D-Link® CORPORATION

Product External Specifications

For

802.11n Wireless PoE Access Point (2.4GHz/5GHz)

(Atheros AR9132+AR9106)

Model Number : DAP-2553

Revision: 1.2

Revision History

Rev.	Date	Author	Reason for Changes
1.0	Aug 09, 2007	Jovi Lee	• Initial draft
1.1	May 05.2008	Jovi Lee	• Update RAM and Flash size
1.2	July 10, 2008	Jovi Lee	• Update Transmitter Output Power and Receiver Sensitivity

Contents

1.0 Scope

1.1 Document

The 802.11n Wireless Access Point **DAP-2553** is an 802.11a/b/g/n PoE AP with one GbE Lan port. The **DAP-2553** is the ideal solution for any network administrator who needs to expand the capacity of the wireless network and allow users on different frequencies to connect.

Featuring the latest dual-band technology in 2.4GHz and 5GHz, it is also a best-of-both-worlds solution for those operating wireless networks in public areas where the extra bandwidth can attract additional paying customers.

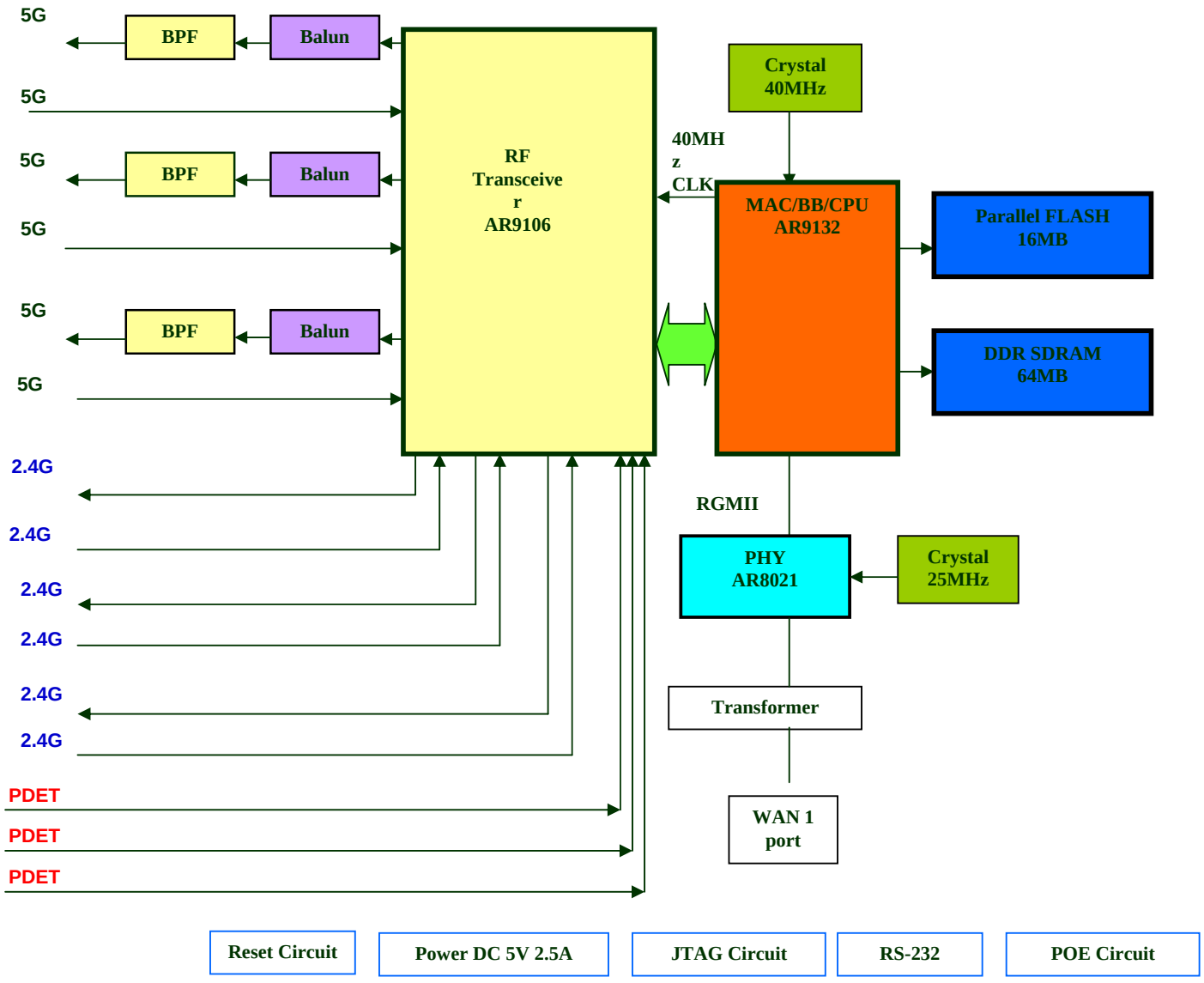
1.2 Product Features

- Provide Ethernet to Wireless LAN bridge fully IEEE 802.3/u compatible on the Ethernet side and fully interoperable with IEEE 802.11a/b/g/n compliant equipment.
- Compatible with IEEE 802.11b high rate standard to provide wireless 11Mbps data rate in Legacy mode.
- Compatible with IEEE 802.11g higher speed standard to provide wireless 54Mbps data rate in Legacy mode.
- Compatible with IEEE 802.11a higher speed standard to provide wireless 54Mbps data rate in Legacy mode.
- Compatible with IEEE 802.11n higher speed standard to provide wireless 300Mbps data rate.
- Operation at 2.4~2.5GHz and 5.15~5.85GHz frequency band to meet worldwide regulations.
- Dynamic data rate scaling at 1, 2, 5.5, and 11Mbps for IEEE802.11b.
- Dynamic data rate scaling at 6, 9, 12, 18, 24, 36, 48, 54Mbps for IEEE802.11g.
- Dynamic data rate scaling at 6, 9, 12, 18, 24, 36, 48, 54Mbps for IEEE802.11a.
- Supports IEEE 802.11 a/b/g/n wireless data encryption with 64/128bit WEP for security.
