KOAMTAC Fundamentals

How to Operate the KDC380 Wi-Fi

KOAMTAC

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Table of Contents

1. Wi-Fi Config Menu

	Screen	Comment
1	Power	Turn the Wi-Fi Module Power ON/OFF.
2	AP	Configure the AP
3	Server	Configure the server
4	Connect	Connect to the AP and server
5	Auto Connect	Enable/Disable auto reconnection
6	Send Stored	Enable/Disable sending stored data
7	Version	Shows Wi-Fi module version and MAC address
8	Exit Menu	Return to previous menu

- All configuration is stored in the KDC380

1.1 Power

	Screen
1	Power
2	AP
3	Server
4	Connect
5	Auto Connect
6	Send Stored
7	Version
8	Exit Menu

▶

	Screen	Comment
1	Enabled	Wi-Fi Power On
2	Disabled	Wi-Fi Power Off
3	Save & Exit	Confirm change
4	Cancel & Exit	Cancel

1.2 AP

	Screen
1	Power
2	AP
3	Server
4	Connect
5	Auto Connect
6	Send Stored
7	Version
8	Exit Menu

▶

	Screen	Comment
1	SSID	Set AP SSID
2	Passcode	Set AP Passcode
3	Exit Menu	Exit

- The maximum number of characters for SSID is 32 and Passcode is 64.

1.3 Server

	Screen
1	Power
2	AP
3	Server
4	Connect
5	Auto Connect
6	Send Stored
7	Version
8	Exit Menu

▶

	Screen	Comment
1	IP Address	Set Server IP address
2	URL Address	Set Server DNS name
3	Port Number	Set Server port number
4	Protocol	Set Protocol Type to use.
5	SSL(Security)	Select if using SSL oor not
6	Server Page	Set HTTP Page for data
7	Resp. Timeout	Set HTTP host response timeout
8	Exit Menu	Exit

- Configuration for each protocol type and default settings.

Protocol Type	SSL	Port Number	Server Page	Remarks
UDP	Not supported	User Setting	Not supported	
TCP	Enable	443	Not supported	
	Disable	User Setting		
HTTP GET	Enable	80	Supported	
	Disable			
HTTP_POST	Enable	443	Supported	
	Disable			

- Server Page
    - The GET and POST method uses the same server page. In POST, KDC sends the string after '?' to host before sending actual data. For example, the KDC sends 'data=' before data when the server page is as following.

      /datacollector/InsertData.php?data=

1.4 Connect

	Screen
1	Power
2	AP
3	Server
4	Connect
5	Auto Connect
6	Send Stored
7	Version
8	Exit Menu

▶

	Screen	Comment
1		
2		
3		
4	"Connected…"	

- KDC will attempt to connect to the AP and Server configured in the "AP" and "Server" Menu.

1.5 Auto Connect

	Screen
1	Power
2	AP
3	Server
4	Connect
5	Auto Connect
6	Send Stored
7	Version
8	Exit Menu

▶

	Screen	Comment
1	Enabled	Enables Auto Connect.
2	Disabled	Disables Auto Connect.
3	Save & Exit	Confirm
4	Cancel & Exit	Cancel

- The KDC will attempt to connect to the AP and server ten times when auto connection is enabled and the KDC loses connection.

1.6 Send Stored

	Screen
1	Power
2	AP
3	Server
4	Connect
5	Auto Connect
6	Send Stored
7	Version
8	Exit Menu

▶

	Screen	Comment
1	Enabled	Enables to send stored data
2	Disabled	Disables to send stored data
3	Save & Exit	Confirm
4	Cancel & Exit	Cancel

- This option is only applied to the HTTP_GET and HTTP_POST protocol.
- The KDC will send stored data first and scanned data.

1.7 Version

	Screen
1	Power
2	AP
3	Server
4	Connect
5	Auto Connect
6	Send Stored
7	Version
8	Exit Menu

