



GS-AN045
S2W UDP, TCP, HTTP
CONNECTION
MANAGEMENT EXAMPLES

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1 Pre-Requirement

Please verify that the “Serial To Wi-Fi” application firmware binaries are loaded on the Gainspan module. For more details on the usage of AT commands described in this document, please refer to the “Serial-to-Wi-Fi Adapter Programming Guide.pdf” document.

2 UDP

2.1 UDP Server

This section describes the steps to setup UDP Server on the Evaluation board using either command mode or auto-connect mode.

2.1.1 Command Mode

1. Disassociate from the current network
 - ▶ `at+wd`
2. Enable DHCP: `AT+NDHCP=<disable=0/enable=1>`
 - ▶ `at+ndhcp=1`
3. Associate to an access point: `AT+WA=<SSID>[,<BSSID>][,<Ch>]`
 - ▶ `at+wa=GainSpanDemoAP,,6`
4. Start a TCP server on a specific port number: `AT+NSUDP=<port>`
 - ▶ `at+nsudp=4000`
5. Upon successful creation of the UDP server, you will see a “CONNECT <CID>” message, where CID is the newly allocated connection identifier. You can check for this new CID by issuing the command: `AT+CID=?`
 - ▶ `at+cid=?`
6. User can now connect to this UDP server by:
 - a. Have a PC connected to the GainSpanDemo AP
 - b. In PC’s command prompt, run UDP client with GS node’s IP address (obtained from step 3), and the port number specified in step 4. For example: `telnet 192.168.3.101 4000`.
 - c. Now anything you type in the client’s command prompt window will be displayed on the TeraTerm. Here’s an example.

The image shows two terminal windows side-by-side. The left window is a Windows command prompt titled 'C:\cygdrive\c\sockets' with the following output:

```

STsao@LPT-STSA0 /cygdrive/c/sockets
$ ipconfig

Windows IP Configuration

Ethernet adapter Wireless Network Connection:

    Connection-specific DNS Suffix  . : 192.168.3.101
    IP Address. . . . .               : 192.168.3.101
    Subnet Mask . . . . .             : 255.255.255.0
    Default Gateway . . . . .         : 192.168.3.1

Ethernet adapter Local Area Connection:

    Media State . . . . .             : Media disconnected

STsao@LPT-STSA0 /cygdrive/c/sockets
$ ./udp_client.exe 192.168.3.100 4000
Client connected
Message sent, waiting for response

```

The right window is a TeraTerm VT terminal titled 'COM4:9600baud - Tera Term VT' showing the AT command sequence and the resulting UDP server status:

```

Serial2WiFi APP
at+wd
OK
at+ndhcp=1
OK
at+wa=GainSpanDemoAP,,6
      IP          SubNet      Gateway
192.168.3.100: 255.255.255.0: 192.168.3.1
OK
at+nsudp=4000
CONNECT 0
OK
at+cid=?
CID    TYPE    MODE    LOCAL PORT    REMOTE PORT    REMOTE IP
0      UDP     SERVER  4000          0              0.0.0.0
OK
0192.168.3.101 1351    You've connected to a UDP echo server

```

2.1.2 Auto Connect Mode

- Disassociate from the current network
 - ▶ `at+wd`
- Enable DHCP: `AT+NDHCP=<disable=0/enable=1>`
 - ▶ `at+ndhcp=1`
- Set the UART communication parameter:
 - `ATB=<baudrate>[[,<bitsperchar>][,<parity>][,<stopbits>]]`
 - ▶ `atb=9600,8,n,2`
- Enable hardware flow control: `AT&R< disable=0/enable=1>`
 - ▶ `at&r1`
- Set the auto connection wireless parameters for the AP profile:
 - `AT+WAUTO=<mode: Infrastructure=0, Ad-hoc=1>,<ssid>,<bssid>,[channel]`
 - ▶ `at+wauto=0,GainSpanDemoAP,,6`
- Set the network parameters for auto connection operation for the current profile:
 - `AT+NAUTO=<client=0/server=1>,<udp=0/tcp=1>,<destination IP>,<destination port>`
Destination IP address is optional if the Adapter is acting as a server
 - ▶ `at+nauto=1,0,,4000`
- Enable auto connection: `ATC<enable=1/disable=0>`
 - ▶ `atc1`
- Save the current profile: `AT&W<profile0=0/profile1=1>`
 - ▶ `at&w0`
- Select the default profile: `AT&Y<profile0=0/profile1=1>`
 - ▶ `at&y0`
- Power off the Evaluation Board
- Power on the Evaluation Board. The board is now in auto-connect mode where it will associate with GainSpanDemoAP, obtain an IP address using DHCP, and listens on port 4000. For example:

```

C:\cygdrive\c\sockets
$ ipconfig

Windows IP Configuration

Ethernet adapter Wireless Network Connection:

    Connection-specific DNS Suffix  . : 
    IP Address . . . . . : 192.168.3.101
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.3.1

Ethernet adapter Local Area Connection:

    Media State . . . . . : Media disconnected

C:\cygdrive\c\sockets
$ ./udp_client.exe 192.168.3.100 4000
Client connected
Message sent, waiting for response

```

```

COM4:9600baud - Tera Term VT
Serial2WiFi APP
at+wd
OK
at+ndhcp=1
OK
atb=9600,8,n,2
OK
at&r1
OK
at+wauto=0,GainSpanDemoAP,,6
OK
at+nauto=1,0,,4000
OK
atc1
OK
at&w0
OK
at&y0
OK

Serial2WiFi APP
IP          SubNet      Gateway
192.168.3.100: 255.255.255.0: 192.168.3.1
CONNECT 0
You've connected to a UDP echo server

```

- To exit out of the auto connection mode, enter the “+++” command, and wait for 1 second. After 1 second, the GS node will exit auto connect mode and enters command mode. Note, do not issue the “enter” key after “+++”.

- ▶ `+++`

2.2 UDP Client

This section describes the steps to setup UDP Client on the Evaluation board using either command mode or auto-connect mode.

2.2.1 Command Mode

1. Disassociate from the current network
 - ▶ `at+wd`
2. Enable DHCP: `AT+NDHCP=<disable=0/enable=1>`
 - ▶ `at+ndhcp=1`
3. Associate to an access point: `AT+WA=<SSID>[,<BSSID>][,<Ch>]]`
 - ▶ `at+wa=GainSpanDemoAP,,6`
4. Start a TCP server: `AT+NCUDP=<Dest-Address>,<Port>>[,<Src.Port>]`
 - ▶ `at+ncudp=192.168.3.101,2000`
5. Upon successful connection to the UDP server, you will see a “CONNECT <CID>” message, where CID is the newly allocated connection identifier

The screenshot shows two windows. The left window is a terminal window titled 'icydrive/c/sockets' showing network configuration for a wireless adapter. The right window is a Tera Term VT window titled 'COM4:9600baud - Tera Term VT' showing AT commands and their responses.

```

Ethernet adapter Wireless Network Connection:
    Connection-specific DNS Suffix . : 
    IP Address . . . . . : 192.168.3.101
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.3.1

Ethernet adapter Local Area Connection:
    Media State . . . . . : Media disconnected

STsao@LPT-SIS00 /cydrive/c/sockets
$ ./udp_server.exe 2000
  
```

```

Serial2WiFi APP
at+wd
OK
at+ndhcp=1
OK
at+wa=GainSpanDemoAP,,6
   IP           SubNet           Gateway
192.168.3.100: 255.255.255.0: 192.168.3.1
OK
at+ncudp=192.168.3.101,2000
CONNECT 0
OK
  
```

2.2.2 Auto Connect Mode

1. Disassociate from the current network
 - ▶ `at+wd`
2. Enable DHCP: `AT+NDHCP=<disable=0/enable=1>`
 - ▶ `at+ndhcp=1`
3. Set the UART communication parameter:
 - ▶ `ATB=<baudrate>[,<bitsperchar>][,<parity>][,<stopbits>]]`
 - ▶ `atb=9600,8,n,2`
4. Enable hardware flow control: `AT&R< disable=0/enable=1>`
 - ▶ `at&r1`
5. Set the auto connection wireless parameters for the AP profile:
 - ▶ `AT+WAUTO=<mode: Infrastructure=0, Ad-hoc=1>,<ssid>,<bssid>,<channel>`
 - ▶ `at+wauto=0,GainSpanDemoAP,,6`