- Support 10/100/1000 Ethernet port.
- Easy-to use Web Management Interface and remote management
- AP Mode, WDS Mode, WDS with AP, and Client Mode.
- 802.3af Power over Ethernet (POE)
- RoHS compliant

2.0 Requirements

The following sections identify the detailed requirements of the **802.11n Wireless PoE Access Point(2.4GHz/5GHz).**

2.1 Functional Block Diagram



2.2 General Requirements

2.2.1 IEEE 802.11b Section

#	Feature	Detailed Description
2.2.1.1	Standard	• IEEE 802.11b
2.2.1.2	Radio and Modulation Schemes	• DQPSK, DBPSK with DSSS, and CCK
2.2.1.3	Operating Frequency	• 2400 ~ 2483.5MHz ISM band
2.2.1.4	Channel Numbers	• 11 channels for United States 13 channels for Europe Countries
2.2.1.5	Data Rate	• 11, 5.5, 2, and 1Mbps
2.2.1.6	Media Access Protocol	• CSMA/CA with ACK
2.2.1.7	Transmitter Output Power	• Typical RF Output Power at each RF chain, Data Rate and at room Temp. 25degree C (tolerance ± 2dB) • 18 dBm at 1,2,5.5,11Mbps
2.2.1.8	Receiver Sensitivity	• Typical -84 dBm for 11Mbps @ 8% PER • Typical -89 dBm for 2Mbps @ 8% PER

2.2.2 IEEE 802.11g Section

#	Feature	Detailed Description
2.2.2.1	Standard	• IEEE 802.11g
2.2.2.2	Radio and Modulation Type	• BPSK, QPSK, 16QAM, 64QAM with OFDM
2.2.2.3	Operating Frequency	• 2400 ~ 2483.5MHz ISM band
2.2.2.4	Channel Numbers	• 11 channels for United States 13 channels for Europe Countries 13 channels for Japan
2.2.2.5	Data Rate	• 6,9,12,18,24,36,48,54Mbps
2.2.2.6	Media Access Protocol	• CSMA/CA with ACK
2.2.2.7	Transmitter Output Power	• Typical RF Output Power at each RF chain, Data Rate and at room Temp. 25degree C (tolerance ± 2dB) • 17 dBm at 6~24 Mbps • 17 dBm at 36 Mbps • 16 dBm at 48 Mbps • 13 dBm at 54 Mbps
2.2.1.8	Receiver Sensitivity	• Typical Sensitivity at Which Frame (1000-byte PDUs) Error Rate = 10% • -86 dBm at 6Mbps • -84 dBm at 9Mbps • -84 dBm at 12Mbps • -82 dBm at 18Mbps • -78 dBm at 24Mbps • -75 dBm at 36Mbps • -70 dBm at 48Mbps • -68 dBm at 54Mbps

