Demo Card

Step by step guide to demonstrating Connect One's WiFi offerings

Introduction to this document

The purpose of this demo card is to enable engineers to perform a quick demonstration of Connect One's iChip based WiFi solutions. The demonstration will cover the following:

1. **Basic WiFi configuration:** allows any MCU/CPU to connect to WiFi with no driver development. This is required for all modes.
2. **Internet controller mode:** Allowing a simple MCU to perform complex Internet related tasks by sending simple text based commands to the iChip
3. **LAN-WiFi bridge mode:** Allowing any device with functional LAN connectivity to connect to a WiFi network with no driver development or application changes
4. **Serial-WiFi bridge mode:** Allowing any device with a serial interface to connect to a WiFi network with no driver development or application changes

Notes:

- Choose which mode to demo according to the design's needs
- Although this demo uses the Nano WiReach, similar functionality is available on other Connect One WiFi solutions.
- High volume customers can replicate the module functionality using a Connect One iChip on the main PCB – visit the reference design section on Connect One's support site.
- Connect One offers additional modes of operation, which are beyond the scope of this demo. See www.connectone.com

Requirements for the Demo

- II-EVB-363MW/MD – the evaluation board for Nano WiReach
- Power adapter & Cables: RS232, LAN (USB optional)
- Existing access point with Internet connectivity
- The WiFi SSID and encryption keys, if applicable.
- Computer with iChipConfig utility or terminal program
- Optional: AT+i programmer's guide – for command syntax, etc.

Initial setup

- Connect the power cable to the EVB and power up
- Connect serial cable to the EVB's serial port.
- Use iChipConfig program' "Dumb Terminal" to select a COM port, make sure to select a speed setting of 115200bps

Basic WiFi Configuration (to access point)

Goal: Configure the Nano WiReach in order to connect it to an existing WiFi access point. In this scenario the WiReach is a client on the existing WiFi network in infrastructure mode.

1. AT+iFD (restore to factory defaults, start fresh)
2. AT+iHIF=1 (set the serial interface to RS232)
3. AT+iBDRF=9 (fix baud rate to 115200 after power cycle)
4. AT+iRP20 (list visible networks)
5. AT+iWLSI=<SSID of network>
6. AT+iWST0=0 / 1 / 2 / 3 / 4
   (None / WEP-64 / WEP-128 / WPA / WPA2)
7. AT+iWKY0=<WEP key 10 or 26 HEX characters>
8. AT+iWPP0=<WPA / WPA2 passphrase>
9. AT+iAWS=1 (enable website upon reboot)
10. AT+iDOWN (reboot to apply settings)

Testing the WiFi Connection to the Access Point

1. Connect your PC to the same WiFi network defined above.
2. AT+i!RP10 (verify association was completed)
3. AT+iIPA? (returns IP address of iChip –assigned by AP)
4. Send PING from PC command line to the iChip:
   C:\ping < result of IPA>
5. Read IP address of PC: run ipconfig.exe
6. AT+iPING:<PC_IP>
   I/(XXXX) returns ping time in msec
   or I/ERROR (571)

Browsing to Embedded Configuration Website

Open browser (Explorer) to the embedded web site on iChip's IPA: http://<IP Address>/iChip .
Note that the iChip has 2 websites:

1. A built in configuration site (as described above)
2. An application website, used to control the host device. The user writes a website and uploads its image into the flash memory included on the module. Demonstrating the host device is outside the scope of this demonstration.

Basic WiFi Configuration (Ad-Hoc mode)

Goal: Configure the Nano WiReach as an Ad-Hoc access point. In this scenario the WiReach is the creator of an Ad-Hoc WiFi network, and assigns IP addresses to other Ad-Hoc peers connecting to it.

1. AT+iFD (restore to factory defaults, start fresh)
2. AT+iHIF=1 (set the serial interface to RS232)
3. AT+iBDRF=9 (fix baud rate to 115200 after power cycle)
4. AT+iWLCH=3 (choose the desired WiFi channel)
5. AT+iWST0=0 (no encryption; note that WEP can be used)
6. AT+iWLSI=!WiReach (sets SSID - '!' Denotes ad-hoc)
7. AT+iDIP=172.20.50.1 (set a fixed IP for the module)
8. AT+iDPSZ=5 (set DHCP pool size)
9. AT+iDSLT=30 (set DHCP lease time)
10. AT+iAWS=1 (enable website upon reboot)
11. AT+iDOWN (reboot to apply settings)

"WiReach" network will become visible. Other devices can connect Ad-Hoc and will get an IP address from the iChip

Testing the WiFi Connection in Ad-Hoc mode

1. Connect your PC to the "WiReach" network defined above.
2. Send PING from PC command line to the iChip:
   C:\ping 172.20.50.1
3. Read IP address of PC: run ipconfig.exe
4. AT+iPING:<PC_IP>
   I/(XXXX) returns ping time in msec
   or I/ERROR (571)

Browsing to Embedded Configuration Website

Open browser (Explorer) to the embedded web site on iChip's IPA: http://172.20.50.1/iChip

Using the module as an embedded router

The Nano WiReach can perform IP routing between its WiFi interface and a cellular/dialup interface.

A typical application is to allow multiple devices to connect over WiFi with a single ingress point to the Internet over a cellular module. Demonstrating this capability is outside the scope of this demonstration.