6. Set the network parameters for auto connection operation for the current profile:
 - ▶ `AT+NAUTO=<client=0/server=1>,<udp=0/tcp=1>,<destination IP>,<destination port>`
 - ▶ `at+nauto=0,0,192.168.3.101,2000`
7. Enable auto connection: `ATC<enable=1/disable=0>`
 - ▶ `atc1`
8. Save the current profile: `AT&W<profile0=0/profile1=1>`
 - ▶ `at&w0`
9. Select the default profile: `AT&Y<profile0=0/profile1=1>`
 - ▶ `at&y0`
10. Power off the Evaluation Board
11. Power on the Evaluation Board. The board is now in auto-connect mode where it will associate with GainSpanDemoAP, obtain an IP address using DHCP, and connects to UDP server on port 2000. Here's an example:

```

/gydrive/c/sockets
STsao@LPT-STSA0 /gydrive/c/sockets
$ ipconfig

Windows IP Configuration

Ethernet adapter Wireless Network Connection:

    Connection-specific DNS Suffix  . : 
    IP Address . . . . . : 192.168.3.101
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.3.1

Ethernet adapter Local Area Connection:

    Media State . . . . . : Media disconnected

STsao@LPT-STSA0 /gydrive/c/sockets
$ ./udp_server.exe 2000
  
```

```

COM4:9600baud - Tera Term VT
File Edit Setup Control Window Help
Serial2WiFi APP
at+wd
OK
at+ndhcp=1
OK
atb=9600,8,n,2
OK
at&r1
OK
at+wauto=0,GainSpanDemoAP,,6
OK
at+nauto=0,0,192.168.3.101,2000
OK
atc1
OK
at&w0
OK
at&y0
OK

Serial2WiFi APP
IP SubNet Gateway
192.168.3.100: 255.255.255.0: 192.168.3.1
CONNECT 0
  
```

12. To exit out of the auto connection mode, enter the “+++” command, and wait for 1 second. After 1 second, the GS node will exit auto connect mode and enters command mode. Note, do not issue the “enter” key after “+++”.
 - ▶ `+++`

3 TCP

3.1 TCP Server

This section describes the steps to setup TCP Server on the Evaluation board using either command mode or auto-connect mode.

3.1.1 Command Mode

1. Disassociate from the current network
 - ▶ `at+wd`
2. Enable DHCP: `AT+NDHCP=<disable=0/enable=1>`
 - ▶ `at+ndhcp=1`
3. Associate to an access point: `AT+WA=<SSID>[,<BSSID>][,<Ch>]`
 - ▶ `at+wa=GainSpanDemoAP,,6`
4. Start a TCP server: `AT+NSTCP=<port>`
 - ▶ `at+nstcp=2000`
5. Upon successful creation of the TCP server, you will see a “CONNECT <CID>” message, where CID is the newly allocated connection identifier. You can check for this new CID by issuing the command: `AT+CID=?`
 - ▶ `at+cid=?`

```

COM4:9600baud - Tera Term VT
File Edit Setup Control Window Help

Serial2WiFi APP
at+wd
OK
at+ndhcp=1
OK
at+wa=GainSpanDemoAP,,6
IP SubNet Gateway
192.168.3.101: 255.255.255.0: 192.168.3.1
OK
at+nstcp=2000
CONNECT 0

OK
at+cid=?
CID TYPE MODE LOCAL PORT REMOTE PORT REMOTE IP
0 TCP SERVER 2000 0 0.0.0.0
OK
  
```


6. User can now telnet into this server by:
 - a. Have a PC connected to the GainSpanDemo AP
 - b. In PC's command prompt, issue the command:
telnet <IP address from step 3> <port number set in step 6>
For example: telnet 192.168.3.101at 2000
 - c. Now anything you type in the command prompt window will be displayed on the TeraTerm.

```

COM4:9600baud - Tera Term VT
File Edit Setup Control Window Help
Serial2WiFi APP
at+wd
OK
at+ndhcp=1
OK
at+na=GainSpanDemoAP,,6
IP SubNet Gateway
192.168.3.101: 255.255.255.0: 192.168.3.1
at+ntcp=2000
CONNECT 0
OK
at+cid=?
CID TYPE MODE LOCAL PORT REMOTE PORT REM
0 0 TCP SERVER 2000 0 0
CONNECT 0 1 192.168.3.100 1454
!Hello, this is a test
!Hello, this is another test

StenoRUPY-ST500 ~
$ ipconfig
Windows IP Configuration

Ethernet adapter Wireless Network Connection:

Connection-specific DNS Suffix . :
IP Address. . . . . : 192.168.3.100
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.3.1

Ethernet adapter Local Area Connection:

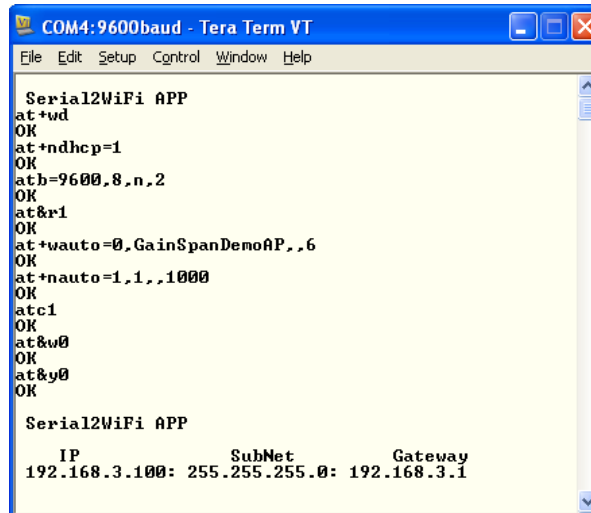
Media State . . . . . : Media disconnected

StenoRUPY-ST500 ~
$ telnet 192.168.3.101 2000
Trying 192.168.3.101...
Connected to 192.168.3.101.
Escape character is '^]'.
Hello, this is a test
Hello, this is another test
  
```

3.1.2 Auto Connect Mode

1. Disassociate from the current network
 - ▶ **at+wd**
2. Enable DHCP: *AT+NDHCP=<disable=0/enable=1>*
 - ▶ **at+ndhcp=1**
3. Set the UART communication parameter:
ATB=<baudrate>[[,<bitsperchar>],[,<parity>]][,<stopbits>]]
 - ▶ **atb=9600,8,n,2**
4. Enable hardware flow control: *AT&R< disable=0/enable=1>*
 - ▶ **at&r1**
5. Set the auto connection wireless parameters for the AP profile:
AT+WAUTO=<mode: Infrastructure=0, Ad-hoc=1>,<ssid>,<bssid>,<channel>
 - ▶ **at+wauto=0,GainSpanDemoAP,,6**
6. Set the network parameters for auto connection operation for the current profile:
AT+NAUTO=<client=0/server=1>,< udp=0/tcp=1>,<destination IP>,<destination port>
Destination IP address is optional if the Adapter is acting as a server
 - ▶ **at+nauto=1,1,,1000**
7. Enable auto connection: *ATC<enable=1/disable=0>*
 - ▶ **atc1**
8. Save the current profile: *AT&W<profile0=0/profile1=1>*
 - ▶ **at&w0**
9. Select the default profile: *AT&Y<profile0=0/profile1=1>*
 - ▶ **at&y0**
10. Power off the Evaluation Board

11. Power on the Evaluation Board. The board is now in auto-connect mode where it will associate with GainSpanDemoAP, obtain an IP address using DHCP, and listens on port 1000. In the following example, the board got an IP address 192.168.3.100.



```

COM4:9600baud - Tera Term VT
File Edit Setup Control Window Help

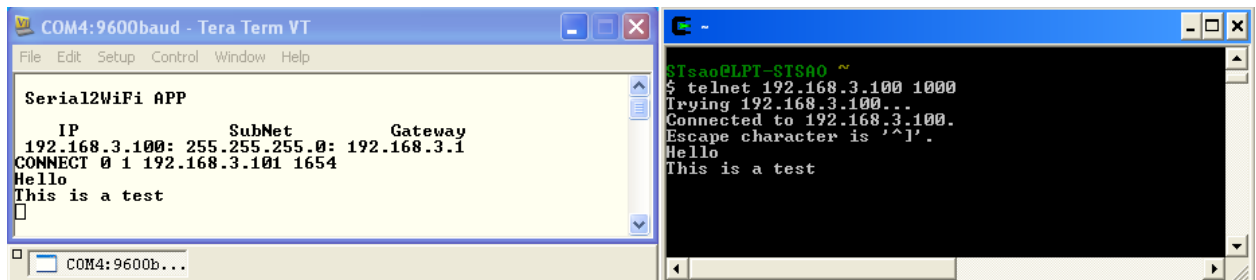
Serial2WiFi APP
at+wd
OK
at+ndhcp=1
OK
atb=9600,8,n,2
OK
at&r1
OK
at+wauto=0,GainSpanDemoAP,,6
OK
at+nauto=1,,1,,1000
OK
atc1
OK
at&w0
OK
at&y0
OK

Serial2WiFi APP

IP          SubNet      Gateway
192.168.3.100: 255.255.255.0: 192.168.3.1