2.2.3 IEEE 802.11a Section

#	Feature	Detailed Description
2.2.3.1	Standard	• IEEE 802.11a
2.2.3.2	Radio and Modulation Type	• BPSK, QPSK, 16QAM, 64QAM with OFDM
2.2.3.3	Operating Frequency	• 5.15~5.35GHz and 5.725~5.825GHz for US and Canada • 5.15~5.35GHz and 5.47~5.725GHz for Japan • 5.15~5.35GHz and 5.47~5.725GHz for Europe
2.2.3.4	Channel Numbers	• 12 non-overlapping channels for US and Canada • 8 non-overlapping channels for Japan • 19 non-overlapping channels for Europe
2.2.3.5	Data Rate	• 6,9,12,18,24,36,48,54Mbps
2.2.3.6	Media Access Protocol	• CSMA/CA with ACK
2.2.3.7	Transmitter Output Power	• Typical RF Output Power at each RF chain, Data Rate and at room Temp. 25degree C (tolerance ± 2dB) • 17 dBm at 6~24 Mbps • 16 dBm at 36 Mbps • 15 dBm at 48 Mbps • 12 dBm at 54 Mbps
2.2.3.8	Receiver Sensitivity	• Typical Sensitivity at Which Frame (1000-byte PDUs) Error Rate = 10% • -86 dBm at 6Mbps • -84 dBm at 9Mbps • -84 dBm at 12Mbps • -82 dBm at 18Mbps • -78 dBm at 24Mbps • -75 dBm at 36Mbps • -70 dBm at 48Mbps • -68 dBm at 54Mbps

2.2.4 IEEE 802.11n Section for 5G Band

#	Feature	Detailed Description
2.2.4.1	Standard	• IEEE 802.11n
2.2.4.2	Radio and Modulation Type	• BPSK, QPSK, 16QAM, 64QAM with OFDM
2.2.4.3	Operating Frequency	• 5.15~5.35GHz and 5.725~5.825GHz for US and Canada • 5.15~5.35GHz and 5.47~5.725GHz for Japan • 5.15~5.35GHz and 5.47~5.725GHz for Europe
2.2.4.4	Data Rate	• From MCS – 0 to MCS –15
2.2.4.5	Media Access Protocol	• CSMA/CA with ACK
2.2.4.6	Transmitter Output Power	• Typical RF Output Power at each RF chain, Data Rate and at room Temp. 25degree C (tolerance ± 2dB) HT20 • 15dBm at MCS - 0 ~ 4, MCS 8 ~ 12 • 15dBm at MCS - 5, 13 • 12dBm at MCS - 6, 14 • 9dBm at MCS - 7, 15 HT40 • 15dBm at MCS - 0 ~ 4, MCS 8 ~ 12 • 15dBm at MCS - 5, 13 • 12dBm at MCS - 6, 14

#	Feature	Detailed Description
		• 9dBm at MCS - 7, 15
2.2.4.7	Receiver Sensitivity	• Typical Sensitivity at Which Frame (1000-byte PDUs) Error Rate = 10% HT20 • –86dBm at MCS0 • –84dBm at MCS1 • –81dBm at MCS2 • –77dBm at MCS3 • –75dBm at MCS4 • –71dBm at MCS5 • –69dBm at MCS6 • –68dBm at MCS7 HT40 • –83dBm at MCS0 • –81dBm at MCS1 • –78dBm at MCS2 • –74dBm at MCS3 • –72dBm at MCS4 • –68dBm at MCS5 • –66dBm at MCS6 • –65dBm at MCS7

2.2.5 IEEE 802.11n Section for 2.4G Band

#	Feature	Detailed Description
2.2.5.1	Standard	• IEEE 802.11n
2.2.5.2	Radio and Modulation Type	• BPSK, QPSK, 16QAM, 64QAM with OFDM
2.2.5.3	Operating Frequency	• 2400 ~ 2483.5MHz ISM band
2.2.5.4	Data Rate	• From MCS – 0 to MCS –15
2.2.5.5	Media Access Protocol	• CSMA/CA with ACK
2.2.5.6	Transmitter Output Power	• Typical RF Output Power at each RF chain, Data Rate and at room Temp. 25degree C (tolerance ± 2dB) HT20 • 17dBm at MCS - 0 ~ 4, MCS 8 ~ 12 • 17dBm at MCS - 5, 13 • 13dBm at MCS - 6, 14 • 11dBm at MCS - 7, 15 HT40 • 17dBm at MCS - 0 ~ 4, MCS 8 ~ 12 • 17dBm at MCS - 5, 13 • 13dBm at MCS - 6, 14 • 11dBm at MCS - 7, 15
2.2.5.7	Receiver Sensitivity	• Typical Sensitivity at Which Frame (1000-byte PDUs) Error Rate = 10% HT20 • –86dBm at MCS0 • –84dBm at MCS1 • –81dBm at MCS2 • –77dBm at MCS3 • –75dBm at MCS4 • –71dBm at MCS5 • –69dBm at MCS6