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Internet controller mode

Goal: Demonstrate several of the applications included with iChip: FTP, Email and retrieving web pages.

Check Connection to Internet

1. Complete WiFi configuration (infrastructure mode)
2. AT+iPING:www.yahoo.com (shout return ping time in msec)
3. AT+iRLNK:"http://www. google.com/" (should return HTML code)

FTP download

Goal: Download a file from ftp.mozilla.org

1. AT+iFOPN:ftp.mozilla.org:anonymous,111 (opens FTP)
2. AT+iFDL:0 (request list of files)
3. AT+iFCWD:0,pub (change working directory)
4. AT+iFDL:0 (request list of files)
5. AT+iFRCV:0,README (download file to terminal)
6. AT+iFCLS:0 (close FTP connection)

Email Send

Goal: Send email using an existing SMTP server.

1. AT+iSMTP=smtp.mail_server.com
2. AT+iSMA=1 (SMTP authentication – '1' if required)
3. AT+iSMU=me@mail_server.com (SMTP username)
4. AT+iSMP=xyz (SMTP login password)
5. AT+iTOA=me@mail_server.com ('to' address)
6. AT+iREA=me@mail_server.com (reply to address)
7. AT+iSBJ=Email from iChip (email subject line)
8. AT+iEMA:This is a capable chip!

   .

   (message must end with Enter-dot-Enter to send the mail. Should return I/OK followed by I/ONLINE)

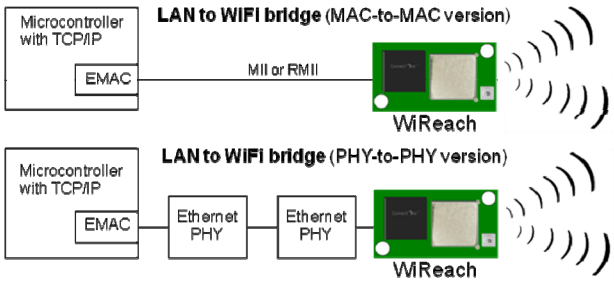
Email Receive

Goal: Retrieve the same email from an existing POP3 server

1. AT+iPOP3=pop.mail_server.com
2. AT+iMBX=me@mail_server.com (POP3 username)
3. AT+iMPWD=111 (POP3 password for username)
4. AT+iRML (Retrieve list of mails in the inbox)
5. AT+iRMH:1 (Retrieve first mail header)
6. AT+iRMM:1 (Retrieve first mail body)

LAN-to-WiFi Bridge mode

Goal: This mode is a perfect solution for adding WiFi to devices which already have 10/100BaseT LAN and onboard TCP/IP. Connect a PC (or existing device with LAN) to LAN port of EVB-363 and bridge connection over WiFi. Embedded implementations use a direct MAC-MAC connection with the module (no PHY needed)



Check Connection to Internet

1. Complete WiFi configuration (infrastructure mode)
2. AT+iRLNK:http://www. google.com/ (should return HTML code)

Configure LAN-WiFi bridge mode

1. AT+iHIF=1 (set the serial interface to RS232)
2. AT+iBDRF=9 (fix baud rate to 115200 after power cycle)
3. AT+iBRM=2
4. Recycle power to the evaluation board.

Once as the module enters LAN-WiFi bridge mode, it becomes a 'layer 2 pipe', passing Ethernet frames to WiFi and vice versa. The module does not have an IP address & cannot be accessed over IP.

Connecting the PC/existing device

1. On the PC or existing device: Disable any internal WiFi card
2. Connect LAN cable from the PC/existing device to RJ45 on EVB
3. Wait for PC to indicate 100Mbps LAN connection with the EVB
4. Your PC/device will get an IP address from the access point
5. You're connected: Browse the Internet, refresh inbox, etc.

Note: Throughput in this mode is up to 12Mbps effective TCP speed (assuming the WiFi connection is fast enough)

Exiting LAN-WiFi bridge mode

1. In EVB-363: AT+iBRM=0 (Disable bridge mode)

SerialNET: Transparent TCP/IP mode

Goal: Demonstrate transparent Serial←→ WiFi bridging. Use Dumb Terminal to send text data over WiFi to a TCP/IP socket on the PC.

Setup: Nano WiReach can be connected to AP or in Ad-Hoc.

1. Verify the WiFi connection is operational
2. AT+iLPRT=5100 (listen port number)
3. AT+iFCHR=\x0D (send with Enter)
4. AT+iSNSI=9 (Baud rate will fix to 115200)
5. AT+iHIF=1 (RS232 cable to the EVB)
6. AT+iSNMD
7. Change baud rate of Dumb Terminal to: 115200 bps
8. Open HyperTerminal
10. Assign random name to the session
11. Connect using: TCP/IP (Winsock)
12. Host address: 172.20.50.1
13. Port number: 5100
14. Click OK

15. Start typing in HyperTerminal and see it appearing on DumbTerminal
16. Type in DumbTerminal. Use Enter key to send to HyperTerminal over TCP/IP.
17. Type: +++ (to exit SerialNET back to AT+i mode)

Troubleshooting

- Use AT+iFD to erase configuration back to factory defaults
- If module appears to be stuck:
  1. Hold MSEL button for 5 seconds
  2. Open terminal on any rate: 9600 to 115200
  3. AT+iFD

Seeking additional help

Please contact Connect One support by calling one of our offices or emailing support@connectone.com