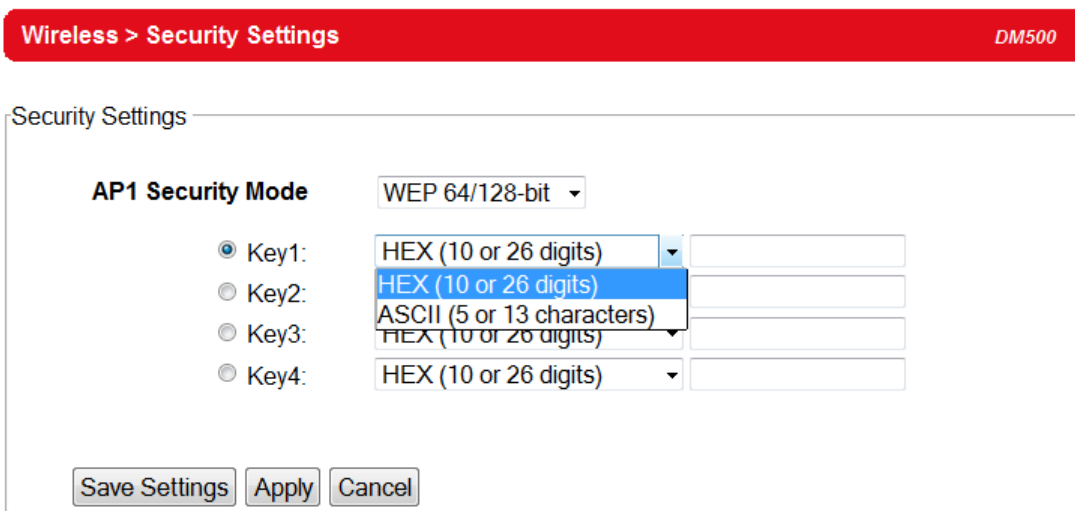


Fig. 12 Security Settings for AP1



- **WPA-PSK:** stands for **Wi-Fi Protected Access**. It uses a passphrase generated and entered by the user; this passphrase can be between 8 and 63 characters long. We strongly recommend not to take a passphrase already in use within the network (nor use a variation of personal information publicly available), since this can compromise network's security, Fig 16.

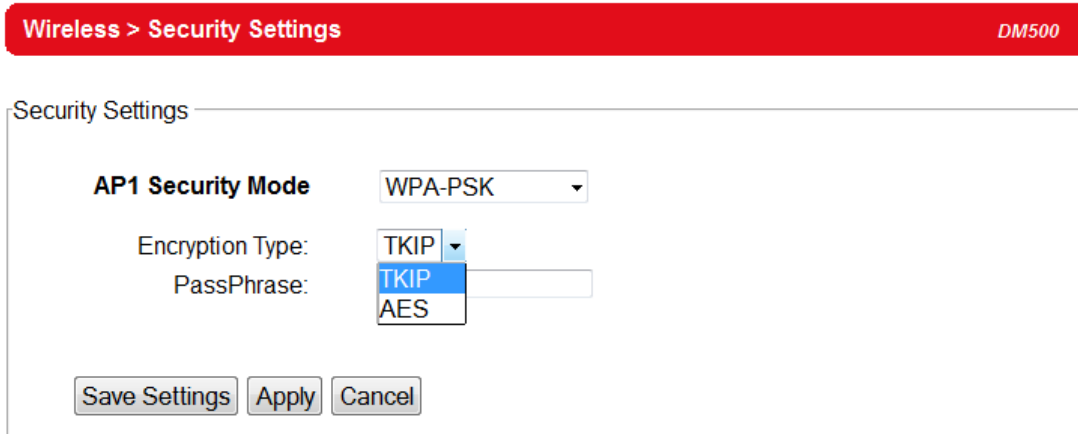


Fig. 13 Security Settings for AP1

- **WPA2-PSK:** stands for **Wi-Fi Protected Access II**. This is a highly recommended setting for the average user. You can select the encryption mode one of the following: TKIP (Temporal Key Integrity Protocol), or AES (Advanced Encryption Standard). Less prone to be hacked than the above one, Figure 17.

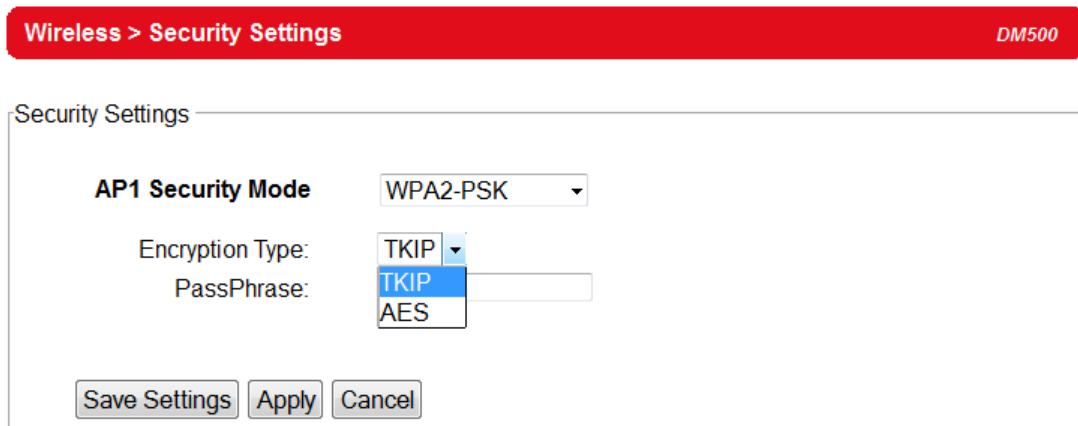


Fig. 14 Security Settings for AP1



- **WPA2 (RADIUS):** Designed for enterprise networks, it requires a RADIUS (Remote Authentication Dial In User Service), authentication server. Although possessing a more complicated setup, security is optimized since passwords are not transmitted between the NAS (Network Authentication Server) and RADIUS, Fig. 18.

Wireless > Security Settings DM500

Security Settings

AP1 Security Mode

Encryption Type:

IP Address:

Port: (1812 is recommended.)

Shared Secret:

Fig. 15 Security Settings for AP1

- **Disabled:** No security settings are being used in the current device (comes as factory default), **Fehler! Verweisquelle konnte nicht gefunden werden.. This option is highly discouraged since authentication as well as encryption is not performed in this mode.**

Wireless > Security Settings DM500

Security Settings

AP1 Security Mode

Fig. 16 Security Settings for AP1



3.3.4. WPS Settings

This option is available only when DM500 is running in the **Regular AP** mode. **WPS** stands for **Wi-Fi Protected Setup**, **PBC** stands for **Push Button Configuration**. WPS needs to be enabled before you can **Start WPS PBC**. To use this feature, first trigger the WPS process in DM500 by pressing the **WPS PBC** button and click on the **WPS PBC** button on SW550X's UI or other WPS methods designated by a WPS compatible device, Fig 20. After the **Start WPS PBC** button is pressed, **WPS** would be triggered and the DM500 will wait for 120 seconds for a WPS compatible device to associate with it automatically.

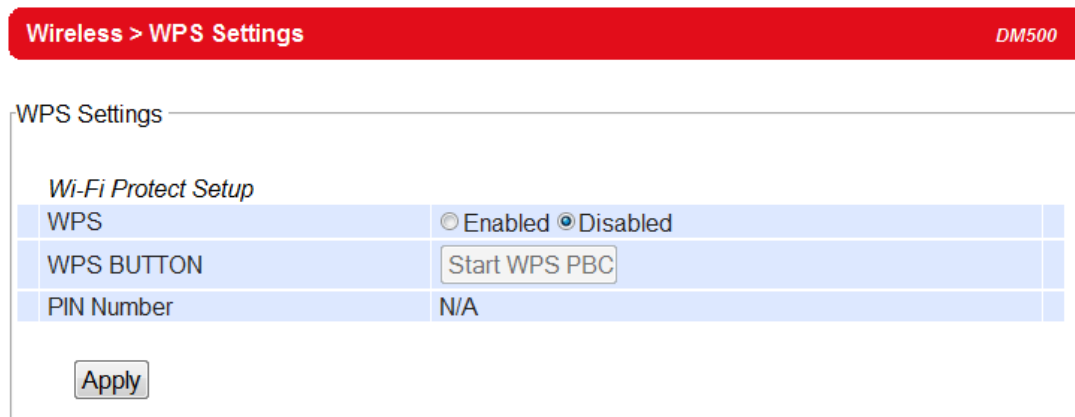


Fig. 17 WPS Settings

Note that since DM500 only supports the “**Configured**” mode of WPS, the following wireless settings need to set manually before the device would enter the WPS state:

	Operation Mode	Regular AP
Basic Settings	SSID	User Define
	Wireless Mode	User Define
WDS Settings	Authentication	WPA-PSK or WPA2-PSK
	Encryption	TKIP or AES
	Passphrase	User Define

Tab. 11 Wireless Settings required for WPS

Note: Again, TKIP is not covered in the 802.11n standard and the wireless rate would be limited to 54 Mbps.



3.3.5. WDS Settings

This option is available only when DM500 is running in the **WDS Bridge** mode and DM500 is configured as a **WDS Hybrid** or a **WDS Station**, three different encryption types are available: WEP, TKIP and AES. The configuration is relatively simple and straightforward; enter the WLAN MAC of the adjacent DM500, the adjacent DM500 could be a **Root AP** or a **Hybrid**, Fig. 21.

WDS Settings		
Root/Hybrid AP	MAC: <input type="text"/> : <input type="text"/> : <input type="text"/> : <input type="text"/> : <input type="text"/> : <input type="text"/>	<input type="button" value="scan network"/>

Fig. 18 WDS Settings

Note that the **Encryption Type** here would also be used by the wireless clients connecting to DM500 if you are a **WDS Root** or **WDS Hybrid**. When TKIP or CCMP (AES) is selected, DM500 would use **WPA2-PSK** authentication for the connecting wireless clients.



3.3.6. Advanced Settings

Provide details on wireless parameters for performance tuning. Changes in this section may affect overall performance, so caution is recommended, if you are not clear of what you are doing please refrain from altering them.

Wireless > Advanced SettingsDM500

Advanced Settings

*Regulatory Domain	EU (ETSI2_WORLD) ▾
Tx Power	100 ▾ %
Short GI	Enabled ▾
WMM	Enabled ▾
WPA Group Rekey Interval	600 seconds
STP	Disabled ▾
Forward Delay	4 seconds
Fast Handoff	Disabled ▾
Wireless Isolation	Disabled ▾
20/40 MHz Coexistence (Only be supported at 802.11n with 2.4 GHz)	Enabled ▾

Different regulatory domains will result in different channels/frequencies being allowed.

