

FRC[®]

FIRST[®] Robotics Competition

How to Configure Your Radio 2011 FRC – *LogoMotion*

Contents

Introduction.....	3
Overview of the DAP-1522.....	3
Features.....	3
Hardware Overview.....	4
Connecting to the DAP-1522 via Wi-Fi	5
Resetting a radio to default settings	5
Configuring a radio for team use.....	6
Configuring a radio for Competition	10

Introduction

This document describes the features and functionality of the new D-Link DAP-1522 robot radio, and the steps used to configure it for use on an FRC robot.

NOTE: The screenshot examples in this document reflect an example radio configured for team 1995

Overview of the DAP-1522

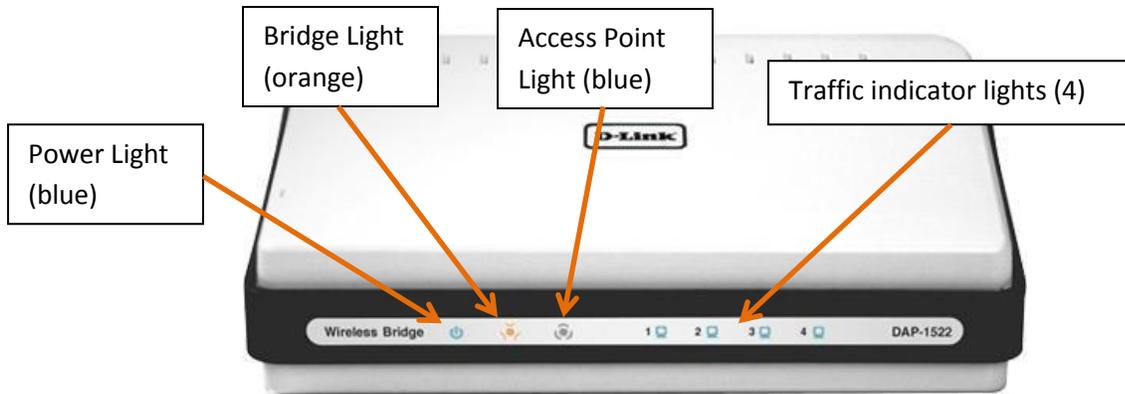
Features

The D-Link DAP 1522 is the new robot radio for the 2011 season. Some new features of this unit as compared to the 2009 and 2010 seasons include

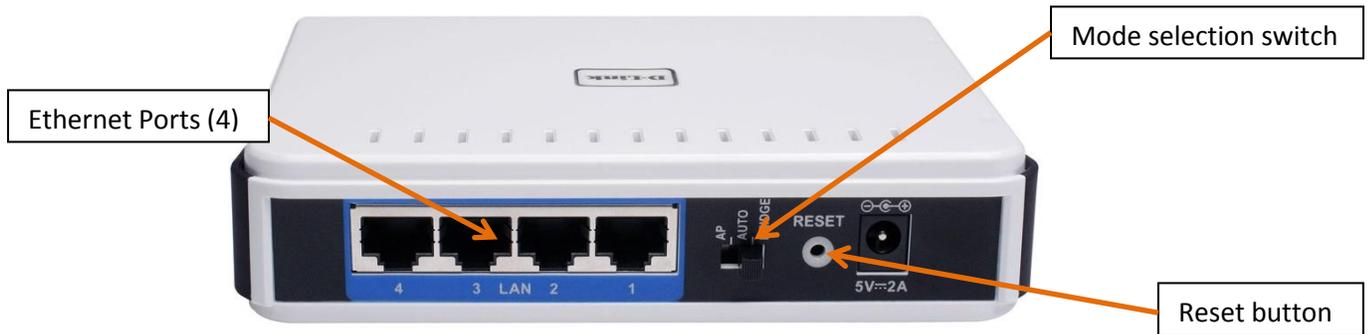
- **Access Point mode:** computers with wireless networking capabilities can connect to the DAP-1522 directly (without additional wireless routers or bridges). This is the recommended operating mode when teams are developing their robots at home
- **Bridge mode:** allows the DAP-1522 to connect to an access point. This mode is used at FRC events to allow the robots on the field to connect to the field access point.
- **Four Ethernet ports:** teams can now tether to the cRio through the DAP-1522 using a standard Ethernet cable. Using this feature, teams will no longer have to unplug the radio in order to tether to the cRio.