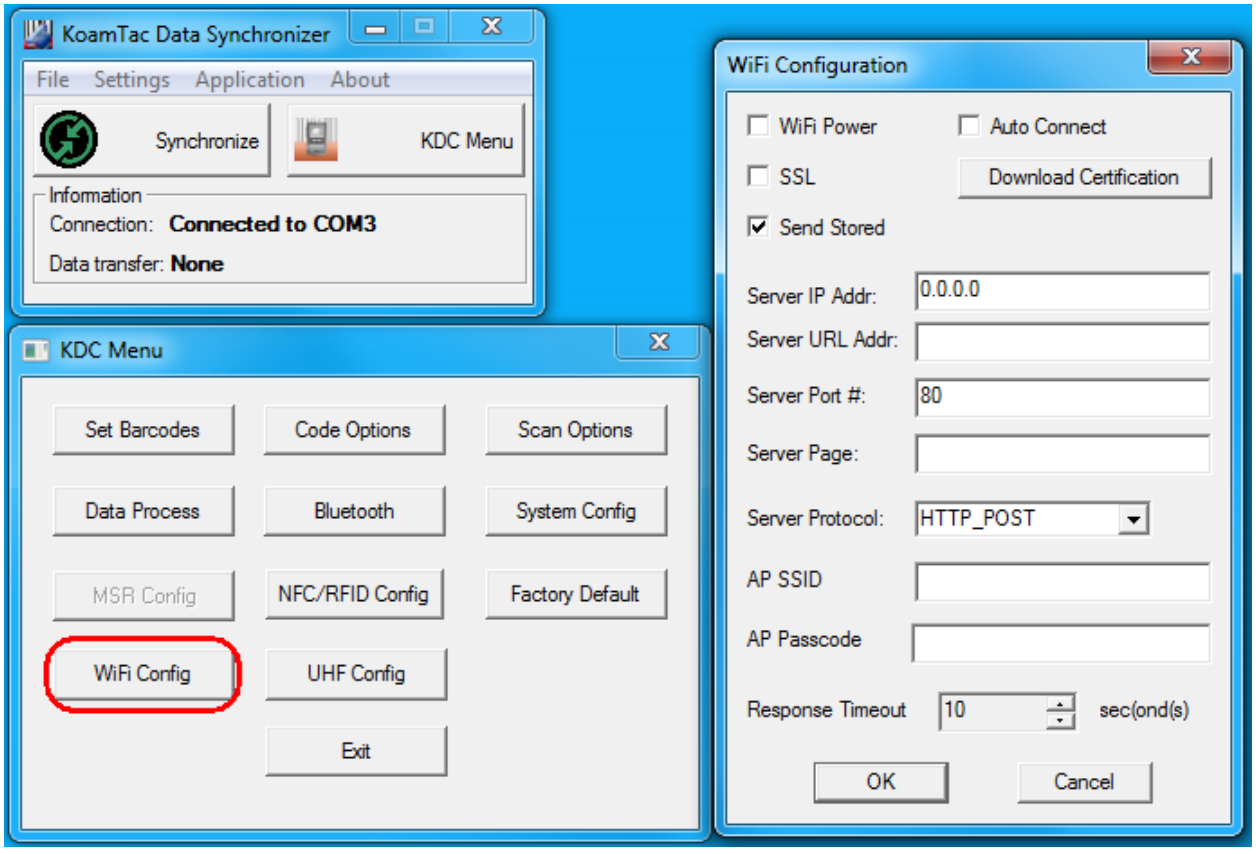
▶

	Screen	Comment
1	APP:5.1.6	Wi-Fi module S/W version
2	MAC:XXXXXXXX	Wi-Fi module MAC address

2. How to use KTSync to configure Wi-Fi

It is possible to configure the following Wi-Fi options by using KTSync.

- Wi-Fi Power
- Auto connect
- SSL
- Download Certification
- Send Stored
- Server IP
- Server URL
- Server Port Number
- Server Page
- Server Protocol
- AP SSID
- AP Passcode
- Response Timeout



3. Wi-Fi Configuration Special Barcodes

3.1 KDC380C

Wi-Fi Enable

Wi-Fi Disable

UDP

TCP

HTTP GET

HTTP POST

Server IP

Server URL

Port Number

Server Page

SSL Enable

SSL Disable

Enable Auto Connect

Disable Auto Connect

AP SSID

AP Passcode

Enable Send Stored

Disable Send Stored

Connect

Resp Timeout = 1 sec

Resp Timeout = 2 seconds

Resp Timeout = 3 seconds

Resp Timeout = 4 seconds

Resp Timeout = 5 seconds

Resp Timeout = 6 seconds

Resp Timeout = 7 seconds

Resp Timeout = 8 seconds

Resp Timeout = 9 seconds

Resp Timeout = 10 seconds

Load Certificate[Binary]

Load Certificate[HexDecimal]

3.2 KDC380L/KDC380D

Wi-Fi Enable

Wi-Fi Disable

UDP

TCP

HTTP GET

HTTP POST

Server IP

Server URL

Port Number

Server Page

SSL Enable

SSL Disable

Enable Auto Connect

Disable Auto Connect

AP SSID

AP Passcode

Enable Send Stored

Disable Send Stored

Connect

Resp Timeout = 1 sec

Resp Timeout = 2 seconds

Resp Timeout = 3 seconds

Resp Timeout = 4 seconds

Resp Timeout = 5 seconds

Resp Timeout = 6 seconds

Resp Timeout = 7 seconds

Resp Timeout = 8 seconds

Resp Timeout = 9 seconds

Resp Timeout = 10 seconds

Load Certificate[Binary]

Load Certificate[HexDecimal]

4. How to test data transmission

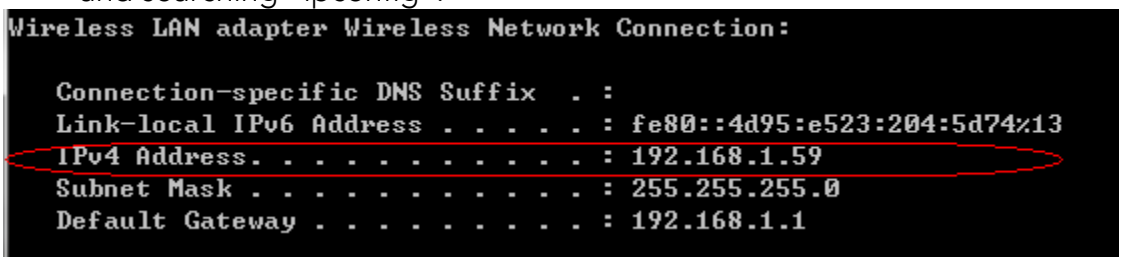
4.1 TCP

Step 1. Wi-Fi Module Power ON

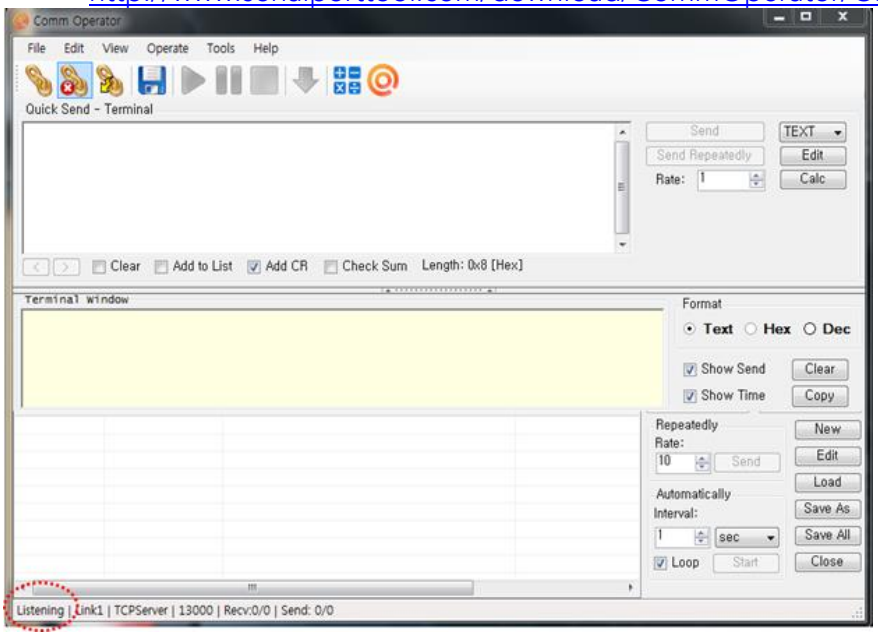
- Turn on the Wi-Fi module's power with "Wi-Fi Config"→"Power"→"Enable".