Fig. 19 Advanced Settings

- **Radio On** can turn off the wireless signal of DM500 completely. This option only shows in the **AP Client** mode. To turn off the wireless signal completely under **Regular AP** mode and **WDS Bridge** mode, disable all APs in the **Basic Settings**.
- **TX Power** is DM500's **Transmission Power**. The transmission power can be reduced to prevent wireless interference to other wireless networks.
- **Short GI** is recommended to leave it as enabled to maximize the throughput.
- **WMM** or **Wireless Multimedia Extension**, which is recommended to leave as enabled in order to comply with 802.11n standards and achieve link speeds higher than 54 Mbps.
- **WPA Group ReKey Interval**, WPA automatically changes secret keys after certain period of time, which all devices on the wireless network share. Constantly rekeying the group key protects your network against intrusion.



- **STP** or Spanning Tree Protocol, please enable this option if STP is enabled in your network to prevent network loops. When disabled, DM500 will not forward STP BPDUs.
 - **Forward Delay** time in which the interface takes to converge from blocking stage to forwarding state. This option only shows in the **AP Client** mode.
- **Maximum Signal Distance** is used to determine how fast a wireless signal should be timed out. If DM500 is equipped with an outdoor antenna to reach further distances, increase this value accordingly.
- **Fast Handoff** is a proprietary protocol to speed up roaming between DM500's. Enable to allow DM500 to share its neighboring DM500 information to SW550X to further reduce its roaming time.
- **Wireless Isolation** creates a firewall between wireless clients connected to this AP. The isolation can be enabled to prevent data traffic flowing between clients to increase client security and to prevent unnecessary traffic between clients.



3.3.7. Wireless Scheduler Settings

This function allows you to setup a wireless schedule and disables SSIDs according to the time in a day when necessary. You can have up to 10 rules.

Wireless > Scheduler SettingsDM500

Scheduler Settings

Number	<input checked="" type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 <input type="radio"/> 8 <input type="radio"/> 9 <input type="radio"/> 10
Name	<input type="text"/>
Status	<input type="radio"/> Enabled <input checked="" type="radio"/> Disabled
SSID	DM500
Day(s)	<input type="checkbox"/> Sun <input type="checkbox"/> Mon <input type="checkbox"/> Tue <input type="checkbox"/> Wed <input type="checkbox"/> Thu <input type="checkbox"/> Fri <input type="checkbox"/> Sat
Time (hour:minute)	00 : 00 - 00 : 00

No.	Name	SSID	Day(s)	Start	Stop	Status
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Fig. 20 Scheduler Settings

- **Number:** select from 1 to 10.
- **Name:** give this rule a name, so it is easier to remember.
- **Status:** enable or disable this rule.
- **SSID:** select the SSID which this rule applies to.
- **Days(s):** select the days of the week when this rule should be effective.
- **Time (hour:minute):** select the time of the day when this rule should be effective. If you want this rule to run for the whole day, set 00:00 – 00:00.



Scheduler Usage Tutorial:

Let's say there are two sites that are covered by the AP and they have different working hours. The office would normally work from 8am to 6pm and the production line should run 24 hours. Both sites will shut down on weekends Fig 24.

Steps

- Enable **AP2** in the Wireless Basic Settings. Set **AP1** to use SSID DM_Production and **AP2** to use **SSID** DM_Office. Configure other wireless settings when necessary.
- Go to Wireless Scheduler Settings and select **Rule 1**. Give this rule a name (Production Line), change its status to **Enabled**, select the **SSID** (DM_Production), check the days (Monday ~ Friday), and set 00:00 – 00:00 for **Time**. In case you have done something wrong and would like to discard the changes, press the **Cancel** button. Click the **Add/Modify** button to add this rule or overwrite an existing rule.
- Select **Rule 2**. Give this rule a name (Office), change its status to **Enabled**, select the **SSID** (DM_Office), check the days (Monday ~ Friday), and set the **Time** range to 8:00-18:00. Click the **Add/Modify** button to add this rule or overwrite an existing rule.
- In case there are other rules present in the table, you can select that rule and press the **Remove** button so it would clear.
- Click the **Apply** button to make the new scheduler rules effective.

Note that under this scenario, the wireless function (radio) would be turned off completely on Saturdays and Sundays.

No.	Name	SSID	Day(s)	Start	Stop	Status
1	Production Line	DM_Production	Mon, Tue, Wed, Thu, Fri	00.00	00.00	Enable
2	Office	DM_Office	Mon, Tue, Wed, Thu, Fri	08.00	18.00	Enable
3						
4						
5						
6						
7						
8						
9						
10						

Fig. 21 Example for Scheduler Settings



3.4. Network Settings

DM500 will get an IP address from a DHCP server connected on the LAN interface, just check “**Obtain an IP Address Automatically**” for it. Besides you can just use your own IP-Configuration if you uncheck “Obtain IP Address Automatically”.

LAN & WLAN Interfaces	
DHCP	<input checked="" type="checkbox"/> Obtain an IP Address Automatically.
Gratuitous ARP	Disabled ▾ 5 minutes
Manual Settings	
IP Address	192.168.2.2
Subnet Mask	255.255.255.0
Default Gateway	192.168.2.1
DNS Server	
Preferred DNS	192.168.2.1
Alternate DNS	

Fig. 22 LAN & WLAN Interfaces

- **Gratuitous ARP** enables to periodically send out an ARP response automatically to announce that DM500 is in the network. The frequency in minutes could be set in the nearby box



3.5. SNMP Settings

The SNMP is used by network management software to monitor devices in a network to retrieve network status information and to configure network parameters. The SNMP Settings shows the configuration of this device so it can be viewed or edited by third-party SNMP software as shown below, **Fehler! Verweisquelle konnte nicht gefunden werden..**

SNMP Settings DM500

SNMP (Simple Network Management Protocol)

The *SNMP* is used in network management systems to monitor network-attached devices for conditions that require administrative attention.

Basic Data Objects	
System Contact	<input type="text" value="Welotec"/>
System Location	<input type="text" value="Germany"/>

SNMP	<input type="checkbox"/> Enabled
Read Community	<input type="text" value="public"/>
Write Community	<input type="text" value="private"/>

SNMP Trap Server	
A trap is an unsolicited message sent by an SNMP agent to an SNMP management system.	
SNMP Trap Server	<input type="text" value="0.0.0.0"/>

Fig. 23 SNMP Settings

DM500 provides two SNMP fields, which are “**System Contact**”, usually used to specify the device’s contact information in case of emergency; and “**System Location**”, usually used to specify the device location.

If you wish to make the device information available for public viewing/editing, **Enable** the SNMP function. Fill in the passphrase for the “**Read Community**”, the group that is allowed to read the device information and fill in the passphrase for the “**Write Community**”, the group that is allowed to read/modify the device information. By default DM500 comes in **public** for **Read Community** and **private** for **Write Community**. In case the device raises an alert due to any unexpected incident, a message will be dispatched to a SNMP trap server.



Specify the **IP Address** of the **SNMP Trap Server** designed to collect all alert messages; any changes made will take effect after the device is restarted.

3.6. Email Settings

In case the device raises an alert and/or warning message, it will send an email to the administrator's mailbox. **Email Settings** allows you to set up the device to be able to send an email. To set up the email sending, you need to put a **"Sender"** email address which will be the **"From"** on the email. Then, you fill in **"Receiver"** email address to which the email is sent. You can send the email to several recipients using Semicolon (;) to separate each email address. Next step is to set the **Email Server**. First, you fill in the **IP address** of a **Mail Server** in your local network. If the **Mail Server** needs a user authentication, you need to enable **"SMTP server authentication required"**, and fill in **Username** and **Password**. Please contact your network administrator for **Mail Server IP address** and the **Username** and **Password**, **Fehler! Verweisquelle konnte nicht gefunden werden..** You can click on **"Send Test Mail"** to verify your mail settings.

E-mail Settings DM500

SMTP Server & Client (Simple Mail Transfer Protocol)

E-mail Address Settings	
Sender	<input type="text"/>
Receiver	<input type="text"/> <small>Use a semicolon (;) for each e-mail address.</small>

E-mail Server	
SMTP Server	<input type="text"/>
Authentication	<input type="checkbox"/> SMTP server authentication required.
User name	<input type="text"/>
Password	<input type="password"/>

Fig. 24 E-mail Settings





3.7. DHCP Server

If there is no workstation or server to act as the DHCP Server and assign IP addresses to each client automatically, DM500 can serve as the DHCP Server to statically or dynamically assign an IP address to any network device. To enable such functionality, check **Enabled** to enable the DHCP Server in DM500; proceed then to fill in the **IP Address Range** including the **“From IP Address”** and **“To IP Address”**, fill in the IP address' **Netmask** (or **Subnet Mask**). **“Lease Time”** is the duration in minutes that an assigned IP Address will belong to that device; once expired, the IP address will be recycled. A maximum of 21600 minutes is set by default.

You can also assign a static IP address to a network device, meaning that the network device would always get the same Static IP Address from the DHCP server. To statically assign an IP address, check on the small box in front of each line, and then fill in the **Host Name** and/or the **MAC Address** that you want to assign a static **IP Address** to. When DHCP is enabled, up to 32 different static IP/MAC can be set, Fig. 28.

DHCP Server Settings

The DHCP Server is used to distribute the dynamic/static IP addresses settings to the requested client. [DHCP Client List](#)

DHCP		<input type="checkbox"/> Enabled	
IP Address Range			
From IP Address	<input type="text"/>		
To IP Address	<input type="text"/>		
Netmask	<input type="text"/>		
Lease Time(seconds)	<input type="text" value="21600"/>		
Static Connection			
Host Name	IP Address	MAC	Status
<input type="checkbox"/> <input type="text"/>	<input type="text"/>	<input type="text"/>	
<input type="checkbox"/> <input type="text"/>	<input type="text"/>	<input type="text"/>	
<input type="checkbox"/> <input type="text"/>	<input type="text"/>	<input type="text"/>	
<input type="checkbox"/> <input type="text"/>	<input type="text"/>	<input type="text"/>	
<input type="checkbox"/> <input type="text"/>	<input type="text"/>	<input type="text"/>	
<input type="checkbox"/> <input type="text"/>	<input type="text"/>	<input type="text"/>	

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Fig. 25 DHCP Server



For a look at the current DHCP client table, just click where it says “**DHCP Client List**”, if no clients are present there would be a message specifying so Fig. 29.