```

12. User can now telnet into this server by:
- Have a PC connected to the GainSpanDemo AP
 - In PC's command prompt, issue the command:
telnet <IP address from step 11> <port number set in step 6>
For example: telnet 192.168.3.100 1000
 - Now anything you type in the command prompt window will be displayed on the TeraTerm. Here's an example.



```

COM4:9600baud - Tera Term VT
File Edit Setup Control Window Help

Serial2WiFi APP

IP          SubNet      Gateway
192.168.3.100: 255.255.255.0: 192.168.3.1
CONNECT 0 1 192.168.3.101 1654
Hello
This is a test

```

```

$Tsan@LPT-ST800 ~
$ telnet 192.168.3.100 1000
Trying 192.168.3.100...
Connected to 192.168.3.100.
Escape character is '^]'.
Hello
This is a test

```

To exit out of the auto connection mode and restore all settings to factory defaults:

- Switch to command mode
 - ▶ **+++**
- Reset to factory defaults
 - ▶ **at&f**
- Save the current profile using the profile number in step 8
 - ▶ **at&w0**
- Set the default profile to be the same as that in step 15
 - ▶ **at&y0**
- Power cycle the evaluation board and the board will power on in command mode

3.2 TCP Client

This section describes the steps to setup TCP Client on the Evaluation board using either command mode or auto-connect mode.

3.2.1 Command Mode

Before you start, have a PC connect to the GainSpanDemoAP and start a TCP server on a specific port number. This example uses port 3000.

1. Disassociate from the current network
 - ▶ `at+wd`
2. Enable DHCP: `AT+NDHCP=<disable=0/enable=1>`
 - ▶ `at+ndhcp=1`
3. Associate to an access point: `AT+WA=<SSID>[,<BSSID>][,<Ch>]]`
 - ▶ `at+wa=GainSpanDemoAP,,6`
4. Start a TCP client: `AT+NCTCP=<Dest-Address>,<Port>`
 - ▶ `at+nctcp=192.168.3.101,3000`

Upon successful connection to the TCP server, you will see a “CONNECT <CID> “ message, where CID is the newly allocated connection identifier. Here’s an example:

The screenshot shows two windows. The left window is a terminal titled 'Icydrive/c/sockets' with the following output:

```

$Tao@LPT1-STSA0 /cygdrive/c/sockets
$ ipconfig

Windows IP Configuration

Ethernet adapter Wireless Network Connection:

    Connection-specific DNS Suffix  . : 
    IP Address. . . . . : 192.168.3.101
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.3.1

Ethernet adapter Local Area Connection:

    Media State . . . . . : Media disconnected

$Tao@LPT1-STSA0 /cygdrive/c/sockets
$ ./tcp_server.exe 3000
Binding to port 3000
A client has connected
  
```

The right window is a Tera Term VT window titled 'COM4:9600baud - Tera Term VT' showing the AT command sequence and response:

```

Serial2WiFi APP
at+wd
OK
at+ndhcp=1
OK
at+wa=GainSpanDemoAP,,6
IP SubNet Gateway
192.168.3.100: 255.255.255.0: 192.168.3.1
OK
at+nctcp=192.168.3.101,3000
CONNECT 0
OK
#you've connected
  
```

3.2.2 Auto Connect Mode

Before you start, have a PC connect to the GainSpanDemoAP and start a TCP server on a specific port number. This example uses port 3000.

1. Disassociate from the current network
 - ▶ `at+wd`
2. Enable DHCP: `AT+NDHCP=<disable=0/enable=1>`
 - ▶ `at+ndhcp=1`
3. Set the UART communication parameter:
 - ▶ `ATB=<baudrate>[,<bitsperchar>][,<parity>][,<stopbits>]]`

- ▶ `atb=9600,8,n,2`
4. Enable hardware flow control: `AT&R<disable=0/enable=1>`
 - ▶ `at&r1`
5. Set the auto connection wireless parameters for the AP profile:
 - `AT+WAUTO=<mode: Infrastructure=0, Ad-hoc=1>,<ssid>,<bssid>,<channel>`
 - ▶ `at+wauto=0,GainSpanDemoAP,,6`
6. Set the network parameters for auto connection operation for the current profile:
 - `AT+NAUTO=<client=0/server=1>,<udp=0/tcp=1>,<destination IP>,<destination port>`
 - ▶ `at+nauto=0,1,192.168.3.101,3000`
7. Enable auto connection: `ATC<enable=1/disable=0>`
 - ▶ `atc1`
8. Save the current profile: `AT&W<profile0=0/profile1=1>`
 - ▶ `at&w0`
9. Select the default profile: `AT&Y<profile0=0/profile1=1>`
 - ▶ `at&y0`
10. Power off the Evaluation Board
11. Power on the Evaluation Board. The board is now in auto-connect mode where it will associate with GainSpanDemoAP, obtain an IP address using DHCP, and connect to the TCP server at 192.168.3.101 on port 3000. If connection to the server is successful, you will see “CONNECT <CID>” followed by “you’ve connected” message. Anything you type in TeraTerm will be received by the TCP server. Here’s an example:

```

Icygdrive/c/sockets
$ ipconfig

Windows IP Configuration

Ethernet adapter Wireless Network Connection:

    Connection-specific DNS Suffix  . : 
    IP Address . . . . . : 192.168.3.101
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.3.1

Ethernet adapter Local Area Connection:

    Media State . . . . . : Media disconnected

Icygdrive/c/sockets
$ ./tcp_server.exe 3000
Binding to port 3000
A client has connected
Received "h"
Received "e"
Received "l"
Received "l"
Received "o"
Received "o"
Received "this is a test"

COM4:9600baud - Tera Term VT
Serial2WiFi APP
at+ud
OK
at+ndhcp=1
OK
atb=9600,8,n,2
OK
at&r1
OK
at+wauto=0,GainSpanDemoAP,,6
OK
at+nauto=0,1,192.168.3.101,3000
OK
atc1
OK
at&w0
OK
at&y0
OK

Serial2WiFi APP

IP                SubNet          Gateway
192.168.3.100: 255.255.255.0: 192.168.3.1
CONNECT 0
you've connected
hello this is a test
  
```

12. To exit out of the auto connection mode, enter the “+++” command, and wait for 1 second. After 1 second, the GS node will exit auto connect mode and enters command mode. Note, do not issue the “enter” key after “+++”.

- ▶ `+++`

4 HTTP

This sections provides instructions to install Apache server in Windows and provides several HTTP GET/POST examples using the Serial To Wi-Fi application.