Step 2. Configure server information

- "Wi-Fi Config" → "Server" → "IP Address" → "XXX.XXX.X.XX"
- "Wi-Fi Config" → "Server" → "Port Number" → "XXXXX".
- "Wi-Fi Config" → "Server" → "Protocol" → "TCP".
- Obtain the PC's IP address by opening the command prompt in the windows and searching "ipconfig".



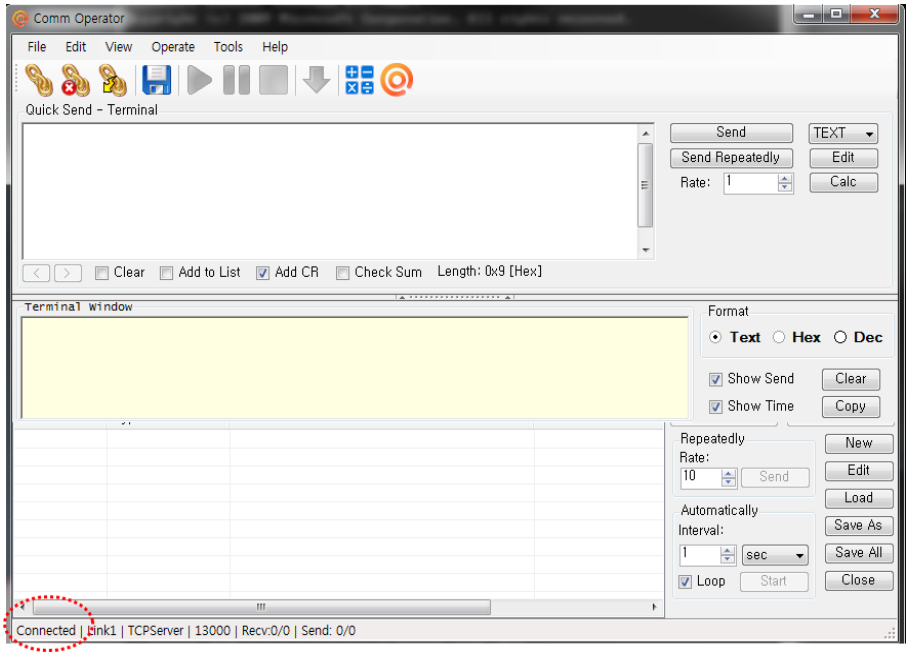
- The port address is defined in the following test application called "CommOp".
  - 30 day free trial can be downloaded from http://www.serialporttool.com/download/CommOperator/CommOperator.zip



Step 3. Connect to server

- Run the test application "CommOp.exe" with TCP server listening mode. Be sure the status is in "Listening" as shown below.

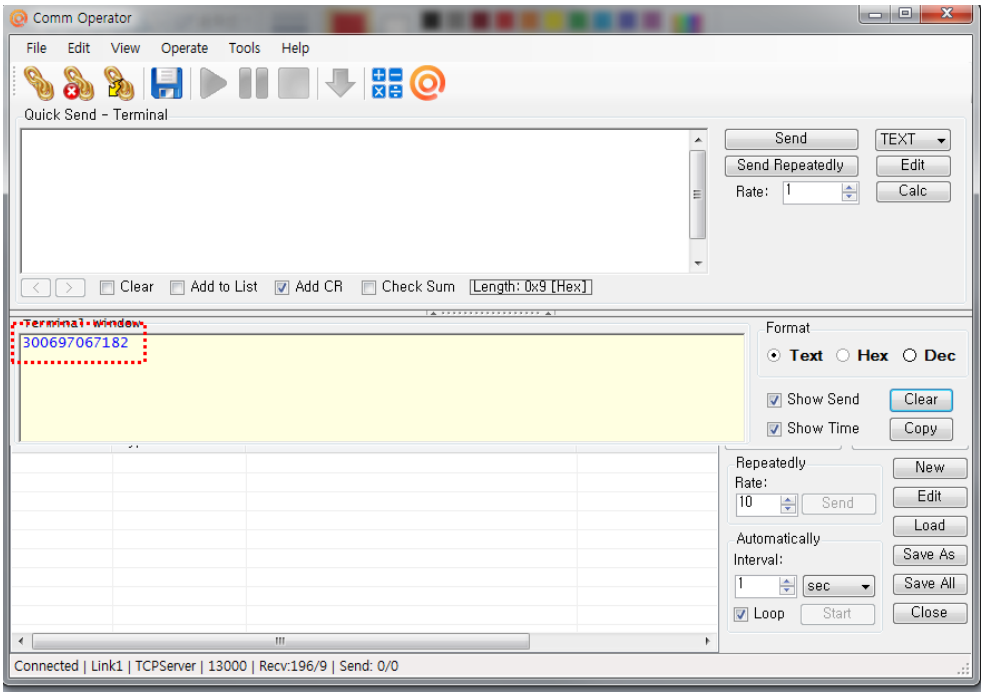
- Connect the KDC to the server in "Wi-Fi Config"→"Connect"



- The status will be changed from "Listening" to "Connected" as shown above once the KDC is connected to the server.