#	Feature	Detailed Description
		• –68dBm at MCS7 HT40 • –83dBm at MCS0 • –81dBm at MCS1 • –78dBm at MCS2 • –74dBm at MCS3 • –72dBm at MCS4 • –68dBm at MCS5 • –66dBm at MCS6 • –65dBm at MCS7

2.2.6 General Section

#	Feature	Detailed Description
2.2.6.1	Interface	• Power Jack • Factory Reset Button • 1 LAN port (GbE) with PoE • Wireless Antenna X 3
2.2.6.2	Antenna Type	• Dipole 3dBi for 2.4GHz/5dBi for 5GHz
2.2.6.3	Ethernet Standard	• IEEE 802.3/u, IEEE 802.3x
2.2.6.4	Operating Voltage	• 5V
2.2.6.5	Current Consumption	• 1000mA at continuous transmit mode (3 Tx chains on) • 500mA at continuous receive mode (3 Rx chains on)
2.2.6.6	LEDs	• Power LED • 2.4GHz/5GHz Wireless LED • LAN

2.3 Software Requirements

The configuration of AP can be done through the Ethernet port by using the Web based application.

2.3.1 Network Setting

#	Feature	Detailed Description
2.3.1.1	Get IP From	• Dynamic (DHCP) • Static (192.168.0.50) <default>
2.3.1.2	IP Address	• The IP address of the AP can be viewed and set
2.3.1.3	Subnet Mask	• The Ethernet station and the AP is on the same subnet. The IP address for the AP is correspond to the Subnet Mask
2.3.1.4	Default Gateway	• The Ethernet station and the AP is on the same Gateway. The IP address for the AP is correspond to the Gateway

2.3.2 Wireless Setting

	Feature	Detailed Description
2.3.2.1	Wireless Band	• The Wireless Band of the AP can be viewed.
2.3.2.2	Mode	• Set as Access Point, WDS with AP, WDS and Wireless Client
2.3.2.3	SSID	• SSID is a group of AP. SSID is the name of the WLAN used for identifying the WLAN
2.3.2.4	SSID visibility	• SSID cannot be site surveyed whiles SSID visibility is disable
2.3.2.5	Auto Channel scan	• Scan channel and find a clear channel.
2.3.2.6	Channel	• Select the radio channel. The permissible channels depend on each domain.
2.3.2.7	Channel Width	• Select 20MHz or Auto 20/40MHz
2.3.2.8	Authentication	• Open system <Default> • Shared key • WPA Personal • WPA Enterprise

2.3.3 Security Settings

	Feature	Detailed Description
2.3.3.1	WEP Key Settings	• Encryption: Disable or Enable, default is set to Enable • Key Type: HEX or ASCII<Default> • Key Size: 64<Default> or 128 bits. • Key Key: First, Second, Third, or Fourth, to select the one which key will be used. • Key
2.3.3.2	PassPhrase Settings	• WPA Mode: Auto<Default>, WPA2 only or WPA only. • Cipher Type: Auto, AES or TKIP • Group Key Update Interval: Default is 1800 seconds • PassPhrase
2.3.3.3	RADIUS Server Settings	• WPA Mode: Auto<Default>, WPA2 only or WPA only. • Cipher Type: Auto, AES or TKIP • Group Key Update Interval: Default is 1800 seconds

2.3.4 Advanced Setting

	Feature	Detailed Description
2.3.4.1	Performance	Advanced Wireless Settings, Like Wireless mode choose, Data rate choose, Beacon interval, DTIM, Transmit Power, WMM, Short GI, ActTimeout, Link Integrality, Connection Limit Setting and so on.
2.3.4.2	Multi-SSID	• Primary and Multi-SSIDs can be configured to allow virtually segregation stations by sharing same channel. Multi-SSID can be scanned by site survey tools. VLAN function can be enabled for primary SSID and Multi-SSIDs.
2.3.4.3	VLAN	• User can set and check VLAN and PVID
2.3.4.4	Intrusion	• User can set and check Wireless Intrusion Protection list
2.3.4.5	Scheduling	• The scheduling setting is used to add and modify scheduling rules on the device.
2.3.4.6	QoS	• User can set QoS Rule
2.3.4.7	DHCP Server	• DHCP (Dynamic Host Control Protocol) Server assigns IP addresses to stations requesting IP addresses while logging to the wireless network.
2.3.4.8	Filters	• Filter function includes MAC address filtering and Wireless LAN Partition. MAC address filtering function blocks or accepts association by identifying MAC address specified. Wireless LAN partition can accept or reject the access from wireless or wired networks.