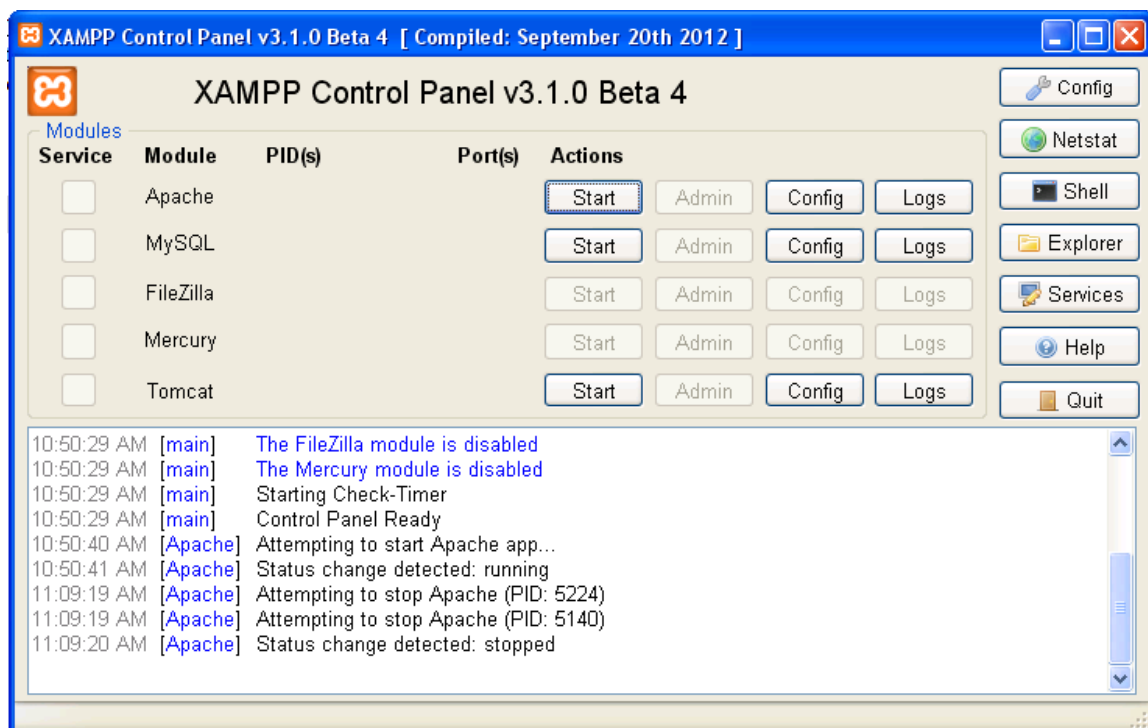
4.1 Installing Apache Server

4.1.1 Install Apache Server in Windows

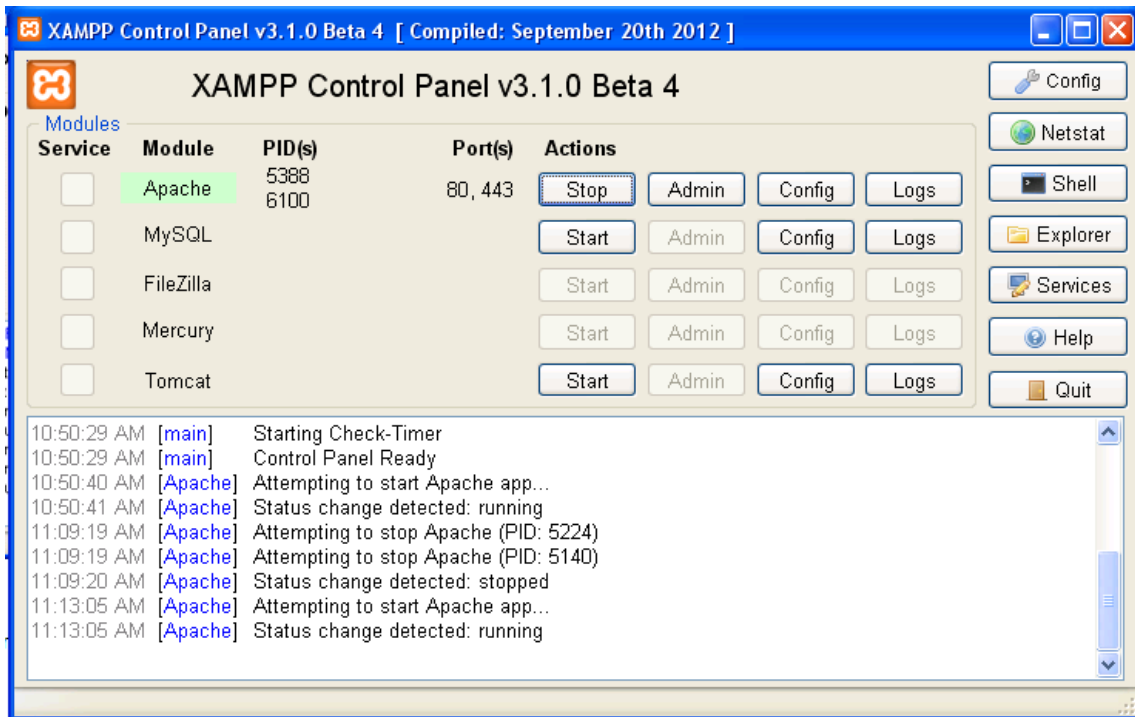
1. Download XAMPP for Windows from the following web link
<http://www.apachefriends.org/en/xampp-windows.html>
2. Run the setup file to install XAMPP. All the files would be extracted to C:\xampp\
Please note to turn off your network connections and all web browsers to avoid any error during the installation process.

4.1.2 Run Apache Web Server

1. Browse to C:\xampp\ and run xampp-control.exe. The xampp control panel is as shown



- Click on the 'Start' button to start the Apache Web server.



- After starting of Apache, go to the address <http://localhost/> or <http://127.0.0.1/> in your browser. This verifies that the web server is running properly.

XAMPP-PORTABLE 1.8.1
[PHP: 5.4.7]

Welcome
Status
Security
Documentation
Components

Php
phpinfo()
CD Collection
Biorhythm
Instant Art
Phone Book

Perl
perlinfo()
Guest Book

J2ee
Info
Tomcat examples

Tools
phpMyAdmin
Mail

©2002-2012
...**APACHE FRIENDS**...

XAMPP 1.8.0
[PHP: 5.4.4]

Willkommen
Status
Sicherheitscheck
Dokumentation
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PHP
phpinfo()
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...**APACHE FRIENDS**...

WELCOME TO XAMPP FOR WINDOWS!

Congratulations:
You have successfully installed XAMPP on this system!

++++ +++++ A great thank you to hackattack142 for this new fine Control Panel! +++++ +++++

XAMPP-Status

Auf dieser Übersicht kann man sehen welche XAMPP-Komponenten gestartet sind bzw. welche funktionieren. Sofern nichts an der Konfiguration von XAMPP geändert wurde, sollten MySQL, PHP, Perl, CGI und SSI aktiviert sein.

Komponente	Status	Hinweis
MySQL-Datenbank	AKTIVIERT	

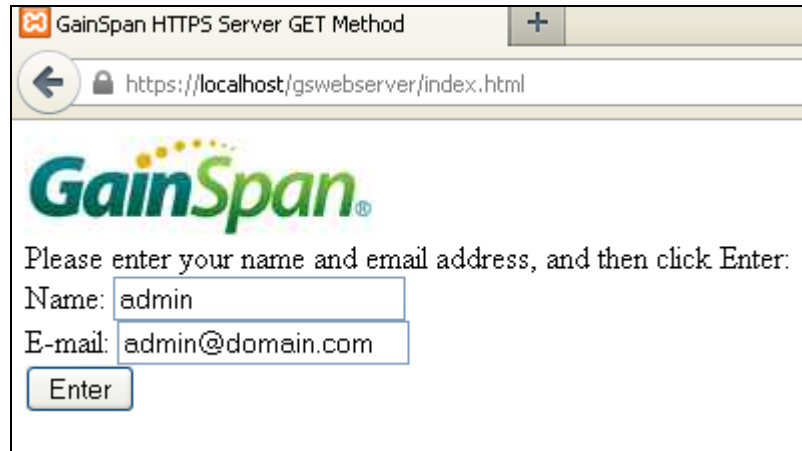
XAMPP Control Panel v3.0.12

Modul	Modul	PID(s)	Port(s)	Aktionen
<input checked="" type="checkbox"/>	Apache	4224	80, 443	Stoppen Admin Konfig Logs
<input checked="" type="checkbox"/>	MySQL	4172	3306	Stoppen Admin Konfig Logs
<input checked="" type="checkbox"/>	FileZilla	4836	21, 14147	Stoppen Admin Konfig Logs
<input type="checkbox"/>	Mercury	4704	25, 79, 105, 106, 110, 143, 2224	Stoppen Admin Konfig Logs
<input checked="" type="checkbox"/>	Tomcat	4340	8005, 8009, 8080	Stoppen Admin Konfig Logs

14.07.07 [mysqld] Statusänderung erkannt: gestartet
14.07.08 [filezilla] Starte Dienst: FileZilla...
14.07.09 [filezilla] Statusänderung erkannt: gestartet
14.07.10 [mercury] Starte Programm: Mercury...
14.07.10 [mercury] Statusänderung erkannt: gestartet
14.07.13 [tomcat] Starte Dienst: tomcat...
14.07.18 [tomcat] Statusänderung erkannt: gestartet

Now you can start using Apache and Co. You should first try »Status« on the left navigation to make sure ever

4. GainSpan provides several example web pages for users to verify that the apache server is configured properly to access the web pages. Copy the GainSpan example "gswebserver" folder into C:\xampp\htdocs\
 - a. To test the index.html web page, open a web browser and go to the address <http://localhost/gswebserver/index.html> or <http://127.0.0.1/gswebserver/index.html>.