Step 4. Send Barcode Data to server

- Scan a barcode.



- The barcode sent from the KDC is displayed on the test application as shown above.

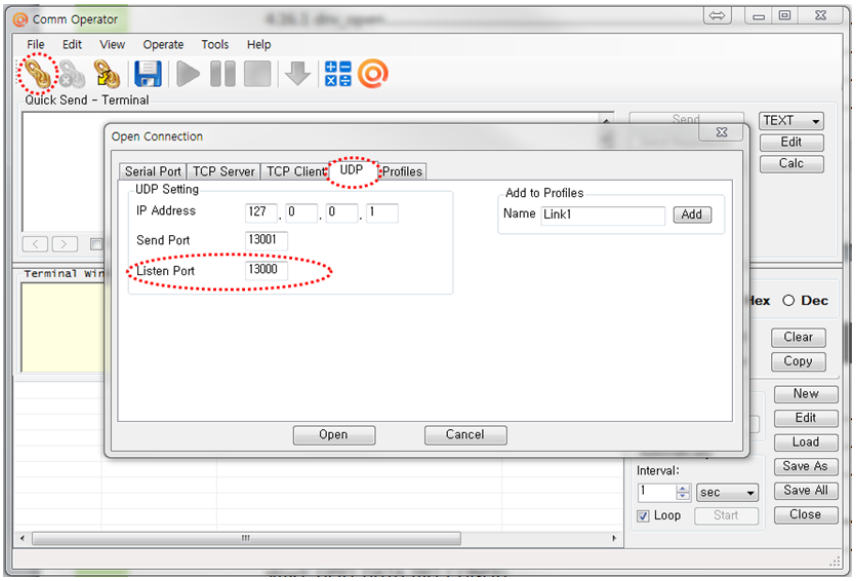
4.2 UDP

Step 1. Wi-Fi Module Power ON

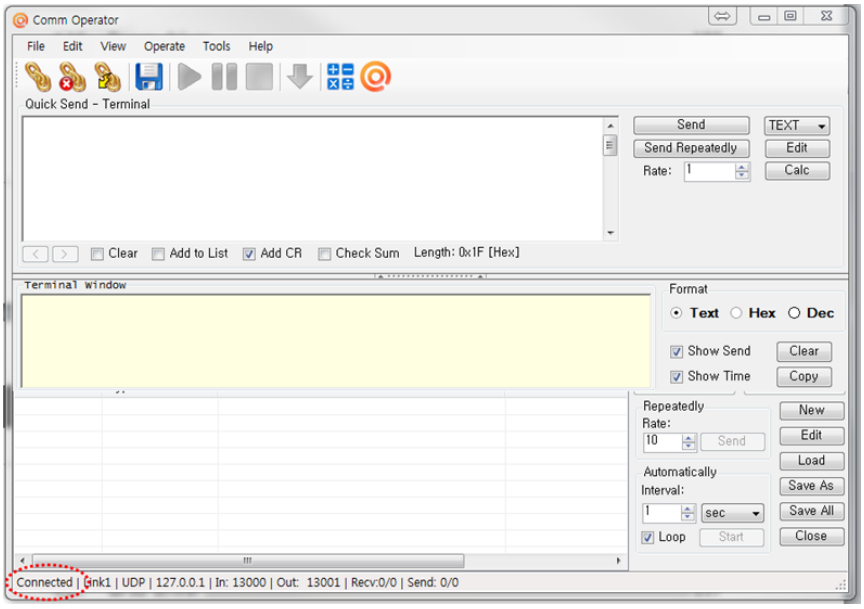
- Turn on the Wi-Fi power module with “Wi-Fi Config” → “Power” → “Enable”.

Step 2. Configure server information

- “Wi-Fi Config” → “Server” → “IP Address” → “XXX.XXX.X.XX”.
- “Wi-Fi Config” → “Server” → “Port Number” → “13000”.
- “Wi-Fi Config” → “Server” → “Protocol” → “UDP”.



- The port address is defined in the test application as following

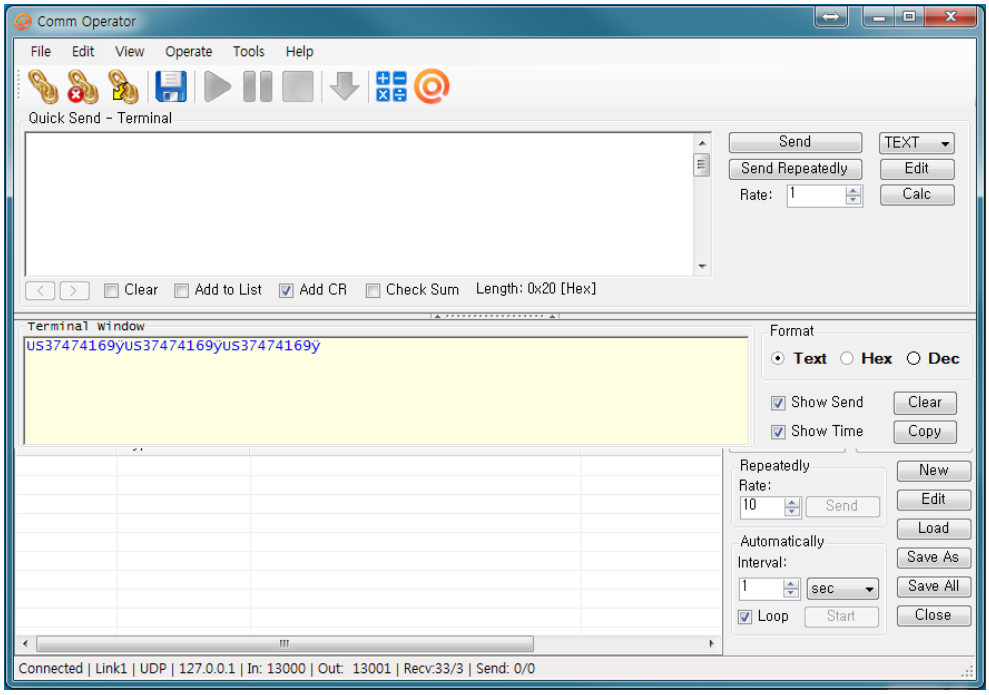


Step 3. Connect to server

- Run the tester application “CommOp.exe” with UDP mode chosen.
- Connect the KDC to the server in “Wi-Fi Config” → “Connect”.