Hardware Overview

Front:



Back:



Connecting to the DAP-1522 via Wi-Fi

When connecting a computer to the DAP-1522 via Wi-Fi, ensure the computer's network settings match the following:

- IP address = 10.xx.yy.zz
 - xxyy is the team number.
 - zz is any number greater than 10 and less than 255.
 - Examples (team number follow by IP address)
 - 19 = 10.0.19.51
 - 109 = 10.1.9.51
 - 190 = 10.1.90.51
 - 1109 = 10.11.9.51
 - 1190 = 10.11.90.51
 - 1900 = 10.19.0.51
- Subnet Mask = 255.0.0.0

Resetting a radio to default settings

1. Plug in the power and Ethernet connections
2. Wait for the either the orange Bridge light or blue Access Point light to begin flashing
3. Hold the reset button (on the back of the unit) for 10 seconds then release
4. Wait for the light to stop flashing (this signals the radio is starting to reset)
5. Wait for the light to resume flashing, your radio is now reset

Configuring a Radio for Team Use

1. Switch your D-Link unit to AP mode using the switch on the back
2. Ensure your laptop is set to the proper IP address (192.168.0.51)
3. Connect the radio to your computer using an **Ethernet** cable
4. Start **Internet Explorer*** and type in your radio IP address (192.168.0.50)
 - a. Username = **admin**
 - b. Password = blank
5. Click on **Manual Wireless Network Setup**

The screenshot shows the web interface for a DAP-1522 device. At the top, there are navigation tabs: SETUP, ADVANCED, MAINTENANCE, and STATUS. The left sidebar has 'WIRELESS SETTINGS' and 'NETWORK SETTINGS'. The main content area is titled 'WIRELESS SETTINGS' and contains the following sections:

- WIRELESS CONNECTION SETUP WIZARD**: A section with a button labeled 'Launch Wireless Setup Wizard'.
- MANUAL WIRELESS NETWORK SETUP**: A section with a button labeled 'Manual Wireless Network Setup'. An orange arrow points to this button.

The 'Manual Wireless Network Setup' button is highlighted with an orange arrow, indicating it is the correct option to click according to the instructions.

*= other internet browsers such as Mozilla Firefox and Google Chrome do not always display the configuration web pages properly.

6. The radio can be used with or without security in access point mode. Change the Wireless settings to match one of the following setups:
- No security

The image shows three sections of a configuration interface with callouts:

- WIRELESS NETWORK SETTINGS:**
 - Wireless Mode : Access Point
 - Enable Wireless :
 - Wireless Network Name : 1995 (Also called the SSID) - Callout: "Change the Wireless Network Name to your team number"
 - 802.11 Band : 2.4GHz 5GHz - Callout: "2.4GHz recommended"
 - 802.11 Mode : Mixed 802.11n, 802.11g and 802.11b
 - Enable Auto Channel Scan :
 - Wireless Channel : 6
 - Transmission Rate : Best(automatic) (Mbit/s)
 - Channel Width : 20 MHz
 - Visibility Status : Visible Invisible
- WIRELESS SECURITY MODE:**
 - Security Mode : Disable Wireless Security (not recommended) - Callout: "Disable Wireless Security"
- WI-FI PROTECTED SETUP (ALSO CALLED WCN 2.0 IN WINDOWS VISTA):**
 - Enable : - Callout: "Disable Wi-Fi Protected Setup"
 - Lock Wireless Security Settings :
 - Current PIN : 59108504
 - Buttons: Generate New PIN, Reset PIN to Default
 - Wi-Fi Protected Status : Enabled / Not Configured
 - Button: Reset to Unconfigured

*=2.4GHz is recommended in most cases. If a team's home facility has a significant amount of 2.4GHz wireless traffic/ interference, the team may want to select 5GHz. If selecting 5GHz, please note that any computer that teams intend to connect to the DAP-1522 must support 5GHz wireless communications. **The classmate computers provided in the 2010 and 2011 Kit of Parts only support 2.4GHz wireless communications.**

b. With security

WIRELESS NETWORK SETTINGS

Wireless Mode : Access Point

Enable Wireless :

Wireless Network Name : 1995 (Also called the SSID)

802.11 Band : 2.4GHz 5GHz

802.11 Mode : Mixed 802.11n, 802.11g and 802.11b

Enable Auto Channel Scan :

Wireless Channel : 6

Transmission Rate : Best(automatic) (Mbit/s)

Channel Width : 20 MHz

Visibility Status : Visible Invisible

WIRELESS SECURITY MODE

Security Mode : WPA-Personal

WPA

WPA Mode : WPA2 Only

Cipher Type : AES

Group Key Update Interval : 1800 (seconds)

PRE-SHARED KEY

Passphrase : 1995WPAKEY

WI-FI PROTECTED SETUP (ALSO CALLED WCN 2.0 IN WINDOWS VISTA)

Enable :

Lock Wireless Security Settings :

Current PIN : 59108504

Generate New PIN Reset PIN to Default

Wi-Fi Protected Status : Enabled / Not Configured

Callout 1: Change the Wireless Network Name to your team number (points to '1995')

Callout 2: 2.4GHz recommended (see note on previous page) (points to '2.4GHz')

Callout 3: Change the Security Mode to WPA-Personal (points to 'WPA-Personal')

Callout 4: Change the WPA mode to WPA2 only (points to 'WPA2 Only')

Callout 5: Change the Cipher Type to AES (points to 'AES')

Callout 6: Change the Passphrase to your WPA key* (points to '1995WPAKEY')

Callout 7: Disable Wi-Fi Protected Setup (points to 'Enable' checkbox)

*= When using security, any computer connecting to the DAP-1522 via Wi-Fi will need this passphrase to gain access to the network.