GainSpan HTTPS Server GET Method

← <https://localhost/gswebserver/index.html>

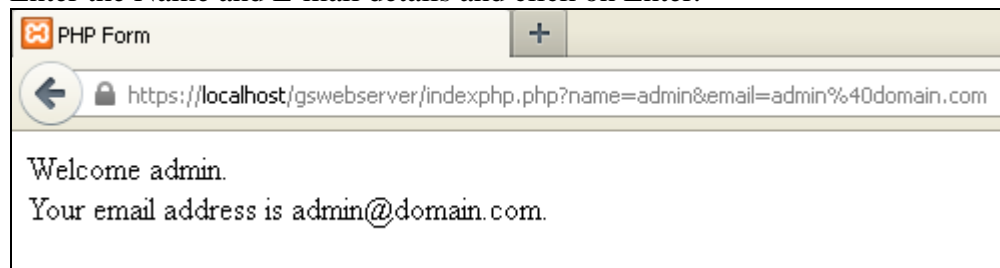
GainSpan®

Please enter your name and email address, and then click Enter:

Name:

E-mail:

Enter the Name and E-mail details and click on Enter.



PHP Form

← <https://localhost/gswebserver/index.php.php?name=admin&email=admin%40domain.com>

GainSpan®

Welcome admin.
Your email address is admin@domain.com.

- b. To test the post.html web page, open a web browser and go to the address <http://localhost/gswebserver/post.html> or <http://127.0.0.1/gswebserver/post.html>.



GainSpan HTTPS Server POST Method

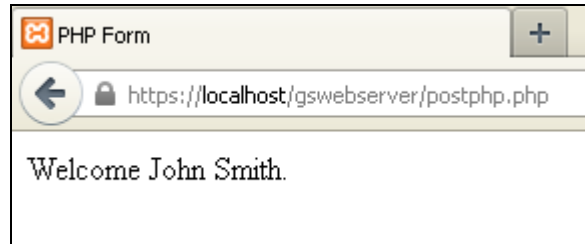
← <https://localhost/gswebserver/post.html>

GainSpan®

Please enter your name and then click Enter:

Name:

Enter the Name and click on Enter.



4.2 HTTP GET EXAMPLES

This section describes the steps to perform a HTTP GET using the Serial2WiFi application.

4.2.1 Example: HTTP GET on local Apache Server

This example shows how to do HTTP GET on a local Apache Server. Setup GSN as HTTP Client, and access the HTTP Server running on the Windows PC.

1. Associate with AP
`at+ndhcp=1`
`at+wa=test_ap,,6`
2. Configure the HTTP parameters:
`at+httpconf=20,Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US) AppleWebKit/534.7 (KHTML, like Gecko) Chrome/7.0.517.44 Safari/534.7`
`at+httpconf=7,application/x-www-form-urlencoded`
`at+httpconf=11,192.168.3.200`
`at+httpconf=3,keep-alive`
3. Initiate HTTP client connection to the server
`at+httpopen=192.168.3.200,80`
4. Do HTTP GET
`at+httpsend=0,1,10,/gswebserver/index.html`

```
COM7:9600baud - Tera Term VT
File Edit Setup Control Window Help

Serial2WiFi APP-Ext.PA
at+ver=??
S2W APP VERSION=2.4.1
S2W GEPS VERSION=2.4.1
S2W WLAN VERSION=2.4.1
S2W BIN TYPE=WEB PROU APP WITH OTAFU ADK
S2W RELEASE TYPE=GA
BUILD TIME=16:12:51
BUILD DATE=Aug 9 2012
WLAN EXT VERSION=1
OK
at+ndhcp=1
OK
at+wa=test_ap.,.6
      IP          SubNet          Gateway
192.168.3.101:255.255.255.0:192.168.3.1
OK
at+httpconf=20,Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US) AppleWebKit/534.7(KHTML,
like Gecko) Chrome/7.0.517.44 Safari/534.7
OK
at+httpconf=7,application/x-www-form-urlencoded
OK
at+httpconf=11,192.168.3.200
OK
at+httpconf=3,keep-alive
OK
at+httpopen=192.168.3.200,80
0
OK
00449200 OK=0,1,10,/gswebserver/index.html
<html>
<head>

<title>GainSpan HTTPS Server GET Method</title>
<link rel="shortcut icon" href="/favicon.ico" />

</head>

<body>
<IMG src="logo.gif"> </br>
Please enter your name and email address, and then click Enter: </br>
<form action="indexphp.php" method="get">
Name: <input type="text" name="name" /> </br>
E-mail: <input type="text" name="email" /> </br>
<input type="submit" value="Enter" />
</form>
</body>
</html>
OK
```

No. -	Time	Source	Destination	Protocol	Info
1825	8.929810	192.168.3.101	192.168.3.200	HTTP	GET /gswebserver/index.html HTTP/1.1
1840	8.997555	192.168.3.200	192.168.3.101	HTTP	HTTP/1.1 200 OK (text/html)

* Frame 1840 (857 bytes on wire, 857 bytes captured)					
+ Radiotap Header v0, Length 20					
+ IEEE 802.11 Data, Flags: ..m...F.C					
+ Logical-Link Control					
+ Internet Protocol, Src: 192.168.3.200 (192.168.3.200), Dst: 192.168.3.101 (192.168.3.101)					
+ Transmission Control Protocol, Src Port: http (80), Dst Port: 47101 (47101), Seq: 1, Ack: 264, Len: 749					
+ Hypertext Transfer Protocol					
+ Line-based text data: text/html					
<pre> <html>\r\n <head>\r\n \r\n <title>Gainspan HTTPS Server GET Method</title>\r\n <link rel="shortcut icon" href="/favicon.ico" />\r\n \r\n </head>\r\n \r\n <body>\r\n </br>\r\n Please enter your name and email address, and then click Enter: </br>\r\n <form action="indexphp.php" method="get">\r\n Name: <input type="text" name="name" /> </br>\r\n </pre>					

4.2.2 Example: HTTP GET on Gainspan.com

This example shows how to do HTTP GET on Gainspan web site.

- Disassociate from the current network
 - ▶ **at+wd**
- Enable DHCP
 - ▶ **at+ndhcp=1**
- Perform network scan
 - ▶ **at+ws**
- If AP security is open, then skip this step. If AP is using WPA-PSK/TKIP, then set the WPA passphrase with the following command:
 - ▶ **at+wwpa=<WPA-PASSWORD>**
- Associate to a specified SSID, BSSID, and channel. **at+wa=<SSID>,<BSSID>,<CHANNEL>**
 - ▶ **at+wa=GainSpanDemoAP,,6**
- Query DNS server for the IP address of hostname URL
 - ▶ **at+dnslookup=www.gainspan.com**
- Configure the HTTP header parameter "GSN_HTTP_HEADER_USER_AGENT"
 - ▶ **at+httpconf=20,User-Agent: Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.9.1.9) Gecko/20100315 Firefox/3.5.9**
- Configure the HTTP header connection parameter "GSN_HTTP_HEADER_CONNECTION". If it is a one-time HTTP GET, set the parameter to "close"
 - ▶ **at+httpconf=3, close**

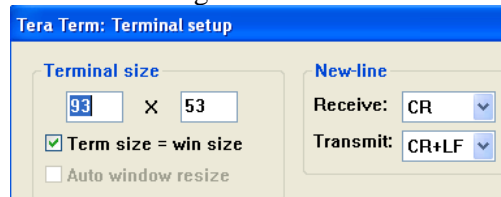
If user wants to do consecutive HTTP GET on the same CID, and given that a server do keep the connection open after HTTP GET is complete, set the parameter to "keep alive"

 - ▶ **at+httpconf=3, keep-alive**
- Configure the HTTP header host parameter "GSN_HTTP_HEADER_HOST"

- ▶ `at+httpconf=11,76.12.140.77`
- 10. Open HTTP client connection. This will return a unique CID.
 - ▶ `at+httpopen=76.12.140.77`
- 11. Send HTTP request to the server using the CID from the previous step
 - `at+httpsend=<CID>, <type: get=1, post=3>, <timeout>, <page>[,size of the content]`
 - ▶ `at+httpsend=0,1,10,/`

4.2.3 Example: HTTP GET on Gainspan.com

1. Change the TeraTerm setting: New-line "transmit=CR+LF"



2. Associate with AP
 - `AT+NDHCP=1`
 - `AT+WWPA=password`
 - `AT+WA=GS-Guest,,01`
3. Start TCP Client to the GainSpan IP and port 80
 - `AT+NCTCP=76.12.140.77,80`
4. Send data to remote server by using the <ESC>S sequence and the CID number:
 - Enter the [ESC] key
 - Enter the [S] key
 - Enter the [CID number from step 3]
5. Copy the highlighted text (the new line should also be copied), and paste it on TeraTerm (via the "Edit" menu, choose "Paste" Option)
 - `GET / HTTP/1.1`
 - `User-Agent: Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.9.1.9) Gecko/20100315 Firefox/3.5.9`
 - `Host: 76.12.140.77:80`
 - `Accept: */*`
 - `Connection: keep-alive`
 - [new line]
 - [new line]
6. Indicate end of transmission by using the <ESC>E sequence:
 - Enter the [ESC] key
 - Enter the [E] key
7. The output of HTTP GET will now be displayed as output on TeraTerm. Since the GainSpan HTTP server closes the connection after HTTP GET is complete, you will see the following output message:
 - `DISCONNECT <cid>`
8. To issue another HTTP GET, repeat step 2-6. If the HTTP server closes the connection after the HTTP GET is complete, then user must issue a HTTP OPEN prior to every HTTP GET. Gainspan.com is an example of such server.