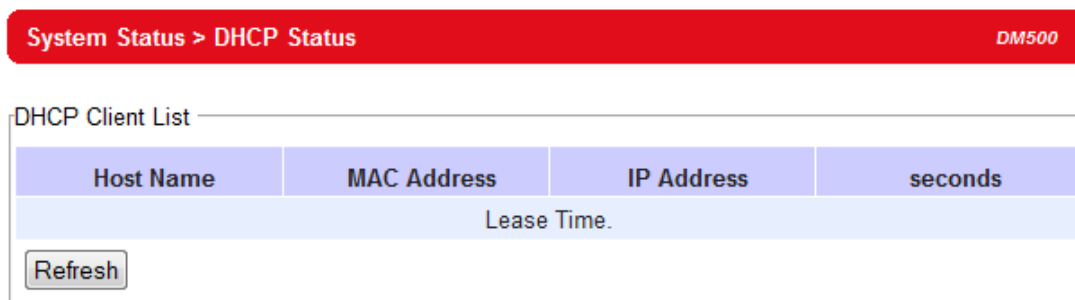


Fig. 26 DHCP Status

3.8. Firewall & Filtering

The following section deals with configuration for the network's **firewall** as well as its **packet filtering**. Available criteria for packet filtering are based on MAC address (Wired or Wireless), Ethernet packet, and IP address. These filtering methods provide security, preventing unauthorized or malicious packets an entrance to your network.

Data packets will be filtered (classified) as either “**allowed packets**” or “**denied packets**”; the “**allowed packets**” mode is more commonly known as the “whitelist” and the “**denied packets**” mode is known as the blacklist. We highly encourage you to be extremely careful on this section as data that doesn't fit into any of those criteria will be discarded with the potential outcome of letting the DM500 as inaccessible if not configured properly. If the latter happens, you will need to reset the device back to its default by any of the methods described on Sec 3.12.



3.8.1. Wired MAC Filtering

When connected to the LAN/Ethernet interface, filtering can be done using this option. The setting is simple, intuitive and straight-forward; just choose whether to **Allow** or **Deny packets** and proceed to fill in the blanks with the corresponding MAC addresses. Up to 64 different MAC addresses can be set for allowing as well as for denying packets, Fig. 30; as a default, **Wired MAC Filtering** is disabled. For changes to take effect, press **Apply**, for saving those changes just press **Save Settings**.

Firewall & Filtering > Wired MAC FilteringDM500

Wired MAC Filtering

The *Wired MAC Filtering* is used to allow or deny packets on LAN interface that have source and destination MAC addresses matching MAC addresses in the table.

DisableMAC Filtering
 Allow packets with MAC addresses listed below
 Deny packets with MAC addresses listed below

Access Control List	
MAC Address 1	<input type="text"/>
MAC Address 2	<input type="text"/>
MAC Address 3	<input type="text"/>
MAC Address 4	<input type="text"/>
MAC Address 5	<input type="text"/>
MAC Address 6	<input type="text"/>
MAC Address 7	<input type="text"/>
MAC Address 8	<input type="text"/>
MAC Address 9	<input type="text"/>
MAC Address 10	<input type="text"/>

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Fig. 27 Wired MAC-Filtering



3.8.2. Wireless MAC Filtering

Packet filtering in a Wireless environment can be done in an analogous way as the Wired MAC Filtering. In the same way, connection is ensured by allowing or denying packets according to their respective MAC addresses; again, a maximum of 64 different MAC addresses are available as an option.

Firewall & Filtering > Wireless MAC FilteringDM500

Wireless MAC Filtering

The *Wireless MAC Filtering* is used to allow or deny the accessibility of wireless stations.

- Disable MAC Filtering
- Allow** packets with MAC addresses listed below
- Deny** packets with MAC addresses listed below

Access Control List		
MAC Address 1	<input type="text"/>	Any ▾
MAC Address 2	<input type="text"/>	Any ▾
MAC Address 3	<input type="text"/>	Any ▾
MAC Address 4	<input type="text"/>	Any ▾
MAC Address 5	<input type="text"/>	Any ▾
MAC Address 6	<input type="text"/>	Any ▾
MAC Address 7	<input type="text"/>	Any ▾
MAC Address 8	<input type="text"/>	Any ▾
MAC Address 9	<input type="text"/>	Any ▾
MAC Address 10	<input type="text"/>	Any ▾

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◀ ▶

Fig. 28 Wireless MAC-Filtering



3.8.3. Ethernet Type Filtering

Ethernet Type Filtering is done according to the packets' **Ethernet type**, also known as Layer 3 filtering. As in the two previous sections, there is a maximum of 64 entries for packets' specification. Enabling is simple (packets are set as disabled by default, Fig. 31), checking the packet's **Ethertype** box (located to the left of it, first column). **Ethertype** numbering usually starts with 0x□□□□, in which □□□□ corresponds to a hexadecimal number, e.g., 0xF0F0 which is to filter NETBUI type messages or 0x8035 for RARP type messages; Fig. 31.

Firewall & Filtering > Ethernet Type Filtering DM500

Ethernet Type Filtering

Ethernet Type Filtering is used to filter packets at data link layer.

- Disable ethernet type filtering
- Allow packets that match specification below
- Deny packets that match specification below

Ethernet Type Filtering List			
Ethernet Type	Protocol	Interface	Status
<input type="checkbox"/> 0x8035	RARP	Any	
<input type="checkbox"/> 0x0806	ARP	Any	
<input type="checkbox"/> 0xF0F0	NetBUI	Any	
<input type="checkbox"/> 0x8138	Novell IPX	Any	
<input type="checkbox"/> 0x0800	IPv4	Any	
<input type="checkbox"/>		Any	
<input type="checkbox"/>		Any	
<input type="checkbox"/>		Any	
<input type="checkbox"/>		Any	
<input type="checkbox"/>		Any	

◀▶ Page 1/7

Fig. 29 Ethernet Type Filtering



3.8.4. IP Filtering

IP Filtering, as its name implies, is for filtering on the IP protocol, also known as Layer 4 filtering. Continuing its simple design, IP address is added on the Source and Destination Address fields. Each filter only provides a one-way filtering, to create a 2-way filtering you need to add another entry that has the source and destination address reversed. The filters should be active once the checkbox in the first column is checked. A total of 64 different entries can be added to the list, Fig. 32.

Firewall & Filtering > IP Filtering rulesDM500

IP Filtering

IP Filtering is used to filter packets at IP network layer.

Disable IP Filtering
 Allow packets that match specification below
 Deny packets that match specification below

IP Filtering List

Code	Protocol	Source Address*	Destination Address*	Interface	Status
<input type="checkbox"/> 1	ICMP	0.0.0.0	0.0.0.0	Any	
<input type="checkbox"/> 2	IGMP	0.0.0.0	0.0.0.0	Any	
<input type="checkbox"/> 6	TCP	0.0.0.0	0.0.0.0	Any	
<input type="checkbox"/> 17	UDP	0.0.0.0	0.0.0.0	Any	
<input type="checkbox"/>		0.0.0.0	0.0.0.0	Any	
<input type="checkbox"/>		0.0.0.0	0.0.0.0	Any	
<input type="checkbox"/>		0.0.0.0	0.0.0.0	Any	
<input type="checkbox"/>		0.0.0.0	0.0.0.0	Any	
<input type="checkbox"/>		0.0.0.0	0.0.0.0	Any	
<input type="checkbox"/>		0.0.0.0	0.0.0.0	Any	

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◀ ▶

Apply

Cancel

*Remark: "0.0.0.0" is all IP address.

Fig. 30 IP Filtering



3.8.5. Management List

The **Management List** is used to filter the MAC address that has access to the Web management interface. When enabled, only the MAC addresses entered in the Access Control List below has access to the Web UI.

Firewall & Filtering > Management ListDM500

Management List

The *Management List* is used to filter the MAC address that has access to the Web management interface.

Disable Management List
 Allow uses with MAC addresses listed below

Access Control List	
MAC Address 1	<input type="text"/>
MAC Address 2	<input type="text"/>
MAC Address 3	<input type="text"/>
MAC Address 4	<input type="text"/>
MAC Address 5	<input type="text"/>
MAC Address 6	<input type="text"/>
MAC Address 7	<input type="text"/>
MAC Address 8	<input type="text"/>
MAC Address 9	<input type="text"/>
MAC Address 10	<input type="text"/>

Fig. 31 Management List



3.9. System Log

3.9.1. Syslog

The Syslog function is turned on by default and cannot be turned off. It is used to log system events and report to an external Syslog server if necessary.

Log Settings > System Log SettingsDM500

System Log Settings

Enable Log Event to Flash	<input checked="" type="checkbox"/> Enabled
Log Level	2: (LOG_CRIT) ▾
Enable Syslog Server	<input checked="" type="checkbox"/> Enabled
IP Address	<input type="text" value="0.0.0.0"/>
Syslog Server Service Port	<input type="text" value="514"/> (1~65535, default=514)

Fig. 32 System Log Settings

- **Enable Log Event to Flash:** this would write log events to the local flash, otherwise the logs would be cleared when the device restarts because they are stored in the RAM by default.
- **Log Level:** 2 (we only allow logging at this level).
- **Enable Syslog Server:** enabling this option would allow you to send Syslog events to a remote Syslog server.
- **Syslog Server IP:** Please specify the remote Syslog Server IP.
- **Syslog Server Service Port:** Please specify the remote Syslog Server Port.



3.9.2. Event Log

Display the current event log stored in the device.