Step 4. Send barcode data to server

- Scan barcode and the barcode will be displayed as following screen.



4.3 HTTP GET&POST

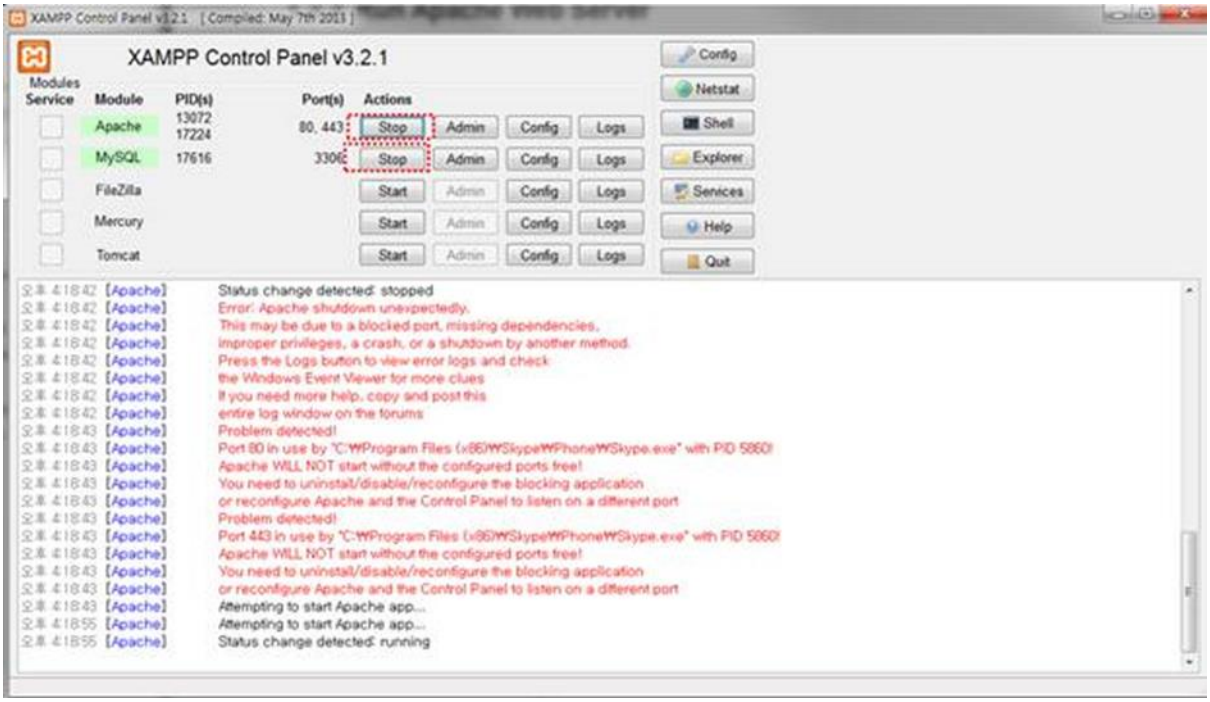
Step 1. Install Apache Server (XAMPP)

- Download the installer from http:www.apachefriends.org/en/xampp-windows.html

Version		Checksum			Size
5.5.24 / PHP 5.5.24	What's Included?	md5	sha1	Download (32 bit)	104 Mb

Step 2. Run XAMPP Control Panel

- Run the XAMPP Control Panel and make sure both Apache and MySQL can be started as shown on the following screen. If it is unable to start, terminate all other online programs, such as skype.

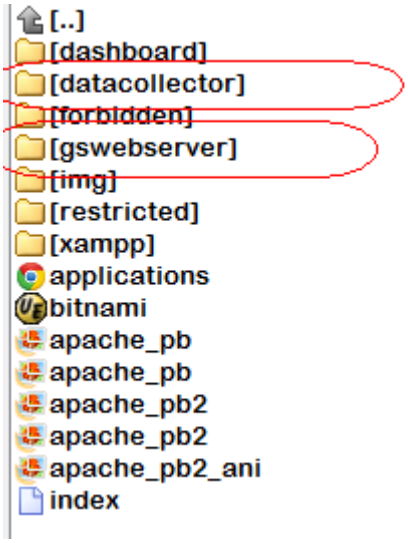


Step 3. Copy web server program into XAMPP

- Unzip the two files below and copy them into c:/xampp/htdocs

  1. Gswebserver.zip
  2. Datacollector.zip

- Be sure the directory list looks like the following



- Make sure that the Apache server has been installed correctly by accessing http://localhost/gswebserver/index.html. You should see the following screen.

Step 4. Setup SSL

- Unzip the certificates.zip and
  1. Copy 'server.crt' into /xampp/apache/conf/ssl.crt
  2. Copy 'server.key' into /xampp/apache/conf/ssl.key
  3. Make sure the following 3 lines are in /xampp/apache/conf/extra/httpd-ssl.conf.