4.3 HTTP POST Examples

This section describes the steps to perform a HTTP POST command using the Serial2WiFi application.

4.3.1 Example: HTTP POST on Local Apache Server

1. Associate with AP
 - `at+ndhcp=1`
 - `at+wa=test_ap,,6`
2. Configure the HTTP parameters:
 - `at+httpconf=20,Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US) AppleWebKit/534.7 (KHTML, like Gecko) Chrome/7.0.517.44 Safari/534.7`
 - `at+httpconf=7,application/x-www-form-urlencoded`
 - `at+httpconf=11,192.168.3.200`
 - `at+httpconf=3,keep-alive`
3. Initiate HTTP client connection to the server
 - `at+httpopen=192.168.3.200,80`
4. Do HTTP POST
 - `at+httpsend=0,3,10,/gswebserver/post.html,5`
 - Enter the [ESC] key
 - Enter the [H] key
 - Enter the CID
 - Enter the text you want to POST.

```
COM7:9600baud - Tera Term VT
File Edit Setup Control Window Help

Serial2WiFi APP-Ext.PA
at+ver=?
S2W APP VERSION=2.4.1
S2W GEPS VERSION=2.4.1
S2W WLAN VERSION=2.4.1
S2W BIN TYPE=WEB PROU APP WITH OTAFU ADK
S2W RELEASE TYPE=GA
BUILD TIME=16:12:51
BUILD DATE=Aug 9 2012
WLAN EXT VERSION=1
OK
at+ndhcp=1
OK
at+wa=test_ap,,6
      IP           SubNet           Gateway
192.168.3.101:255.255.255.0:192.168.3.1
OK
at+httpconf=20,Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US) AppleWebKit/534.7<KHTML,
like Gecko> Chrome/7.0.517.44 Safari/534.7
OK
at+httpconf=7,application/x-www-form-urlencoded
OK
at+httpconf=11,192.168.3.200
OK
at+httpconf=3,keep-alive
OK
at+httpopen=192.168.3.200,80
0
OK
at+httpsend=0,3,10,/gswebserver/post.html,5
OK
00383200 OK
<html>
<head>

<title>GainSpan HTTPS Server POST Method</title>
<link rel="shortcut icon" href="/favicon.ico" />

</head>

<body>
<IMG src="logo.gif"> </br>
Please enter your name and then click Enter: </br>
<form action="postphp.php" method="post">
Name: <input type="text" name="name" /> </br>
<input type="submit" value="Enter" />
</form>

</body>
</html>
OK
```

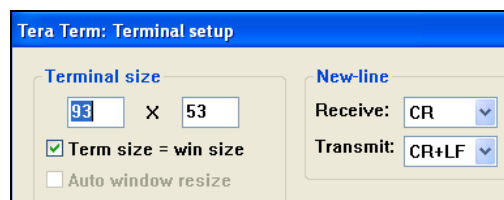
No. -	Time	Source	Destination	Protocol	Info
2099	10.903672	192.168.3.101	192.168.3.200	HTTP	POST /gswebserver/post.html HTTP/1.1
2133	11.061814	192.168.3.200	192.168.3.101	HTTP	HTTP/1.1 200 OK (text/html)
2139	11.063557	192.168.3.101	192.168.3.200	HTTP	Continuation or non-HTTP traffic

Frame 2139 (113 bytes on wire, 113 bytes captured)					
Radiotap Header v0, Length 20					
IEEE 802.11 Data, Flags: ...P...TC					
Logical-Link Control					
Internet Protocol, Src: 192.168.3.101 (192.168.3.101), Dst: 192.168.3.200 (192.168.3.200)					
Transmission Control Protocol, Src Port: 34861 (34861), Dst Port: http (80), Seq: 264, Ack: 1, Len: 5					
Hypertext Transfer Protocol					
Data (5 bytes)					
Data: 73756E6E79					

0000	00 00 14 00 ee 18 00 00	10 16 85 09 a0 00 e2 9c
0010	64 00 00 46 08 11 d5 00	98 fc 11 7b f2 b5 00 1d	d..F....}{....
0020	c9 aa bb cc 00 1f e2 1a	ec 35 90 01 aa aa 03 005.....
0030	00 00 08 00 45 00 00 39	2f db 00 00 40 06 c2 66E..9 /...@..f
0040	c0 a8 03 65 c0 a8 03 c8	88 2d 00 50 08 81 b2 2b	...e....-.P...+
0050	51 83 51 c1 80 18 21 f0	2f 9e 00 00 01 01 08 0a	Q.Q...!./.....
0060	e9 c8 40 2f 00 00 31 59	73 75 6e 6e 79 8d 73 ef	..@/..1Y sunny.s.
0070	81		.

4.3.2 Example: HTTP Post to Pachube.com

1. Change the TeraTerm setting: New-line "transmit=CR+LF"



2. Associate with AP
 - AT+NDHCP=1
 - AT+WVPA=password
 - AT+WA=GS-Guest,,01
3. Start TCP Client to Google's IP and port 80
 - AT+NCTCP=173.203.98.29,80
4. Send data to remote server by using the <ESC>S sequence and the CID number:
 - Enter the [ESC] key
 - Enter the [S] key
 - Enter the [CID number from step 3]
5. Copy the highlighted text, and paste it on TeraTerm (via the "Edit" menu, choose "Paste" Option)
 - PUT /v2/feeds/11366.csv HTTP/1.1
 - User-Agent: curl/7.19.5 (i486-pc-linux-gnu) libcurl/7.19.5 OpenSSL/0.9.8g zlib/1.2.3.3 libidn/1.15
 - Host: api.pachube.com
 - Accept: */*
 - X-PachubeApiKey: 103338a658c84debc9d4d0609362056882b6ccaa312d3de7fbde57e592630007
 - Content-Length: 4
 - Content-Type: application/x-www-form-urlencoded

- 1,44
6. Indicate end of transmission by using the <ESC>E sequence:
 Enter the [ESC] key
 Enter the [E] key
 7. You should now see the data “1,44” on <http://pachube.com/feeds/11366>
 8. Close current connection:
 AT+NCLOSE=0
 9. Start a connection to the Pachube.com IP and port 80
 AT+NCTCP=173.203.98.29,80
 10. Send data to remote server by using the <ESC>S sequence and the CID number:
 Enter the [ESC] [S][CID number from step 9]
 11. Copy the highlighted text, and paste it on TeraTerm (via the "Edit" menu, choose "Paste" Option)
 PUT /v2/feeds/11366.csv HTTP/1.1
 User-Agent: curl/7.19.5 (i486-pc-linux-gnu) libcurl/7.19.5
 OpenSSL/0.9.8g zlib/1.2.3.3 libidn/1.15
 Host: api.pachube.com
 Accept: */*
 X-PachubeApiKey:
 103338a658c84debc9d4d0609362056882b6ccaa312d3de7fbd
 e57e592630007
 Content-Length: 4
 Content-Type: application/x-www-form-urlencoded



- 0,19
12. Indicate end of transmission by using the <ESC>E sequence:
 Enter the [ESC] key
 Enter the [E] key
 13. You should now see the data “0,19” on <http://pachube.com/feeds/11366>
 14. To post another set of data points to Pachube.com, just repeat step 8-12

5 Limited AP

Use the following steps to create a limited AP.

- Set the security type.
- Create the limited AP.
- Enable DHCP server, if needed.
- Enable DNS server, if needed.

Configuring security type to WEP, WPA/WPA2:

To configure security type to WEP, issue the following AT commands:

- AT+WAUTH to 1 or 2 for open or shared authentication
- AT+WWEpn to configure the WEP key.

When using GEPS version 2.3.x and 3.3.x:

- To configure module as Limited AP with WEP security, one should use the Serial to WiFi “Web Server Provisioning” application binaries.
- To configure module as Limited AP with WPA/WPA2 security, one needs to program the Serial to WiFi “Secure Web Server Provisioning” application binaries.