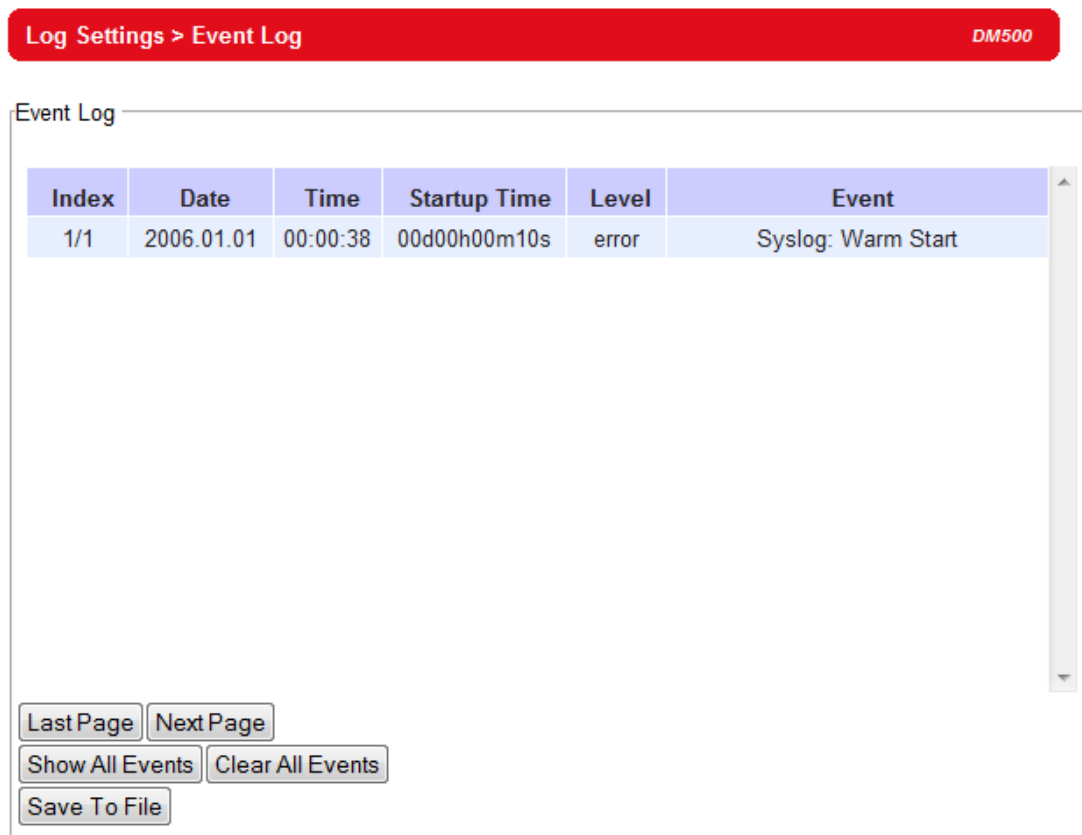


Fig. 33 Event Log

Fig. 3. 1

Click on “**Last Page**” to go to the last page. Click on “**Next Page**” to go to the next page. Click on “**Show All Event**” to show all events in one page. Click on “**Clear All Event**” to clear the events stored in the device. Click on “**Save To File**” to save all the events to a file locally. Click on “**Last Page**” to go to the last page. Click on “**Next Page**” to go to the next page. Click on “**Show All Event**” to show all events in one page. Click on “**Clear All Event**” to clear the events stored in the device. Click on “**Save To File**” to save all the events to a file locally.



3.10. System Setup

The following section describes some critical settings for the DM500; take care when changing the values here as they will greatly influence your network performance.

3.10.1. Admin Settings

The DM500 allows User and password management, the user's default is as "adm" and the password will be "123456" as default. The Device name entry can be changed as well; to set/change their value just follows the steps filling in the corresponding blanks and choose **Apply** in the end, Fig. 37.

There are two ways to access DM500's Web UI. One is Hypertext Transfer Protocol (**HTTP**) and the other is Hypertext Transfer Protocol Secure (**HTTPS**). For enhanced security, it is recommended to use the encrypted HTTPS protocol. Note that HTTP uses the 80 port while HTTPS uses the 443 port.

System Setup > Admin Settings		DM500
Admin Settings		
User & Password		
User name	<input type="text" value="adm"/>	
Old password	<input type="text"/>	
New password	<input type="text"/>	
Repeat new password	<input type="text"/>	
Web mode		
Web mode	<input checked="" type="radio"/> HTTP <input type="radio"/> HTTPS	
Device Name		
Device Name	<input type="text" value="0060E90EFBDA"/>	
<input type="button" value="Apply"/> <input type="button" value="Cancel"/>		

Fig. 34 Admin Settings

If the Web mode is switched to „HTTPS“ it is important to fill in the old password and an new one. This new one can be the same as the old one but it needs to be filled in. Otherwise the DM500 is no more accessible via the web-interface.



3.10.2. Date/Time Settings

Date and time can be set manually, or using **Network Time Protocol (NTP)** to automatically synchronizes with a Time Server. For auto-synching check the box below **NTP Server Settings** “**Obtain date/time automatically**” proceeding then to fill the IP address or host name for it if a hostname is entered, the DNS server must be configured properly; a Time Zone can be selected as well.

System Setup > Date/Time SettingsDM500

Date/Time Settings

The *NTP (Network Time Protocol)* is used to synchronize the date/time from the NTP server.

Current Date/Time	
3 / Feb / 2014 03:53:02	

NTP Server Settings	
NTP	<input type="checkbox"/> Obtain date/time automatically
NTP Server	<input type="text" value="pool.ntp.org"/>
Time Zone	<input type="text" value="(GMT) Greenwich Mean Time: Dublin, Edinburgh, Lisbon, London"/>

Daylight Saving Time Settings	
<input type="checkbox"/> Enable Daylight Saving Time	
Start Date	<input type="text" value="--"/> / <input type="text" value="--"/> / <input type="text" value="Sun"/> / <input type="text" value="00"/> (Month / Week / Date / Hour)
End Date	<input type="text" value="--"/> / <input type="text" value="--"/> / <input type="text" value="Sun"/> / <input type="text" value="00"/> (Month / Week / Date / Hour)
Offset	<input type="text" value="0"/>

Manual Time Settings	
Date	<input type="text" value="03"/> / <input type="text" value="Feb"/> / <input type="text" value="2014"/>
Time	<input type="text" value="03"/> : <input type="text" value="52"/> : <input type="text" value="57"/> (HH : MM : SS)

Fig. 35 Date and Time Settings



3.10.3. Alert Event

There are five events that will trigger the alarm; these alerts are useful for security control or security monitoring, Fig. 39.

- **Cold Start**, when there is a power interruption.
- **Warm Start**, when the device resets.
- **Authentication Failure**, when an incorrect username or password is entered.
- **IP Address Changed**, when the device's IP is changed.
- **Password Changed**, when the administrator password is changed.

Any of the five events would trigger an alert. When enabled, an email alert would be sent to the designated address in the E-Mail Settings. A Trap alert would be sent to the designated Trap server in the SNMP Settings.

See “**Email Settings**” section, to specify the email addresses to which the alert message is sent. See “**SNMP Settings**” section to specify a SNMP trap server.

System Setup > Alert EventDM500

Alert Event Settings

There are two types of alerts: E-mail and SNMP. Alerts are triggered by respective events. E-mail recipients and Trap server can both be set at E-mail Settings and SNMP Settings respectively.

Event	E-mail Alert	Trap Alert
Cold Start	<input type="checkbox"/>	<input type="checkbox"/>
Warm Start	<input type="checkbox"/>	<input type="checkbox"/>
Authentication Failure	<input type="checkbox"/>	<input type="checkbox"/>
IP Address Changed	<input type="checkbox"/>	
Password Changed	<input type="checkbox"/>	

Fig. 36 Alert Events

3.10.4. Firmware Upgrade





Updated firmware is provided by our company from time to time (for more information visit our News & Events webpage), to fix bugs and optimize performance. It is very important that the device must **NOT be turned off or powered off during the firmware upgrading, (please be patient as this whole process might take up to 7 minutes)**. Before upgrading the firmware, please make sure that the device has a reliable power source that will not be powered off or restarted during the upgrading process. To upgrade a new firmware, once downloaded, copy the new firmware file to your computer, and then click **“Browse”** to find the new firmware file, then click **“Upload”**. The program will show the upload status, please wait until the uploading process is finished (the amount of time varies depending on the equipment used); the device will then proceed to restart itself (**Fehler! Verweisquelle konnte nicht gefunden werden.**).

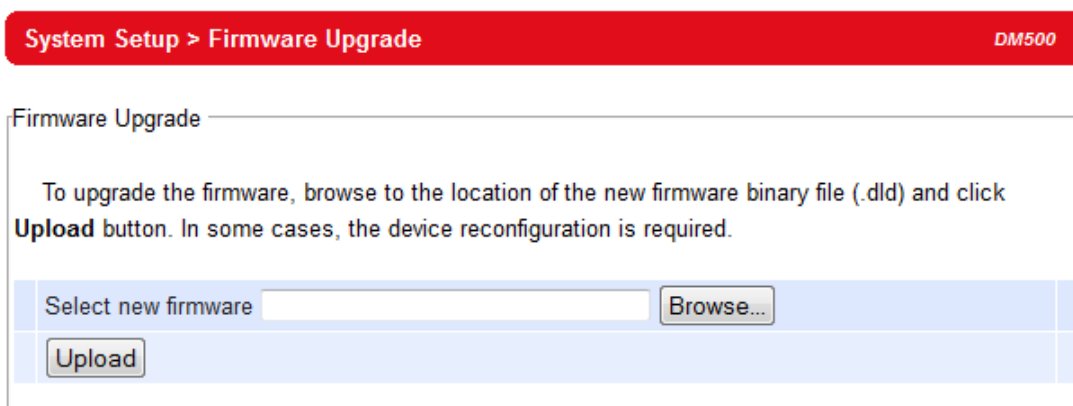


Fig. 37 Firmware Upgrade

Note: if the firmware upgrade process fails and the device becomes unreachable, follow the TFTP Recovery procedure on the Appendix.



3.10.5. Backup & Restore Configuration

Once all the configurations are set and the device is working properly, you may want to back up your configuration. Backup can be used when the new firmware is uploaded and it is reset to a factory default settings, it is done to prevent accidental loading of incompatible old settings. The backup file could also be used to efficiently deploy multiple DM500's of similar settings by uploading the settings to the devices.

To back up your configuration, click "**Backup**", and a pop-up dialog is prompted for saving the backup file on your computer. It is important **NOT to modify the saved configuration file by any editor. Any modification to the file may corrupt the file, and it may not be used for restore.** Please contact our authorized distributors for more information on this subject.

To restore the configuration backup, click "**Browse**" to locate the backup file, and then click "**Upload**" to upload the configuration backup file to the device. Once, the backup file is successfully uploaded; the device will restart, the time needed for this process may vary on the equipment used, Fig. 2.