7. **Save your settings**

- Click on the **Network Settings** tab on the left side of the page
- Change the Network Settings as follows:

ACCESS POINT SETTINGS

Use this section to configure the internal network settings of your access point. The IP Address that is configured here is the IP Address that you use to access the Web-based management interface. If you change the IP Address here, you may need to adjust your PC's network settings to access the network again.

LAN Connection Type :	Static IP
Access Point IP Address :	10.19.95.1
Subnet Mask :	255.0.0.0
Default Gateway :	10.19.95.4

Set the IP address to 10.xx.yy.1
where xxyy is your team number

Set the Subnet Mask to 255.0.0.0

Set the Default Gateway to
10.xx.yy.4

- Save your settings

Configuring a Radio for Competition

NOTE:

At official FRC events, you must use the FRC Radio Kiosk at or near the Inspection table to configure your radio. These instructions are provided for reference purposes.

1. Set your **computer IP address** to 192.168.0.51
2. Switch your D-Link unit to **Bridge** mode using the switch on the back (the radio should always be in bridge mode at competition)
3. Reset your radio
4. Connect the radio to your computer using an **Ethernet** cable
5. Start Internet Explorer and type in an address of **192.168.0.50**
 - a. Username = **admin**
 - b. Password = blank
6. Click on the **Setup** tab on the top menu bar
7. Click on the **Wireless** tab on the left side of the page

8. Change the Wireless settings as follows:

The image shows a series of configuration panels for wireless settings. Each panel has a title bar and several settings. Orange arrows point from callout boxes to specific settings, indicating the required changes.

- WIRELESS NETWORK SETTINGS**
 - Wireless Mode : Bridge Mode
 - Enable Wireless :
 - Wireless Network Name : 1995 (Also called the SSID)
 - 802.11 Band : 2.4GHz / 5GHz / 2.4GHz/5GHz
 - 802.11 Mode : Mixed 802.11 abgn
 - Enable Auto Channel Scan :
 - Wireless Channel : 6
 - Transmission Rate : Best(automatic) (Mbit/s)
 - Channel Width : 20 MHz
 - Visibility Status : Visible / Invisible
- WIRELESS SECURITY MODE**
 - Security Mode : WPA-Personal
- WPA**
 - WPA Mode : WPA2 Only
 - Cipher Type : AES
 - Group Key Update Interval : (seconds)
- PRE-SHARED KEY**
 - Passphrase : 1995WPAKEY
- WI-FI PROTECTED SETUP (ALSO CALLED WCN 2.0 IN WINDOWS VISTA)**
 - Enable :
- WIRELESS MAC CLONING**
 - Enable :
 - MAC Source : Auto

Callout boxes with arrows pointing to the settings:

- Change the Wireless Network Name to your team number (points to Wireless Network Name)
- Change the Security Mode to WPA-Personal (points to Security Mode)
- Change the WPA mode to WPA2 only (points to WPA Mode)
- Change the Cipher Type to AES (points to Cipher Type)
- Change the Passphrase to your WPA key* (points to Passphrase)
- Disable Wi-Fi Protected Setup (points to Enable checkbox)
- Disable Wireless MAC Cloning (points to Enable checkbox)

*= WPA keys are generated by the Field Management System at FRC events.

9. **Save your settings**

10. Click on the **Network Settings** tab on the left side of the page

11. Change the Network Settings as follows:

The screenshot shows the 'LAN SETTINGS' configuration page. It includes a header, a descriptive paragraph, and four configuration fields: 'LAN Connection Type' (Static IP), 'Access Point IP Address' (10.19.95.1), 'Subnet Mask' (255.0.0.0), and 'Default Gateway' (10.19.95.4). Three callout boxes with arrows point to these fields, providing instructions on how to modify them.

LAN SETTINGS

Use this section to configure the internal network settings of your access point. The IP Address that is configured here is the IP Address that you use to access the Web-based management interface. If you change the IP Address here, you may need to adjust your PC 's network settings to access the network again.

LAN Connection Type : Static IP

Access Point IP Address : 10.19.95.1

Subnet Mask : 255.0.0.0

Default Gateway : 10.19.95.4

Set the IP address to 10.xx.yy.1 where xxyy is your team number

Set the Subnet Mask to 255.0.0.0

Set the Default Gateway to 10.xx.yy.4

12. Save your settings