Configuring security type to WPA/WPA2:

To configure security type to WEP, issue the following AT commands:

- AT+WSEC to 4, 8 or 64 for WPA-PSK TKIP, WPA2-PSK AES or WPA2-PSK AES-TKIP correspondingly.
- AT+WAUTH to 0.
- AT+WVPA, AT+WPAPSK or AT+WPSK commands for configuring the key and passphrase.

When using GEPS version 2.4.x and 3.4.x:

- To configure module as Limited AP with WEP security, one should use the Serial to WiFi “Web Prov+OTA FWU” application binaries.
- To configure module as Limited AP with WPA/WPA2 security, one needs to program the Serial to WiFi “EAP +OTA FWU” application binaries.

Enabling DHCP server

To enable/disable the DHCP server, issue the AT command: AT+DHCPSPRV=<0/1>.

Make certain to configure the preferred IP address by using AT+NSET command before issuing this command. The DHCP server will automatically start allocating IP address one higher than the assigned IP address to the node.

5.1 Example: Creating Limited AP in WPA2-PSK mode with DHCP and DNS server enabled

1. Configure network stack parameter: *AT+NSET=<Src Addr>,<Net-Mask>,<Gateway>*
AT+NSET=192.168.3.1,255.255.255.0,192.168.3.1
2. Compute WPA2-PSK from a given SSID and Passphrase: *AT+WPAPSK=<SSID>,<PASSPHRASE>*
AT+WPAPSK=limitedAP,1234567890
3. Configure security to WPA2-PSK: *AT+WSEC=<n>*
AT+WSEC=8
4. Configure authentication mode to NONE: *AT+WAUTH=<none,WPA/WP2=0, open=1, WEP=2>*
AT+WAUTH=0
5. Configure wireless mode to Limited AP: *AT+WM=<infrastructure=0, ad hoc=1,limited AP = 2>*
AT+WM=2
6. Start the DHCP server: *AT+DHCSRVR=<disable=0/enable=1>*
AT+DHCSRVR=1
7. Create the infrastructure network:
AT+WA=<SSID>[, [<BSSID>][, <Ch>]]
AT+WA=limitedAP,,6
8. Start the DNS server and specify a DNS name:
AT+DNS=<disable=0/enable=1, <url>
AT+DNS= 1,www.limitedAP.com

```

COM5:9600baud - Tera Term VT
File Edit Setup Control Window Help
Serial2WiFi APP
at+nset=192.168.3.1,255.255.255.0,192.168.3.1
OK
at+wpapsk=limitedAP,1234567890
Computing PSK from SSID and PassPhrase...
OK
at+wsec=8
OK
at+wauth=0
OK
at+wm=2
OK
at+dhcsrvr=1
OK
at+wa=limitedAP,,6
IP SubNet Gateway
192.168.3.1: 255.255.255.0: 192.168.3.1
OK
at+dns=1,www.limitedAP.com
OK

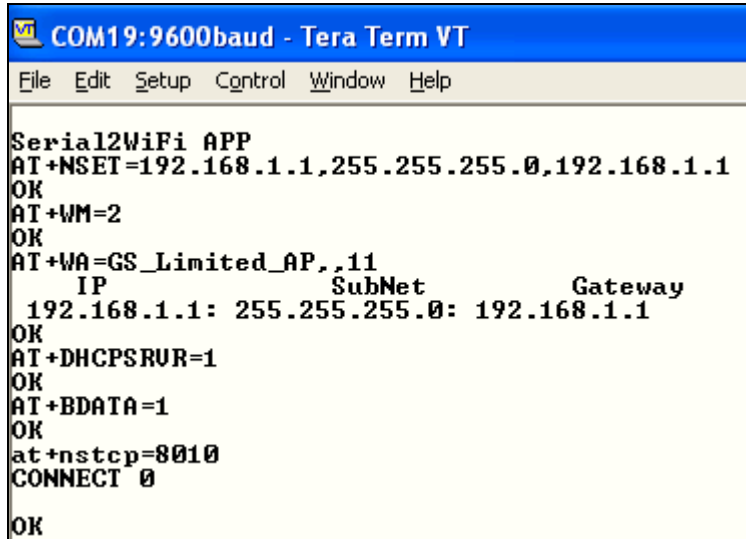
```

5.2 Example: Creating Limited AP in Open Security mode with TCP server enabled

1. Issue the following AT command sequence to create a Limited AP and start TCP server on port 8010.

```
AT+NSET=192.168.1.1,255.255.255.0,192.168.1.1
AT+WM=2
AT+WA=GS_Limited_AP,,11
AT+DHCPSRVR=1
AT+BDATA=1
AT+NSTCP=8010
```

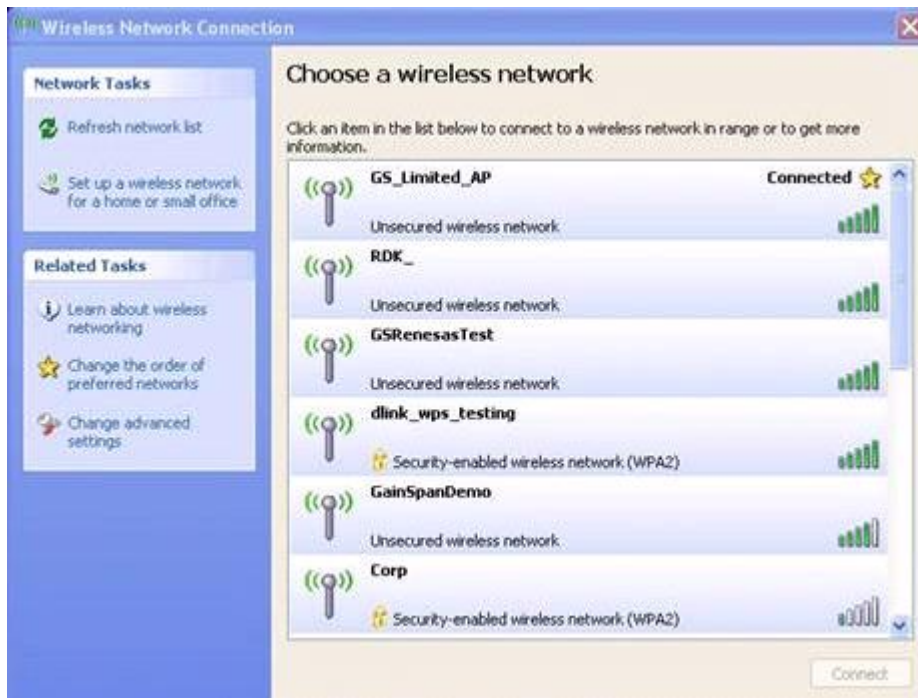
Example output in TeraTerm:



The screenshot shows a TeraTerm window titled "COM19:9600baud - Tera Term VT". The menu bar includes "File", "Edit", "Setup", "Control", "Window", and "Help". The terminal output is as follows:

```
Serial2WiFi APP
AT+NSET=192.168.1.1,255.255.255.0,192.168.1.1
OK
AT+WM=2
OK
AT+WA=GS_Limited_AP,,11
   IP           SubNet           Gateway
192.168.1.1: 255.255.255.0: 192.168.1.1
OK
AT+DHCPSRUR=1
OK
AT+BDATA=1
OK
at+nstcp=8010
CONNECT 0
OK
```