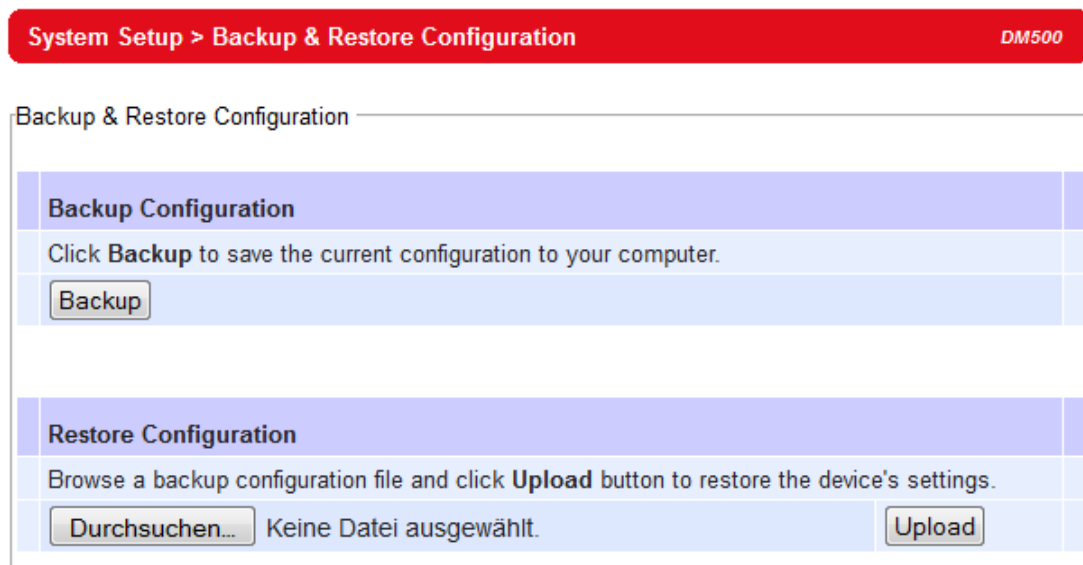


Fig. 2



3.11. System Status

Overall DM500's info as well as network (and very possibly neighbors) information will be available when browsing this section.

3.11.1. System Information

This section illustrates DM500's overall information, **Fehler! Verweisquelle konnte nicht gefunden werden..**

System Status > System Information DM500

System Information

Operating Mode:	DM500	Device Name:	0060E90EFBDA
Model Name:	2.22	Kernel Version:	2.22
Operating Mode:	Regular AP		

Network Information:	
MAC	00:80:E9:0E:FB:DB
IP Mode	Static
IP Address	192.168.2.2
Subnet Mask	255.255.255.0
Gateway	192.168.2.1
WIFI Mode	802.11b/g/n
Channel	1
BandWidth	Auto 20/40 MHz
Ethernet Link	ON

AP-Client Information:	
SSID	AW555
BSSID	--
Topology	--
TxRate	-- Mb/s
Channel	--
Encryption	--
Status	Disconnected

Fig. 38 System Information

3.11.2. Site Monitor

Site Monitor allows users to view the other wireless networks in the neighborhood, it also provides information on other access points such as SSID, Channel, the RSSI (**R**eceived **S**ignal **S**trength **I**ndicator), Security and Link Speed of other access points. It can be helpful when setting SSID and Channel for this device to avoid SSID name and Channel conflict and prevent unexpected errors or degraded performance.

Please keep in mind that it will take some time (approximately 10 seconds), for this option to gather information of the surrounding wireless networks, Fig. 42 ~Fig. 43.



Show Waiting

DM500



Please wait -

Fig. 39 Site Monitor – Waiting

System Status > Site Monitor

DM500

Neighbor Wireless Network

SSID	Mode	Channel	Authentication	Encryption	Mbps	Signal%
Visitor_24	b/g	13	WPA2-PSK	AES	54	36
setmeefree	b/g	7	WPA-PSK	TKIP/AES	54	4
Visitor_5	a	48	WPA2-PSK	AES	54	45

Refresh

Fig. 40 Site Monitor



3.11.3. Wireless Client Table

On this table you may be able to see all the Wireless and WDS device connected to this DM500, Fig. 44.

MAC Address	*AID	Channel	Tx Rate	*RSSI	Disconnected	Tx Seq	Rx Seq
Associated wireless client.							

*AID: Association ID.
*RSSI: Signal strength of the last received packet..

Refresh

Fig. 41 Wireless Client Table

3.11.4. Traffic Log & Statistics

Traffic Log & Statistics shows wireless network and status information; "Refresh Rate" can be changed to automatically reload/update the page, the default being a "no refresh" option, but it can be done manually by clicking on Refresh. Be careful when setting this value because it will increase CPU load on the device, Fig. 45.

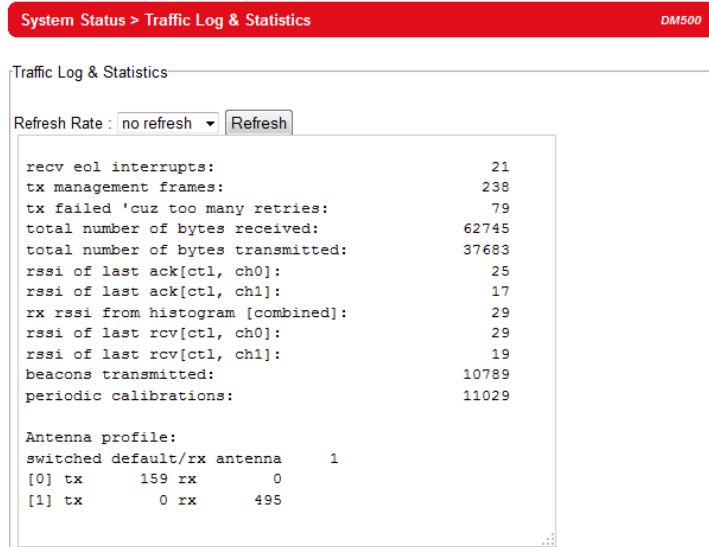


Fig. 42 Traffic Log and Statistics

3.11.5. DHCP Status

DM500 could distribute IP addresses using the DHCP protocol; a list of clients currently receiving an IP can be accessed by choosing the DHCP Status option. DHCP Client's **MAC Address** as well as its **IP addresses**, **Host Name**, and **Lease Time** will be shown in this list, Fig. 46.



Fig. 43 DHCP Status

3.11.6. Ping

Use the Ping function to determine whether DM500 can reach the gateway or other devices in the network or not. This process takes around 20 seconds. Fig. 47 represents a successful ping while Fig. 3. 3 means that the connecting device is not reachable.

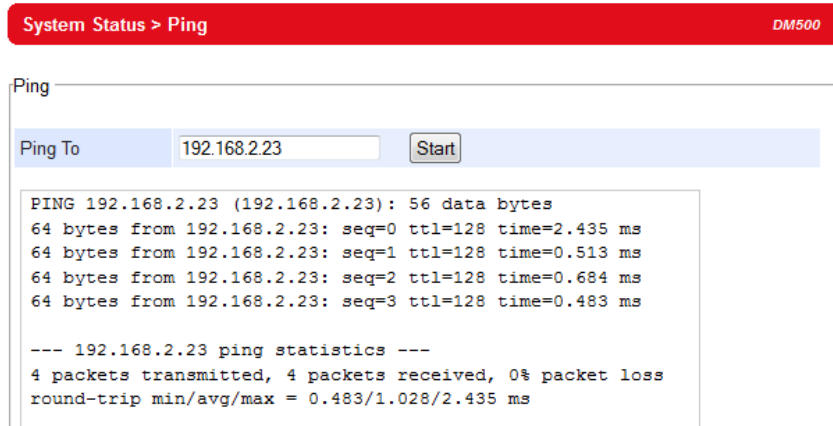


Fig. 44 Successful Ping

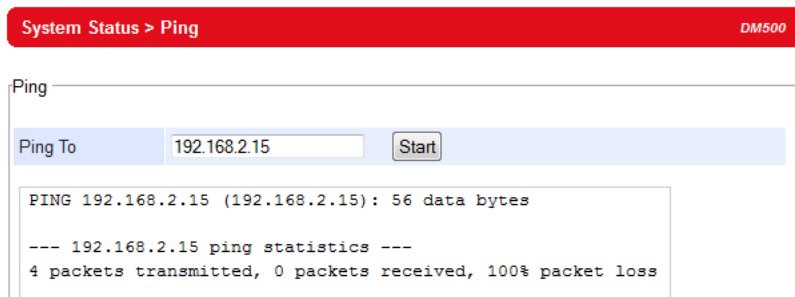


Fig. 45 Device not reachable

3.12. Reboot and Restore Default Settings

To manually reboot the device, you may click on “Reboot”, after which the device will restart. If a factory default setting is needed, tick the “Reset” checkbox, and then click on Reboot, Fig. 49.

Also, you could use the button located on the Front panel, close to the ANT2; it is conveniently labeled as Reset. Just insert the tip of a paper clip and hold it long enough until the device produce a long beep, release the button and wait for the device to restart.



Reboot & Restore Default

DM500

Reboot

Click **Reboot** to have the device perform a software restart.
Wait a minute before logging into the device again.
Adjust your PC LAN and WLAN settings according to the new device's configuration if needed.

Restore to Default Settings

Check **Reset** box and click **Reboot** if you need to restore the device to factory default settings.

Reset

Reboot

Fig. 46 Reboot & Restore Default

4. Operation Modes

4.1. Regular AP Mode

Regular AP mode's welcome screen is as shown below, Fig. 50.

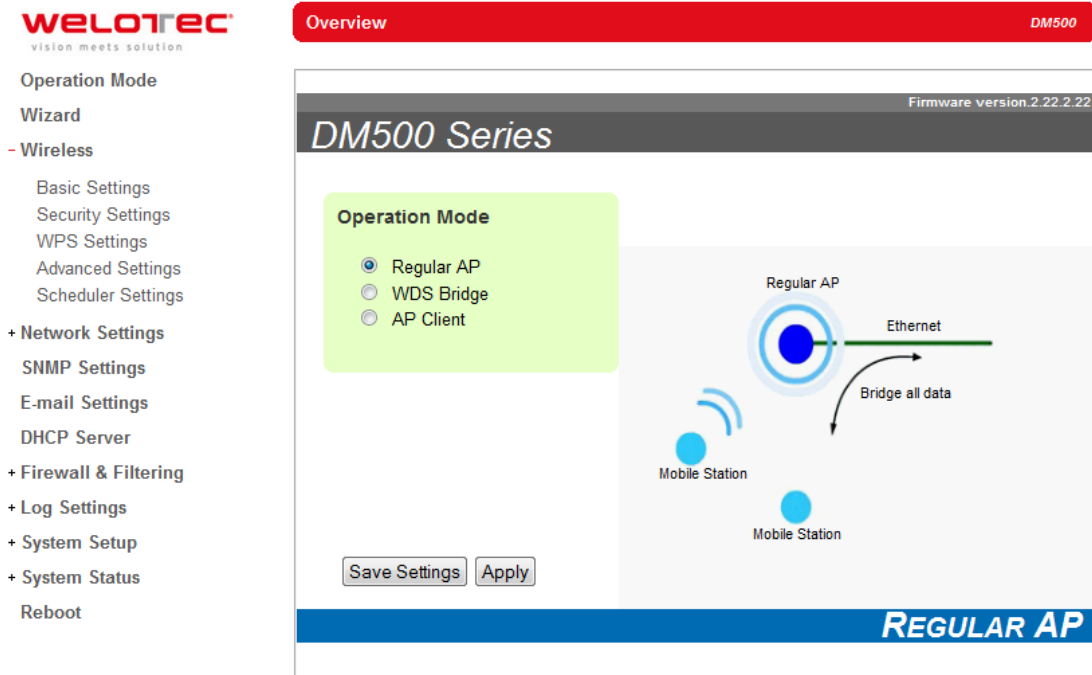


Fig. 47 Operation Mode

Regular AP mode which is the factory default and the first option on the screen, allows wireless clients to connect to a network, relaying data between the wired and wireless devices in the network. It allows multiple wireless clients to access the network through DM500's Ethernet interface (physical/wired connection). Its corresponding complete menu-tree is as follows in Fig. 51.



