Application Note: Going Wireless

SUMMARY

This application note details the components and configuration needed to implement a wireless connection.

REQUIRED

Item	Description	Obtained From
1	freETarget V2.2 or higher	
2	freETarget firmware V3.2 or higher	
3	ESP-01	Amazon https://www.amazon.com/Wireless-Transceiver-Receiver-DC3-0-3-6V-Compatible/dp/B07R4MXPLF/ref=sr_1_12?crid=3V1D0J59OCRTH&dchild=1&keywords=esp-01&qid=1624114287&sprefix=esp-01%2Caps%2C169&sr=8-12 Or Similar
4	ESP-01 5Volt Adapter	Amazon https://www.amazon.com/Aideepen-ESP8266-Wireless-Adapter-Compatible/dp/B01M09B43H/ref=sr_1_3?dchild=1&keywords=esp-01+5V&qid=1624114362&sr=8-3 Or Similar
5	6 Pin IDC Connector	Digikey https://www.digikey.com/en/products/detail/te-connectivity-amp-connectors/3-640441-6/698225 Or Similar
6	24 Guage Hookup Wire	

INTRODUCTION

freETarget supports a WiFi connection using the accessory connector and an off-the-shelf ESP-01 Serial WiFi transceiver. Using the ESP-01, freETarget appears as a WiFi hotspot that when a connection is made transmits the score JSON message to the PC program.

Installing the ESP-01 consists of the following steps

- Build the ESP-01 interface
- Attach the ESP-01 to freETarget
- Select the target name
- Power Up
- On the PC choose the freETarget SSID for your target
- On the freETarget PC application, choose WiFi and CONNECT

ASSEMBLING THE WiFi INTERFACE

Building the ESP-01 Adapter

The ESP-01 is a self-contained circuit that operates at 3.3 Volts. freETarget operates at 5.0 Volts, so connecting an ESP-01 directly to the board will damage the ESP-01 circuit. Fortunately, adapter circuits are available that convert the voltage levels. Install the ESP-01 into the adapter as shown in Figure 1.
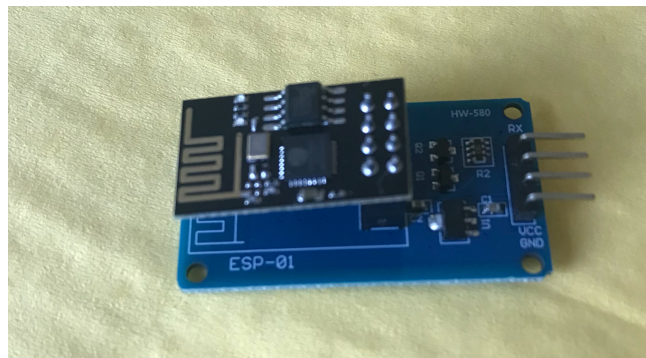

Figure 1: ESP-01 and Adapter Assembly

The ESP-01 and freETarget connect to each other using a short six pin connector illustrated in Figure 2. While the ESP-01 adapter uses four pins and freETarget uses six, for the purposes of convenience two six pin connectors can be used.
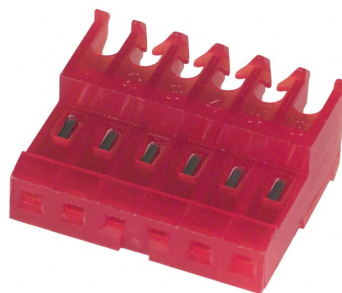

Figure 2: Sample IDC Connector

The wiring for each of the connectors is found in Table 1.

Table 1: WiFI Cable Harness

freETarget Connector	Description	ESP-01 Connector
1	5VDC	2
2	Auxiliary Transmit Data	4
3	Auxiliary Receive Data	3
4	Motor Drive (Not Used)	
5	Spare (Not Used)	
6	Ground	1

Connect the ESP-01 to freETarget using the cable harness.

IMPORTANT

When connecting the cable harness to the ESP-01, ensure that Pin 1 of the connector mates to Pin 1 of the adapter. Pins 5 and 6 will overhang the board and not be connected.

Naming the Target

freETarget allows you to assign a name to each target for identification. This name appears in the SSID of the WiFi sources on your computer. If you are using a single lane freETarget, the default name "FET-TARGET" can be used for the SSID.

In larger installations a name can be chosen from Table. Use NAME setting found in the PC program setup tab.

Table 2: freETarget Lane Names

Name ID	
0	TARGET
1-10	Numeric 1-10
11-18	Seven Dwarfs "DOC", "DOPEY", "HAPPY", "GRUMPY", "BASHFUL", "SNEEZEY", "SLEEPY"
19-27	Eight Reindeer "RUDOLF", "DONNER", "BLITXEM", "DASHER", "PRANCER", "VIXEN", "COMET", "CUPID", "DUNDER"
28-32	Norse Gods "ODIN", "WODEN", "THOR", "BALDAR"

PC Interface

John

Please put in screen shots of the appropriate parts.

SPECIFICATIONS

When an ESP-01 is attached to freETarget, the firmware will detect the ESP-01 and automatically configure the connection.

SSID

The WiFi SSID connection will take on the name of the target, FET-<name>. For example FET-TARGET or FET-RUDOLF.

freETarget IP Address

The freETarget IP address is fixed and is 192.168.10.9

PC IP Address

The ESP-01 contains a DHCP server and will assign the PC an address of 192.168.10.0

Server Connection

The PC acts as a client to freETarget, and connects to freETarget on port 1090