2. PC connected to "GS_Limited_AP".



3. Confirm connection is established, ping to 192.168.1.1 from the PC:

```
DOS Prompt
C:\>ipconfig
Windows IP Configuration

Ethernet adapter Wireless Network Connection:

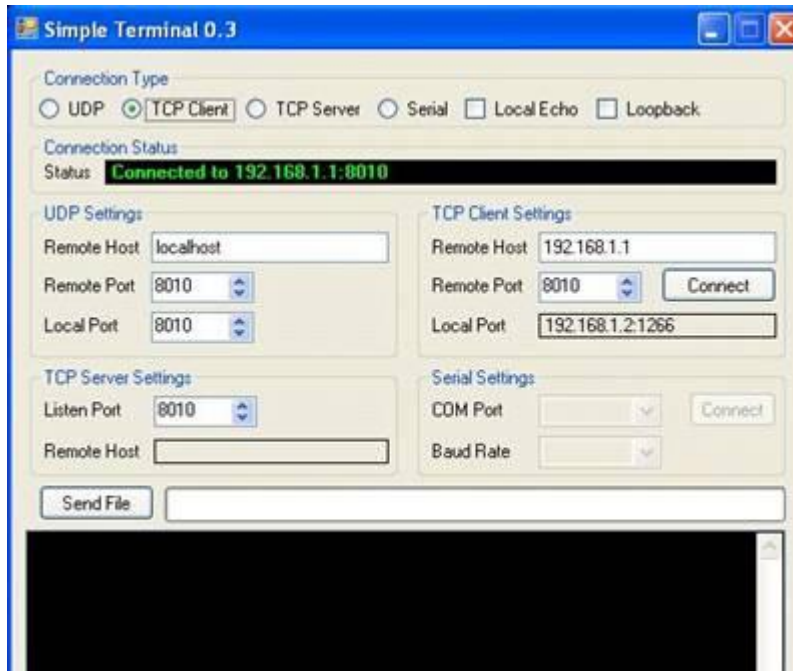
    Connection-specific DNS Suffix  . : 
    IP Address . . . . . : 192.168.1.2
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.1.1

Ethernet adapter Local Area Connection:

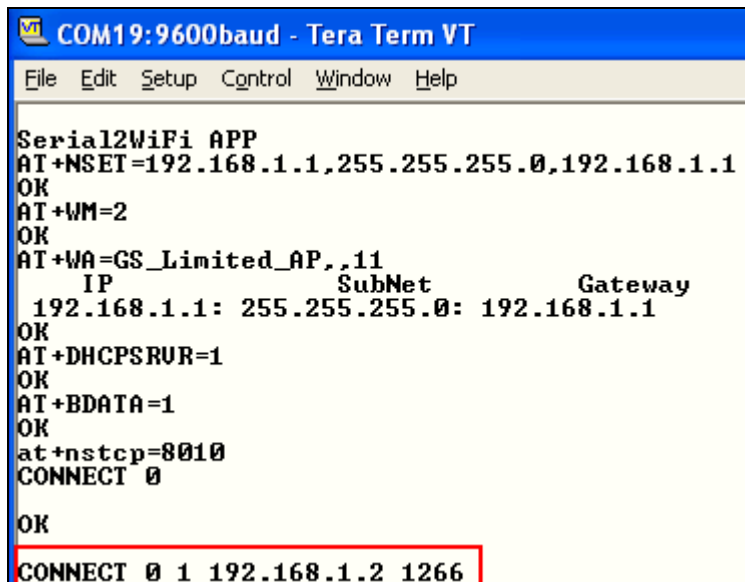
    Media State . . . . . : Media disconnected

C:\>ping 192.168.1.1
Pinging 192.168.1.1 with 32 bytes of data:
Reply from 192.168.1.1: bytes=32 time=5ms TTL=255
Reply from 192.168.1.1: bytes=32 time=5ms TTL=255
Reply from 192.168.1.1: bytes=32 time=4ms TTL=255
```

- On the PC, launch the SimpleTerm and connect to GS1011M (example: 192.168.1.1 8010):

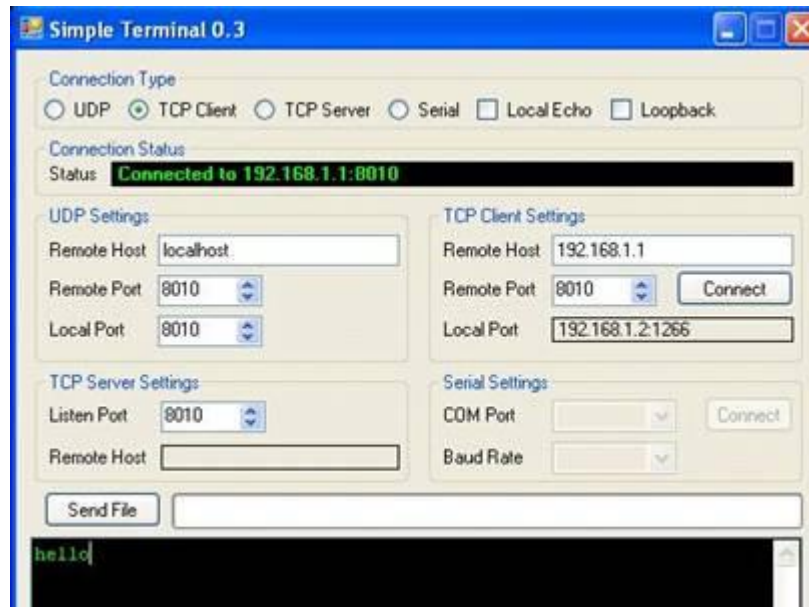


- Upon successful TCP connection, locate the “CONNECT <CID> <CID> <IP Address> <Port number>” message displayed on TeraTerm:

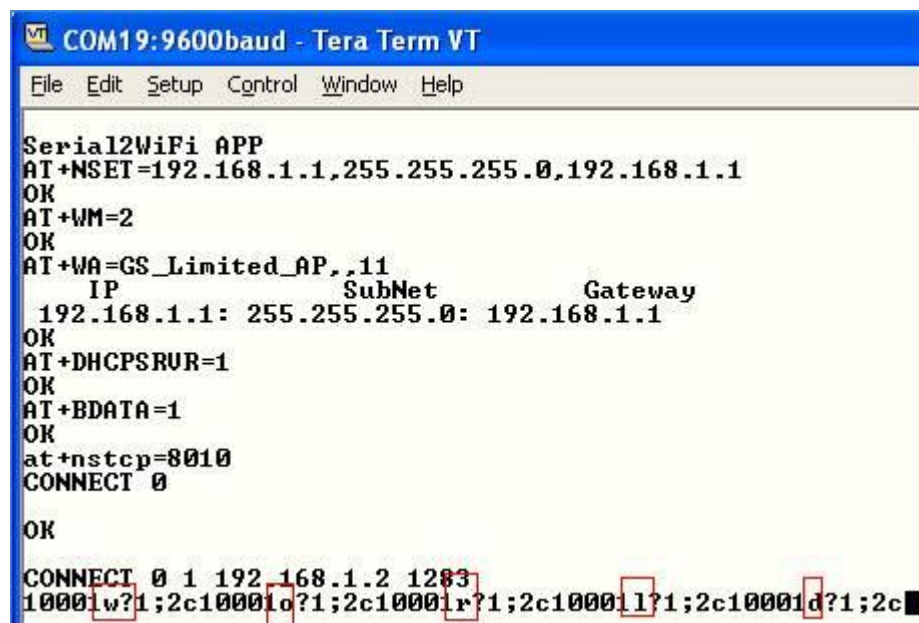


```
COM19:9600baud - Tera Term VT
File Edit Setup Control Window Help
Serial2WiFi APP
AT+NSET=192.168.1.1,255.255.255.0,192.168.1.1
OK
AT+WM=2
OK
AT+WA=GS_Limited_AP,,11
      IP          SubNet          Gateway
192.168.1.1: 255.255.255.0: 192.168.1.1
OK
AT+DHCSRUR=1
OK
AT+BDATA=1
OK
at+nstcp=8010
CONNECT 0
OK
CONNECT 0 1 192.168.1.2 1266
```

6. To send data (for example: hello) from TCP Server (GS1011M) to TCP client (SimpleTerm), go to TeraTerm and enter: <ESC>Z10005hello. You should now see “hello” received in the Simple Terminal window:



7. If you want to send data from TCP client to TCP server, simply enter any text in the Simple Terminal window. In the example shown below, user entered the text “world” slowly in the Simple Term, and the text is seen received on the TeraTerm screen:



6 Additional References

Serial to Wi-Fi Evaluation Kit Startup Guide.pdf

Serial to WiFi_Adapter_Guide.pdf

Detail description of the AT commands supported

Serial to WiFi_Command_Reference.pdf

List of the various AT commands supported

Serial to Provisioning Methods with S2W App Note AN039.pdf

Example of provisioning method supported as well as the steps necessary to connect to the infrastructure (i.e. Access Point) using either Web Based Provisioning or Wi-Fi Protected Setup (WPS).

Serial to WiFi Bridge App Note AN025.pdf

The GainSpan Ultra-Low-Power Wi-Fi System-On-Chip may be used as a transparent bridge to carry serial (UART) traffic over an 802.11 wireless link. Serial commands are used to manage the wireless network configuration. This application note will give the details necessary to setup this bridge.

Version	Date	Remarks
1.2	27-June-2012	▶ Added example for Posting to Pachube.com
1.3	10-July-2012	▶ Limited AP in Open Security mode with TCP
1.8	12-Feb-2013	▶ Updated Limited AP and HTTP example for HTTP POST
1.9	3-May-2013	▶ Updated with wireshark screen shots and optimized command sequence for HTTP GET & POST

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