Operation Mode
Wizard
- Wireless
 Basic Settings
 Security Settings
 WPS Settings
 Advanced Settings
 Scheduler Settings
- Network Settings
 LAN & WLAN Interfaces
SNMP Settings
E-mail Settings
DHCP Server
- Firewall & Filtering
 Wired MAC Filtering
 Wireless MAC Filtering
 Ethernet Type Filtering
 IP Filtering
 Management List
- Log Settings
 System Log Settings
 Event Log
- System Setup
 Admin Settings
 Date/Time Settings
 Alert Event
 Firmware Upgrade
 Backup & Restore
 Configuration
- System Status
 System Information
 Site Monitor
 Wireless Client Table
 Traffic Log & Statistics
 DHCP Status
 Ping
Reboot

Fig. 48 Menu tree for regular AP mode

Steps for a quick setting for the DM500 as a Regular AP are:

- On operation mode choose “**Regular AP**” (if the device is not in factory default).
- Go to **Wireless → Basic Settings**; here you can change the **Network Name** (SSID) to your preferred name, you might want to first click on “**Scan network**” to find whether there are neighbors with a name matching yours (this is done for preventing any conflict over networks).
- At this point you may decide to change other settings such as the **Wireless Mode**,



whether to have **Automatic Channel Selection**, the **Bandwidth**, **Transmission Rate** and the **Secondary Channel** (only available when on **802.11a/n** and **802.11b/g/n** modes).

- Next go to **Security Settings**, and on **Security Mode** choose which security protocol will be used in the network. We strongly recommend not leaving this section as disabled.
- On **LAN & WLAN Interfaces**, enter the **IP Address**, **Subnet Mask**, **Default Gateway**, and **DNS servers** used (if any), according to your network configuration.
- Click "**Apply**", and wait for the changes to take effect. You may also want to **Save Settings** afterwards just in case you need these configurations in the future.

4.2. WDS Bridge Mode

On this mode multiple DM500 can bridge together to create a **Wireless Distribution System**. The following details the WDS structure; there are three roles that DM500 can play in a WDS network:

- **Root AP (or Root)**
- **Hybrid (or Parent)**
- **Station (or Child)**

Please keep in mind that there should be one and only one **Root AP** in the WDS network. **Hybrids** can connect to a **Root AP** or connect with each other and **Stations** can connect with either a **Root AP** or a **Hybrid**. Connecting multiple WDS nodes to a **Root AP** or a **Hybrid** is allowed as well. Please take a look at the following tree structure, **Fehler! Verweisquelle konnte nicht gefunden werden.**

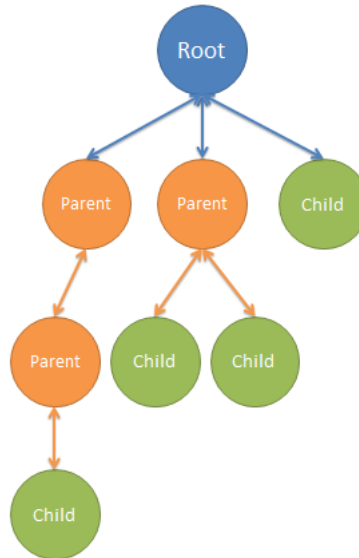


Fig. 49 WDS tree structure

Note: It is possible to setup a Hybrid (Parent) without a Station (Child). The difference between a Hybrid and a Station is that the Station does not allow wireless clients to associate to it.

For DM500 quick steps to work as in WDS Mode, the procedure is as follows:

- On operation mode choose **“WDS Bridge”**.
- Go to **Wireless** → **Basic Settings**; on **WDS Mode** you can choose whether to use the DM500 as a **Root AP, Hybrid, or Station**. Also as before, you can change the **Network Name** (SSID) to your preferred name; you might want to first click on **“Scan network”** to find whether there are neighbors with a name matching yours (this is done for preventing any conflict over networks). From here three different configurations are therefore possible:
 - **When on Root mode**
 - **SSID Broadcast** can be disabled here for an additional level of security.
 - On **Wireless Mode**, we recommend using **802.11 a/n** since it is not as crowded as **802.11 b/g/n**; however this is only possible if it is supported by your wireless client. **Channel and transmission rate** can be chosen automatically by the DM500, however feel free to change them to the settings that work for you.
 - On **WDS Settings** → **Encryption Type**, do not leave this option as NONE, non-existent encryption will result in an easy target for undesired access to your



network.

- On **Root AP**, the **MAC address** is to be left empty; again the Local Area network fields should be entered with their corresponding values for the network being configured.
- Save and apply the settings for them to take effect.

- **When on Hybrid mode**

- Please remember that the SSID here should be the same as the Root AP. This also means roaming is possible between APs.
- On **WDS Settings** → **Root AP**, the **MAC address** entered should be the **Root/Hybrid's (Parent's)** MAC address that is directly above this **Hybrid AP**. It might not be the **Root AP's** MAC address if the WDS setup has a multilayer architecture.
- Save and apply the settings for them to take effect.

- **When on Station mode**

- SSID is not present here as there is no AP function
- On **WDS Settings** → **Root AP**, the **MAC address** entered should be the **Root/Hybrid's (Parent's)** MAC address that is directly above the Station AP. It might not be the **Root AP's** MAC address if the WDS setup has a multi-layer.
- Save and apply the settings for them to take effect.



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Operation Mode

Wizard

- Wireless

- Basic Settings
- Security Settings
- WPS Settings
- Advanced Settings
- Scheduler Settings

+ Network Settings

- SNMP Settings
- E-mail Settings
- DHCP Server

+ Firewall & Filtering

+ Log Settings

+ System Setup

+ System Status

Reboot

Overview DM500

Firmware version: 2.22.2.22

DM500 Series

Operation Mode

- Regular AP
- WDS Bridge
- AP Client

WDS Hybrid

Mobile Station

Work Station

WDS Link

Peer AP

Save Settings Apply

WDS BRIDGE

Fig. 50 Operation mode WDS Bridge



Its corresponding menu-tree has slight differences compared to Regular AP, Fig. 54.

- Operation Mode
- Wizard
- Wireless
 - Basic Settings
 - Security Settings
 - WPS Settings
 - Advanced Settings
 - Scheduler Settings
- Network Settings
 - LAN & WLAN Interfaces
- SNMP Settings
- E-mail Settings
- DHCP Server
- Firewall & Filtering
 - Wired MAC Filtering
 - Wireless MAC Filtering
 - Ethernet Type Filtering
 - IP Filtering
 - Management List
- Log Settings
 - System Log Settings
 - Event Log
- System Setup
 - Admin Settings
 - Date/Time Settings
 - Alert Event
 - Firmware Upgrade
 - Backup & Restore
 - Configuration
- System Status
 - System Information
 - Site Monitor
 - Wireless Client Table
 - Traffic Log & Statistics
 - DHCP Status
 - Ping
- Reboot

Fig. 51 Menu tree for WDS Bridge mode

4.3. AP Client Mode

This mode allows your DM500 to connect to an **Access Point**. **Ethernet clients** connected to DM500 over the Ethernet interface are allowed to access the network through DM500's wireless interface.

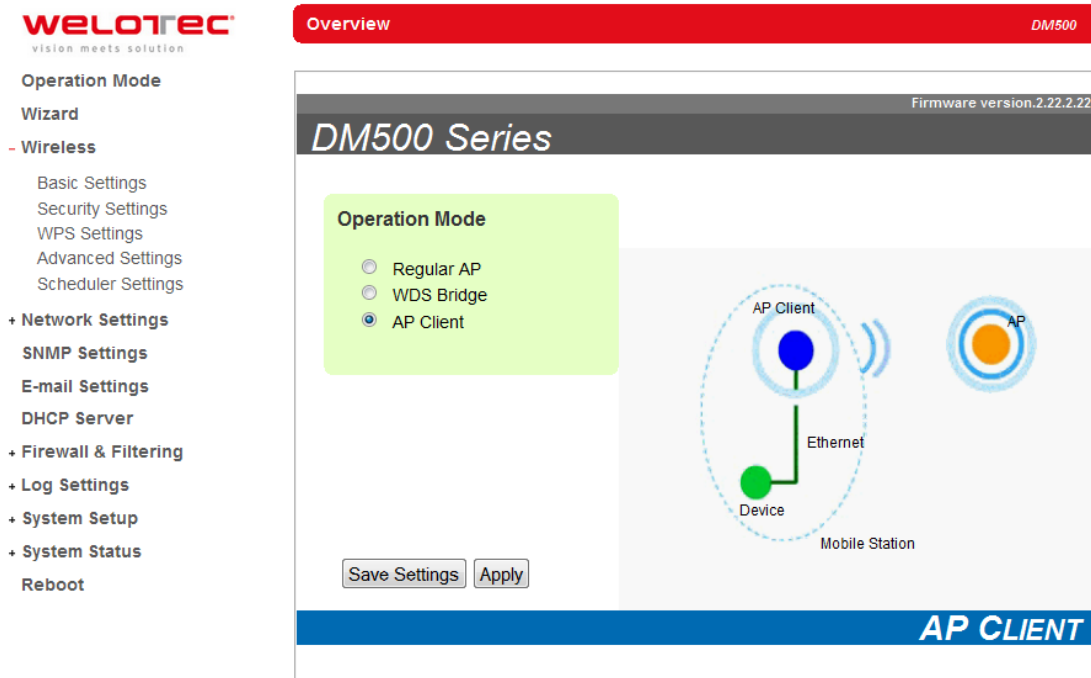


Fig. 52 Operation mode AP Client

Remember that your DM500 can function as both a **Regular AP** and as an **AP Client** (the latter connected to the first one).