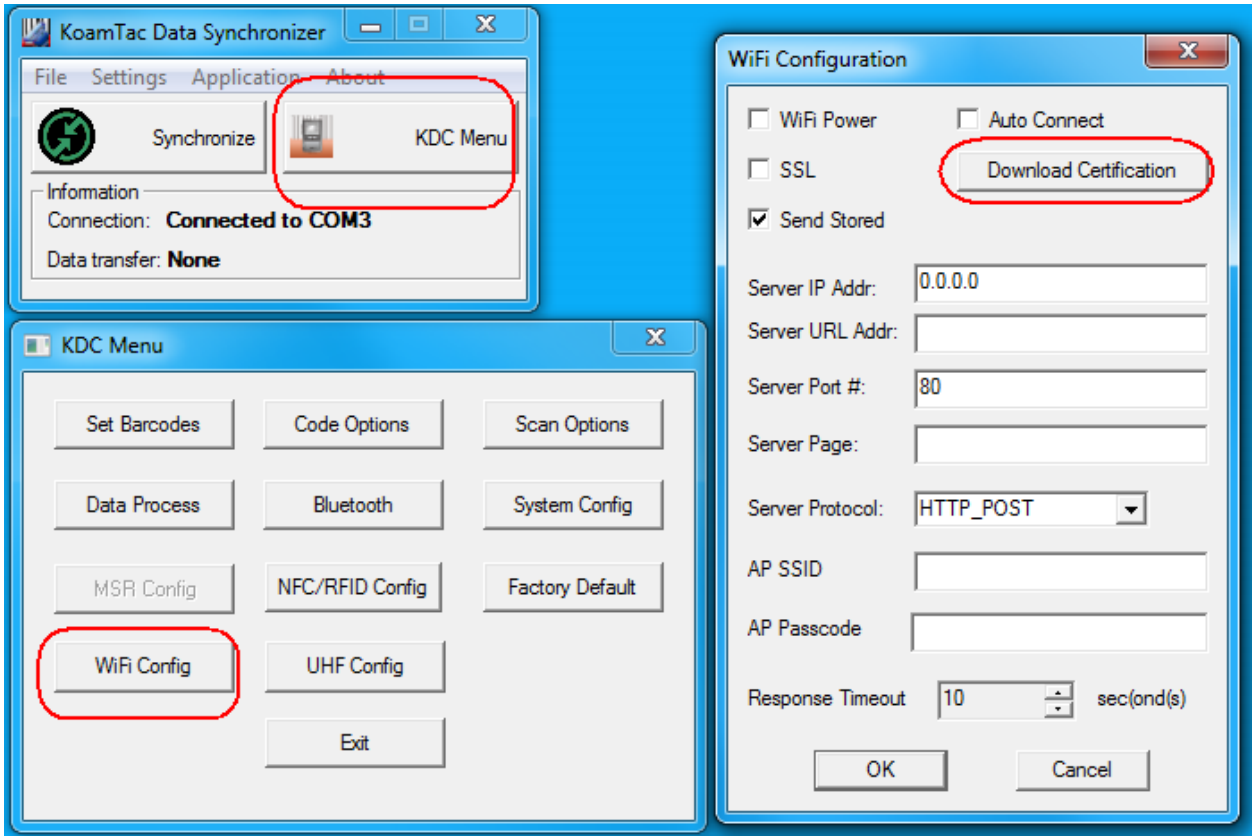
     # SSL Engine Switch:

     # Enable/Disable SSL for this virtual host.

     SSLEngine on

- Download 'cacert.der' into KDC using KTSync

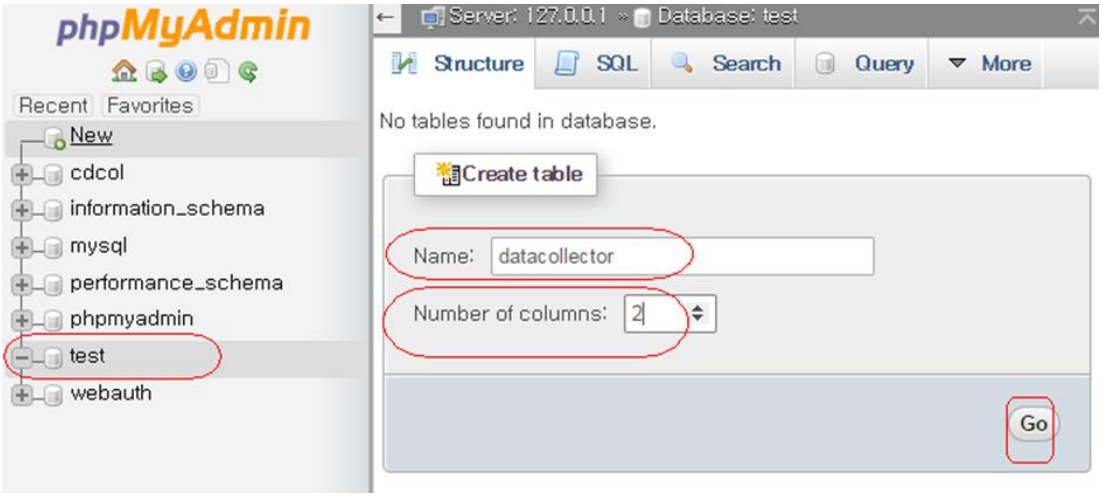
  1. Open KDC Menu and enter Wi-Fi Config.
  2. Select "Download certification" to download certification data into KDC.
  3. KTSync will display "Download is done".