2.3.5 Status and Log

	Feature	Detailed Description
2.3.5.1	Device/Client/WDS Information	• Display the configuration of the device, wireless client information for clients currently connected to the access point, and WDS information.
2.3.5.2	Status	• Show the Ethernet traffic statistics and WLAN traffic statistics
2.3.5.2	Log	• System log and remote log support

2.3.6 Maintenance

	Feature	Detailed Description
2.3.6.1	Administrator Settings	• Limit Administrator/Login Settins/Console Settings/SNMP Settings/Ping Control Settings
2.3.6.2	Firmware and SSL Certification Upload	• Upload Firmware/Certificate/Key From File.
2.3.6.3	Configuration file	• You can use WEB or Telnet to download/upload configuration data via Ethernet or Wireless
2.3.6.4	Time and Date	• Show Date/Time information and set Date/Time Configuration

2.4 Mechanical Requirements

	Feature	Detailed Description
2.4.1	Length	178mm
2.4.2	Width	106mm
2.4.3	High	16mm

2.5 Reliability Requirement

#	Feature	Detailed Description
2.5.1	MTBF	• Mean Time Between Failure > 30,000 hours
2.5.2	Maintainability	• There is no scheduled preventive maintenance required
2.5.3	Quality	• The product quality followed D-Link quality control system

2.6 Environment Requirement

	Feature	Detailed Description
2.6.1	Operating Temperature Conditions	• The product is capable of continuous reliable operation when operating in ambient temperature of 0 □ to +40□.
2.6.2	Non-Operating Temperature Conditions	• Neither subassemblies is damaged nor the operational performance be degraded when restored to the operating temperature after exposing to storage temperature in the range of -20 □ to +65 □.
2.6.3	Operating Humidity conditions	• The product is capable of continuous reliable operation when subjected to relative humidity in the range of 10% and 90% non-condensing.
2.6.4	Non-Operating Humidity Conditions	• The product is not be damaged nor the performance be degraded after exposure to relative humidity ranging from 5% to 95% non-condensing

2.7 Compatibility Requirement

	Feature	Detailed Description
2.7.1	Wi-Fi/WMM	• Conform with Wi-Fi/WMM certification
2.7.2	Physical Layer and Functionality	• Pass D-Link Engineering Test Plan and Test Report

Appendix I:

Rate Dependent Parameters for High Throughput . Modulation and Coding Schemes (MCS)

Table 1 - Modulation and Coding Schemes

Bits 0-6 in HT-SIG1 (MCS index)	Number of spatial streams	Modulation	Coding rate	N_{ES}		N_{SD}		N_{CBPS}		GI = 800ns		GI = 400ns	
				20	40	20	40	20MHz	40MHz	Rate in 20MHz	Rate in 40MHz	Rate in 20MHz	Rate in 40MHz
0	1	BPSK	½	1	1	52	108	52	108	6.5	13.5	7 2/9	15
1	1	QPSK	½	1	1	52	108	104	216	13	27	14 4/9	30
2	1	QPSK	¾	1	1	52	108	104	216	19.5	40.5	21 2/3	45
3	1	16-QAM	½	1	1	52	108	208	432	26	54	28 8/9	60
4	1	16-QAM	¾	1	1	52	108	208	432	39	81	43 1/3	90
5	1	64-QAM	⅔	1	1	52	108	312	648	52	108	57 7/9	120
6	1	64-QAM	¾	1	1	52	108	312	648	58.5	121.5	65	135
7	1	64-QAM	5/6	1	1	52	108	312	648	65	135	72 2/9	150
8	2	BPSK	½	1	1	52	108	104	216	13	27	14 4/9	30
9	2	QPSK	½	1	1	52	108	208	432	26	54	28 8/9	60
10	2	QPSK	¾	1	1	52	108	208	432	39	81	43 1/3	90
11	2	16-QAM	½	1	1	52	108	416	864	52	108	57 7/9	120
12	2	16-QAM	¾	1	1	52	108	416	864	78	162	86 2/3	180
13	2	64-QAM	⅔	1	1	52	108	624	1296	104	216	115 5/9	240
14	2	64-QAM	¾	1	1	52	108	624	1296	117	243	130	270
15	2	64-QAM	5/6	1	1	52	108	624	1296	130	270	144 4/9	300

The parameters in the table are:

- Rate: Rate in Mbps
- NES: Number of FEC encoders used
- NSD: Number of Data Subcarriers
- NCBPS: Number of Code Bits Per Symbol (total of all spatial streams)
- NSS: Number of Spatial Streams