Supposing we already have the network physically installed, the steps for configuring your DM500 as an **AP Client** are as follows.

- On **Operation Mode** choose **AP Client**.
- Click on **“Save Settings”**, go then to **Mobile Station** under the **Wireless** section and click on **“Scan network”** to choose an **SSID**.
- A window/tab will pop out; in that new window/tab, there will be the names of the surrounding Wireless Networks. Choose the one that you already designated as your **Regular AP** by selecting its corresponding SSID.
- Click **“Connect”**, this will make you close the pop-out window/tab, and leave you with the settings selected on the previous page.



- Enter the **WEP key** or the **WPA passphrase** if necessary.
- Scroll to the end of the page and press "**Apply**", please wait for some time for the changes to apply.
- Then proceed to go to **System Information**, on the **AP Client** Information you can confirm your DM500 is connected to the Network selected if the status field displays a signal percentage instead of disconnected. Also, you may also double check the wireless connection status inside the client table of the connected **AP**.

System Status > System Information DM500

System Information

Operating Mode: DM500	Device Name: 0060E90EFBDA
Model Name: 2.22	Kernel Version: 2.22
Operating Mode: AP Client	

Network Information:	
MAC	00:60:E9:0E:FB:DB
IP Mode	Static
IP Address	192.168.2.2
Subnet Mask	255.255.255.0
Gateway	192.168.2.1
WIFI Mode	N/A
Channel	N/A
BandWidth	N/A
Ethernet Link	ON


AP-Client Information:	
SSID	HTC Portable Hotspot 4130
BSSID	Any
Topology	Infrastrustion
Channel	6
Encryption	AES
Status	 92%

Fig. 53 System Information

5. Applications

5.1. Basic Access Point Setup

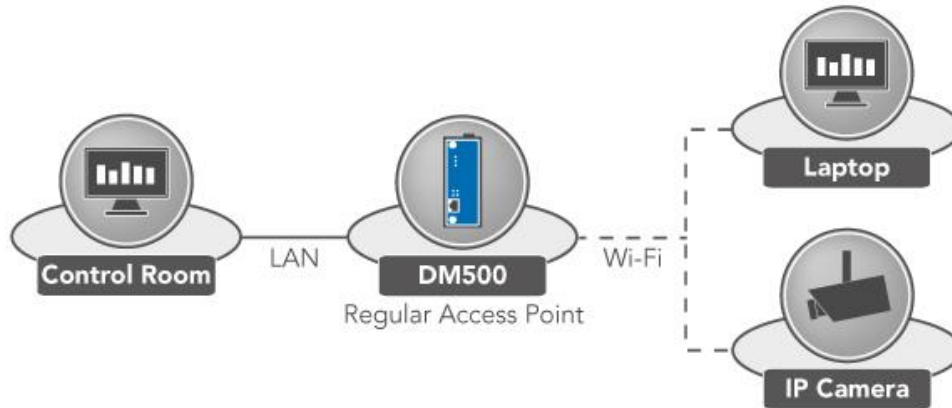


Fig. 57 Basic Access Point Setup

For more information on how to configure your DM500 as an **Access Point** please refer to Sec. 4.1.

Note: Wireless coverage is dependent on the environment.

5.2. Basic WDS Setup

The following figure illustrates two sites with some considerable distance apart. Ethernet cabling is impossible to the adjacent site. The adjacent site has both wireless clients and ethernet clients. Note that if the **Access Point** function is not required at the adjacent site (no wireless clients), **WDS Hybrid** can be changed to **WDS Station**.

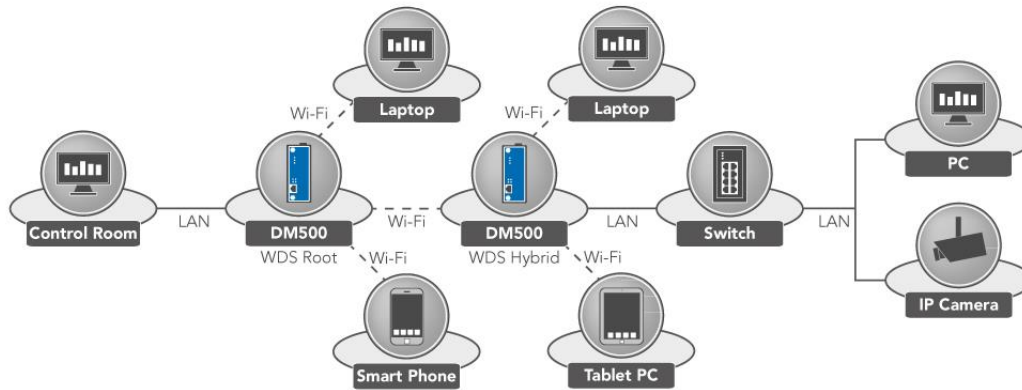


Fig. 58 Basic WDS Setup

For more information on how to configure your DM500 for this topology, please refer to Sec. 4.2.

Note: Wireless coverage is dependent on the environment.

5.3. Coverage Range Extender Setup

Extending from the above scenario, if the distance needs to be further extended, it is always possible to add more DM500 (in **WDS Hybrid** mode) in between the existing one. The **WDS MAC address** of the newly added DM500 (in **WDS Hybrid** mode) should be **MAC address** of the DM500 that it is directly connecting to, not the **MAC address** of the DM500 in **WDS Root** mode. Note that DM500 in **WDS Station** mode does not allow both wireless client and DM500 (in **WDS Hybrid** mode) to connect in. Normally it should be the last DM500 in the wireless topology if utilized.

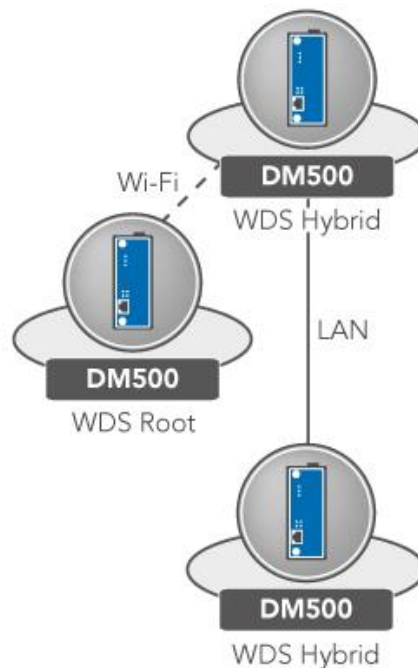


Fig. 59 Coverage Range Extender Setup

For more information on how to configure your DM500 for this topology, please refer to Sec. 4.2.

Note: wireless coverage is dependent on the environment.

5.4. AP Client Setup

If DM500 is being added to a wireless network where **Access Points** (AP1) from other vendors already existed, DM500 could be set to AP Client mode to connect to that AP1 and bridge the Ethernet clients to AP1. This setup is similar to Scenario #2, except that WDS is not used. This is because WDS from different vendors might not be compatible.

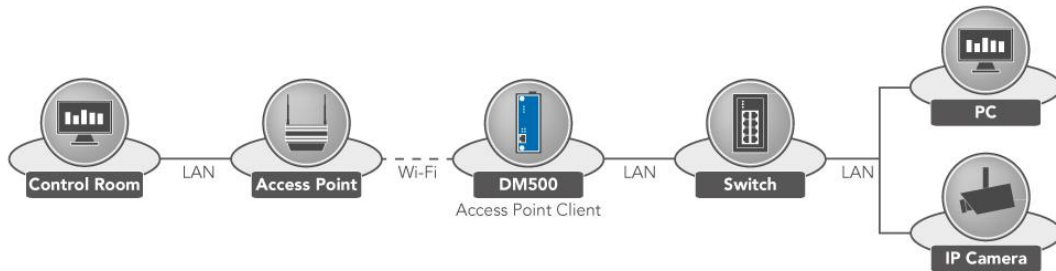


Fig. 60 AP Client Setup

For more information on how to configure your DM500 for this topology, please refer to Sec. 4.3.

Note: Wireless coverage is dependent on the environment.

6. Specifications

6.1. Hardware Specification

The device's appearance is as follows, Fig. .



Fig. 61 DM500

- **Ethernet:** IEEE 802.3 10 BASE-T, 802.3U 100BASE-TX, 802.3ab 1000 BASE-T

Power Requirements

- **Input Voltage:** 9VDC-48VDC
- **Input Current:** (9VDC) 0.65 A
- **Power Consumption:** Approx. 5.85 W
- **Reverse Polarity Protection*:** Yes
- **Connection:** 3-pin Lockable, terminal block on top

Note*: We strongly advice against this practice.



Physical Characteristics

- **Housing:** IP50 protection, metal case.
- **Weight:** 500 g
- **Dimensions:** 47x110x90 mm
- **Installation:** DIN-Rail, wall mount (optional kit)

Environmental Limits

- **Operating Temperature:** -10°C~60°C (14°F~140°F)
- **Storage Temperature:** -40°C~85°C (-40°F~185°F)
- **Ambient Relative Humidity:** 5~95% RH, (non-condensing)

Wireless Specifications

- **PCI-e Module:** Atheros AR9382
- **Tx/Rx:** 2T2R MIMO (2x2 with MCS 0-15)
- **Wireless Standard Conformance:** 802.11a, 802.11b, 802.11g, 802.11n
- **Antenna:** 3/5 dBi Dual antenna design, SMA(R) Female connector



Frequency Range

Country/Region	2.4 GHz	5 GHz
Unites States (FCC)	2412-2462 (20 MHz)	5180-5240, 5745-5825 (20 MHz)
	2422-2452 (40 MHz)	5190-5230, 5755-5795(40MHz)
Europe (ETSI)	2412-2472 (20 MHz)	5180-5240(20MHz)
	2422-2462 (40 MHz)	5190-5230(40MHz)
Taiwan (NCC)	2412-2462 (20 MHz)	5320,5745-5825(20MHz)
	2422-2452 (40 MHz)	5310-5310, 5755-5795(40MHz)
China (CCC)	2412-2472 (20 MHz)	5745-5825(20MHz)
	2422-2462 (40 MHz)	5755-5795(40MHz)

Tab. 12 Frequency Range

Data Rate

Standard		Data Rate
802.11a		6, 9, 12, 18, 24, 36, 48, 54 Mbps
802.11b		1, 2, 5.5 and 11 Mbps
802.11g		6, 9, 12, 18, 24, 36, 48, 54 Mbps
802.11n	20 MHz	1Nss: 65Mbps @ 800GI, 72.2Mbps @ 400GI (Max.)
		2Nss: 130Mbps @ 800GI, 144.4Mbps @ 400GI (Max.)
	40 MHz	1Nss: 135Mbps @ 800GI, 150Mbps @ 400GI (Max.)
		2Nss: 270Mbps @ 800GI, 300Mbps @ 400GI (Max.)