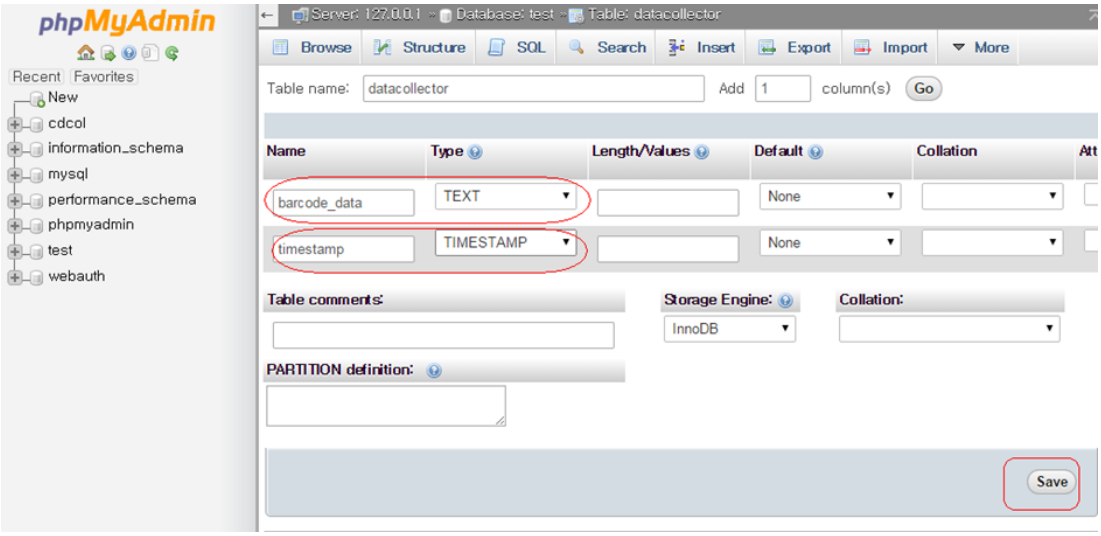
Step 5. Setup SQL DB

- Enter the MqSQL configuration by pressing "Admin" in XAMPP as shown

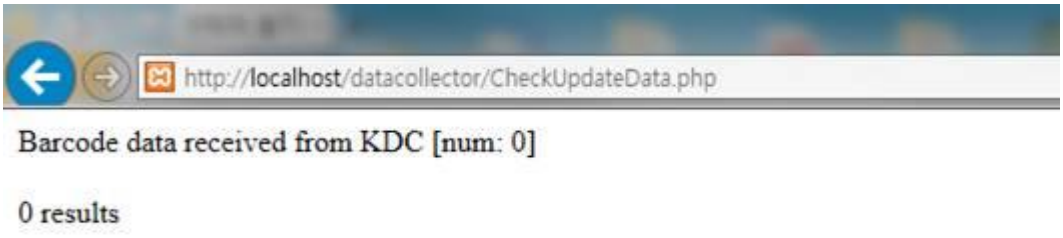
- Select "test" and press 'Go" button after entering "datacollector" in Name, and "2" in the Number of columns in the following screen.



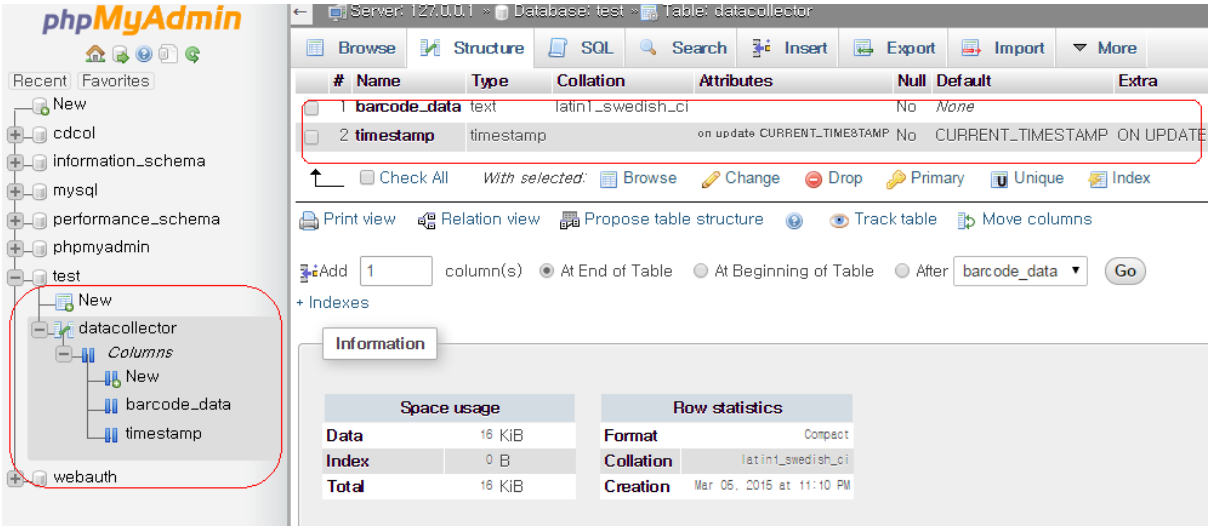
- Enter the following name and type as shown below, then click "Save".



- Once Save is completed, the following screen will display.



- If everything is installed properly, the following screen will display while opening: http://localhost/datacollector/CheckUpdateData.php.



Step 6. Send data from KDC to server

- Configure the KDC380 settings as follows:

  IP Address: Server IP address
  Port: 80(HTTP) if SSL is disabled, 443(HTTPS) if SSL is enabled.
  Server page: /datacollector/InsertData.php?data=

[Note]

- Set the KDC date to current date when using provided certificates.
- Rename InsertData.php.GET when using HTTP GET method.
- Rename InsertData.php.POST when using HTTP POST method.
-

5. Data Format

5.1 Storage Format

KDC380 Wi-Fi model can store scanned barcode and RFID data into internal flash memory.

The KDC380 Wi-Fi model stores the read barcodes and RFID data in the internal flash memory in the following data format:

C0	Y0	D0	T0	C1	Y1	D1	T1	…..	…..	…..	…..	Cn	Yn	Dn	Tn

Where

- C0,C1,…,Cn : Total number of each barcode record (C+Y+D+T) (2 bytes).
- Y0,Y1,…, Yn : Type of each barcode (1 byte) or RFID tag.
- D0,D1,…,Dn : Actual barcode data of each barcode (variable size) or RFID data.
- T0, T1,…,Tn : Timestamp of each barcode (4 bytes) or RFID data.