Tab. 13 Data Rate



Output Power

802.11a		+15dBm @ 6, 9, 12, 18, 24Mbps
		+15dBm @ 36Mbps +12dBm @ 54Mbps +14dBm @ 48Mbps
802.11b		+14dBm
802.11g		+17dBm @ 6, 9, 12, 18, 24Mbps +17dBm @ 36Mbps +16dBm @ 48Mbps +16dBm @ 54Mbps
802.11n	2.4GHz/HT20	+16dBm @ MCS 0/8 +16dBm @ MCS 1/9 +16dBm @ MCS 2/10 +16dBm @ MCS 3/11 +16dBm @ MCS 4/12 +16dBm @ MCS 5/13 +16dBm @ MCS 6/14 +15dBm @ MCS 7/15
	2.4GHz/HT40	+15dBm @ MCS 0/8 +15dBm @ MCS 1/9 +15dBm @ MCS 2/10 +15dBm @ MCS 3/11 +15dBm @ MCS 4/12 +15dBm @ MCS 5/13 +15dBm @ MCS 6/14 +14dBm @ MCS 7/15



	5GHz/HT20	+15dBm @ MCS 0/8, +15dBm @ MCS 1/9 +15dBm @ MCS 2/10 +15dBm @ MCS 3/11 +15dBm @ MCS 4/12 +11 - 14dBm @ MCS 5/13 +9 - 12dBm @ MCS 6/14 +7 - 10dBm @ MCS 7/15
	5GHz/HT40	+14dBm @ MCS 0/8, +14dBm @ MCS 1/9 +14dBm @ MCS 2/10 +14dBm @ MCS 3/11 +14dBm @ MCS 4/12 +10- 13dBm @ MCS 5/13 +8 - 11dBm @ MCS 6/14 +6 - 9dBm @ MCS 7/15

Tab. 14 Output Power

Note*: Please keep in mind that this is the raw output power for the RF module; note that the device has been tested with two 3 dbi @2.4GHz and 5 dbi @5GHz antenna.



Receiver Sensitivity

	Data Rate	IEEE Spec (1RX dBm)	Typical/Maximum (2RX dBm)
802.11a	6M	-82	-95/-85
	9M	-81	-94/-84
	12M	-79	-93/+82
	18M	-77	-90/-80
	24M	-74	-88/-77
	36M	-70	-84/-73
	48M	-66	-82/-69
	54M	-65	-81/-68
802.11b	1M	Not specified	-98/-85
	5.5M	Not specified	-98/-85
	11M	Not specified	-94/-85
	6M	-82	-96/-85
	9M	-81	-96/-84
	12M	-79	-95/-82
	18M	-77	-93/-80
	24M	-74	-90/-77
	36M	-70	-87/-73
	48M	-66	-83/-69
	54M	s-65	-82/-68
802.11a/n HT20	MCS0	-82	-94/-85
	MCS1	-79	-92/-82
	MCS2	-77	-90/-80
	MCS3	-74	-87/-77
	MCS4	-70	-84/-73
	MCS5	-66	-79/-69
	MCS6	-65	-78/-68
	MCS7	-64	-76/-67



802.11a/n HT40	MCS0	-79	-92/-82
	MCS1	-76	-90/-79
	MCS2	-74	-87/-77
	MCS3	-71	-84/-74
	MCS4	-67	-80/-70
	MCS5	-63	-76/-66
	MCS6	-62	-74/-65
	MCS7	-61	-72/-64
802.11b/g/n HT20	MCS0	-82	-95/-85
	MCS1	-79	-94/-82
	MCS2	-77	-92/-80
	MCS3	-74	-89/-77
	MCS4	-70	-86/-73
	MCS5	-66	-82/-69
	MCS6	-65	-80/-68
	MCS7	-64	-78/-67
802.11b/g/n HT40	MCS0	-79	-92/-82
	MCS1	-76	-92/-79
	MCS2	-74	-89/-77
	MCS3	-71	-86/-74
	MCS4	-67	-83/-70
	MCS5	-63	-77/-66
	MCS6	-62	-76/-65
	MCS7	-61	-75/-64

Tab. 15 Receiver Sensitivity



Operation Distance

Standard	Outdoor	Indoor
802.11a	50m @ 54Mbps	30m @ 54Mbps
	300m @ 6Mbps	100m @ 6Mbps
802.11b	150m @ 11Mbps	30m @ 11Mbps
	300m @ 1Mbps	100m @ 1Mbps
802.11g	50m @ 54Mbps	30m @ 54Mbps
	300m @ 6Mbps	100m @ 6Mbps
802.11n	30m @ 300Mbps	20m @ 300Mbps
	30m @ 130Mbps	20m @ 130Mbps
	250m @ 6.5Mbps	100m @ 6.5Mbps

Tab. 16 Operation Distances

Security

- 64-bit and 128-bit WEP encryption
- 802.1x authentication
- AES and TKIP, WPA/WPA2

Others

- **Reset Button:** Yes

Regulatory requirements

- **EMC:** EN 301489-1: 2008, EN301489-17: 2009 (Class A), FCC 15B (Class A), CNS 13438
- **Radio:** FCC 15C 15.247, FCC 15E 15.407, EN 301893: 2008, EN 300328: 2006, NCC LP00002
- **EMF:** EN 62311: 2008, EN 50385: 2002,
- **Safety:** UL60950-1, EN60950-1, CNS 14336
- **Shock:** IEC 60068-2-27
- **Freefall:** IEC 60068-2-32



- **Vibration:** IEC 60068-2-6
- **MTB*F:** 20 years
- **RoHS:** Yes
- **Maritime:** N/A
- **Hazardous location:** IEC 62368-1

Test		Item	Value	Level
IEC 61000-4-2	ESD	Contact Discharge	±8KV	4
		Air Discharge	±15KV	4
IEC 61000-4-3	RS	Radiated(Enclosure)	10(V/m)	3
IEC 61000-4-4	EFT	AC Power Port	±2.0 KV	3
		LAN Port	±2.0 KV	4
		COM Port	±2.0 KV	4
IEC 61000-4-5	Surge	AC Power Port	Line-to-Line±1.0 KV	3
		AC Power Port	Line-to-Earth±2.0 KV	3
		LAN Port	Line-to-Earth±2.0 KV	3
		COM Port	Line-to-Earth±2.0 KV	3
IEC 61000-4-6	CS	Conducted(Enclosure)	10 V rms	3
IEC 61000-4-8	PFMF	(Enclosure)	10(A/m)	3
IEC 61000-4-11	DIP	AC Power Port	-	-

Note: Above certifications are subject to change depending on product's final destination. DC Ports are tested through a power adaptor available in the accessories kit.



6.2. Software Specifications

Configuration	<ul style="list-style-type: none">• Browser (IE8+, Firefox 6+, and Chrome 13+)• Telnet• Serial Manager© (Windows utility)
Protocol	<ul style="list-style-type: none">• ICMP• TCP• UDP• DHCP• DNS• SNMP• NTP• SMTP• HTTP• HTTPS• IPv4• 802.1x• RADIUS• Syslog
Alert Events	<ul style="list-style-type: none">• E-mail• SNMP Trap
Radio OFF	Yes
Other	<ul style="list-style-type: none">• Multiple SSID• Wireless Scheduler• Config Import / Export from Web• Firmware upgrade through Web or Device View©• Site Monitor / Site Survey• Wireless Isolation• Firewall/Filtering (Wired / Wireless MAC Filtering, Ethernet Type Filtering, IP Filtering, Management List)

Tab. 17 Software Specifications



6.3. LED Indicators

Name	Color	Status	Description
Regular AP Mode	Green	On	The Access Point (AP) function is enabled and has more than one wireless client connected.
		Blinking	The AP function is enabled and does not have any wireless client connected.
		Off	The Access Point (AP) function is disabled.
WDS Bridge Mode	Green	On	The WDS Bridge function is enabled and the WDS is connected successfully.
		Blinking	The WDS Bridge function is enabled and the WDS is not connected successfully.
		Off	The WDS Bridge function is disabled.
AP Client Mode	Green	On	The AP Client function is enabled and connected to the remote AP successfully
		Blinking	The AP Client function is enabled but not connected to the remote AP
		Off	The AP Client function is disabled.
5GHz	Red	On	The AP is running on 5GHz band if WLAN LED is On.
		Off	The AP is running on 2.4GHz band if WLAN LED is On
Locate	Green	Blinking	The AP is being located
		Off	The AP is not being located
LAN	Orange	Blinking	Ethernet is Connected on 10Mbps
		On	Ethernet is Connected on 100/1000Mbps
		Off	Ethernet is Disconnected
	Green	Blinking	Data is transmitting on Ethernet
WLAN	Green	On	Wireless Radio is enabled
		Blinking	Wireless Radio is enabled and data is transmitting
		Off	Wireless Radio is disabled (Mode LEDs should also disable)
RUN	Green	Off	System is not powered on
		Blinking Rapidly	AP firmware is running normally
RUN		Blinking Steadily	AP firmware is not running

Tab. 18 LED Indicators



Warranty

Limited Warranty Conditions

Products supplied by us are covered in this warranty for undesired performance or defects resulting from shipping, or any other event deemed to be the result of Welotec's mishandling. The warranty does not cover however, equipment which has been damaged due to accident, misuse, abuse, such as:

- Use of incorrect power supply, connectors, or maintenance procedures
- Use of accessories not sanctioned by us
- Improper or insufficient ventilation
- Improper or unauthorized repair
- Replacement with unauthorized parts
- Failure to follow Our operating Instructions
- Fire, flood, "Act of God", or any other contingencies beyond our control.

RMA and Shipping Reimbursement

- Customers must always obtain an authorized "RMA" number from us before shipping the goods to be repaired.
- When in normal use, a sold product shall be replaced with a new one within 3 months upon purchase. The shipping cost from the customer to us will be reimbursed.
- After 3 months and still within the warranty period, it is up to us whether to replace the unit with a new one; normally, as long as a product is under warranty, all parts and labor are free of charge to the customers.
- After the warranty period, the customer shall cover the cost for parts and labor.
- Three months after purchase, the shipping cost from you to us will not be reimbursed, but the shipping costs from us to the customer will be paid by us.

Limited Liability

Welotec GmbH shall not be held responsible for any consequential losses from using our products.