The timestamp field has 6 sub-fields as follows:

MSB LSB

Years (6 bits)	Months (4 bits)	Days (5 bits)	AM/PM (1 bit)	Hours (4 bits)	Minutes (6 bits)	Seconds (6 bits)

Note:

(1) The base year is 2000. It means the year is 2000 if the Years field is 0.

(2) The Hours range is 0 – 11 and AM/PM bit 0 means AM, and 1 means PM

5.2 Sending Format

The KDC380 Wi-Fi model sends barcode and RFID data to host with the following format in the HTTP_GET and HTTP_POST modes.

1. Packet Data
    - Real time data

TAG (0)	UID (10)	Type (3)	Timestamp (14)	Data Length (4)	Data (N)

    - Stored data

TAG (1)	UID (10)	Type (3)	Timestamp (14)	Data Length (4)	Data (N)	…….	Type (3)	Timestamp (14)	Data Length (4)	Data (N)

Where

- TAG(1 byte)
    - '0': Real time data
    - '1': Stored data
- UID(10 bytes)
    - It is a unique identifier of KDC380. It contains 10 digits of KDC380 serial number.
- Type(3 bytes) ➔ Decimal number of barcode type or RFID type
    - It says if the following data is a barcode or RFID.

        "000" – "111": Barcode data

        "112" – "125": RFID tag data
- Timestamp(14 bytes)
    - It is the timestamp of each barcode and RFID data and will be sent with the following format.

YYYYMMDDHHmmSS

- Data Length(4 bytes)
  - The length of Data(N). “0000” to “9999”.
- Data(N bytes)
  - The barcode data or RFID data.

**** When there are stored data, KDC sends stored data first and real time data as following. ****

[[[[[Example 1]]]]]

- Stored data
  FVF3815
- Real time data
  koamtac.com

  115X5013527019201503011313210007FVF3815027201503011313380011koamtac.com
  - ✓ 1 ➔ Stored data
    - ◆ 15X5013527 ➔ Device serial number
    - ◆ 019 ➔ ‘FVF3815’ barcode type(Code 39)
    - ◆ 20150301131321 ➔ Time stamp(2015/3/1, 13/13/21)
    - ◆ 0007 ➔ Barcode length
    - ◆ FVF3815 ➔ Barcode data
  - ✓ Real Time Data
    - ◆ 027 ➔ ‘koamtac.com’ barcode type(Code 128)
    - ◆ 20150301131338 ➔ Time stamp
    - ◆ 0011 ➔ Barcode length
    - ◆ koamtac.com ➔ Barcode data

[[[[[Example 2]]]]]

- Real time data

  koamtac.com

  015X5013527027201512192152010011koamtac.com
  - 0 ➔ Real time data

- 15X5013527 ➔ Device serial number
- 027 ➔ 'koamtac.com' barcode type(Code 128)
- 20150301131338 ➔ Time stamp
- 0011 ➔ Barcode length
- koamtac.com ➔ Barcode data

5.3 Barcode Type

- KDC380C

Type #	Symbology	Type#	Symbology
0	Code 32	24	MSI
1	Trioptic	25	Code 11
2	Korea Post	26	Code 93
3	Aus. Post	27	Code 128
4	British Post	28	Code 49
5	Canada Post	29	Matrix 2of5
6	EAN-8	30	Plessey
7	UPC-E	31	Code 16K
8	GS1-128	32	Codablock F
9	Japan Post	33	PDF417
10	KIX Post	34	QR code
11	Planet Code	35	Telepen
12	OCR	36	VeriCode
13	Postnet	37	Data Matrix
14	China Post	38	MaxiCode
15	Micro PDF417	39	GS1 Omni
16	TLC 39	40	GS1 Limited
17	PosiCode	41	Aztec Code
18	Codabar	42	GS1 Expanded
19	Code 39	43	Hanxin Code
20	UPC-A	44	Unknown
21	EAN-13	45	Driver License
22	I2of5		
23	IATA		

- KDC380L/380D

Type #	Symbology	Type#	Symbology
0	EAN 13	10	Code 93
1	EAN 8	11	Code 35
2	UPCA	12	Code 128
3	UPCE	13	N/A
4	Code 39	14	N/A
5	ITF-14	15	Bookland
6	Code 128	16	GS1 Omni
7	I2of5	17	GS1 Limited
8	CodaBar	18	GS1 Expanded
9	GS1-128		

5.4 NFC Tag Type

Type #	Tag Type
0x79	Mifare 1K
0x7a	Mifare Ultralight C
0x7b	Mifare Ultrlight
0x7d	ISO 15693

6. How to send KDC commands in HTTP GET/POST mode

It is possible to send KDC commands to KDC as HTTP Response so KDC can display message for example.

To send KDC commands as HTTP Response, please add following to HTTP Response.

```
Received Barcode Post <?php echo ""; ?>.<br />
</body>
</html>
<HTML>
<KDC GMBC="64#08#3#"/>
<KDC GML="4#"/>
<KDC GML="1#"/>
<KDC GMC="0"/>
<KDC GMf="1#"/>
<KDC C="^15^03^01^13^12^34"/>
<KDC GMT="[POST]Scan     successful^13"/>
<h2> Test successful....</h2>
</HTML>
```

- KDC first is looking for '<KDC ' as a start indicator of KDC commands
- KDC then is looking for command byte as like 'GMBC=', 'GML=' or 'GMT='
- KDC is getting command parameters as like "64#08#3#" and "[POS]Scan successful^13"
- Finally KDC is looking for the command end indicator '/>'.

7. Workflow

The following diagram demonstrates the firmware workflow in HTTP GET/POST mode.