

KOAMTAC Fundamentals How to Operate the KDC380 Wi-Fi

ΚΟΛΜΤΛΟ

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Table of Contents

1. WI-FI CONFIG MENU	4
1.1 Power	4
1.2 AP	5
1.3 Server	6
1.4 Connect	7
1.5 Auto Connect	
1.6 Send Stored	9
1.7 Version	9
2. HOW TO USE KTSYNC TO CONFIGURE WI-FI	
3. WI-FI CONFIGURATION SPECIAL BARCODES	11
3.1 KDC380C	
3.2 KDC380L/KDC380D	
4. HOW TO TEST DATA TRANSMISSION	15
4.1 TCP	
4.2 UDP	
4.3 HTTP GET&POST	
5. DATA FORMAT	25
5.1 Storage Format	
5.2 Sending Format	
5.3 Barcode Type	
5.4 NFC Тад Туре	
6. HOW TO SEND KDC COMMANDS IN HTTP GET/POST MO	DE31

7.	WORKFLOW	32	2

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



1.2 AP

	Screen			Screen	Comment
1	Power		1	SSID	Set AP SSID
2	AP	►	2	Passcode	Set AP Passcode
3	Server				
4	Connect		3	Exit Menu	Exit
5	Auto Connect				
6	Send Stored				
7	Version				
8	Exit Menu				

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

1.3 Server

	Screen			Screen	Comment
1	Power		1	IP Address	Set Server IP address
2	AP	►	2	URL Address	Set Server DNS name
3	Server		3	Port Number	Set Server port number
4	Connect		4	Protocol	Set Protocol Type to use.
5	Auto Connect		5	SSL(Security)	Select if using SSL oor not
6	Send Stored		6	Server Page	Set HTTP Page for data
7	Version		7	Resp. Timeout	Set HTTP host response timeout
8	Exit Menu		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	
	Enable	443		
ТСР	Disable	User Setting	Not supported	
HTTP GET	Enable	80	Supported	
	Disable		Supported	
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			Screen	Comment
1	Power		1		
2	AP		2		
3	Server		3		
4	Connect	►	4	"Connected"	
5	Auto Connect				
6	Send Stored				
7	Version				
8	Exit Menu				

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

1.5 Auto Connect

	Screen			Screen	Comment
1	Power		1	Enabled	Enables Auto Connect.
2	AP		2	Disabled	Disables Auto Connect.
3	Server		3	Save & Exit	Confirm
4	Connect		4	Cancel & Exit	Cancel
5	Auto Connect				
6	Send Stored	►			
7	Version				
8	Exit Menu				

• 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			Screen	Comment
1	Power		1	Enabled	Enables to send stored data
2	AP		2	Disabled	Disables to send stored data
3	Server		3	Save & Exit	Confirm
4	Connect		4	Cancel & Exit	Cancel
5	Auto Connect				
6	Send Stored	►			
7	Version				
8	Exit Menu				

- 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			Screen	Comment
1	Power		1	APP:5.1.6	Wi-Fi module S/W version
2	AP		2	MAC:XXXXXXXX	Wi-Fi module MAC address
3	Server				
4	Connect				
5	Auto Connect				
6	Send Stored				
7	Version	►			
8	Exit Menu				

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

🔛 KoamTac Data Synchronizer 🗖 🗖 🔀	
File Settings Application About	WiFi Configuration
Synchronize KDC Menu	WiFi Power Connect
	SSL Download Certification
Connection: Connected to COM3	Send Stored
Data transfer: None	Server IP Addr: 0.0.0.0
II KDC Menu	Server URL Addr:
	Server Port #: 80
Set Barcodes Code Options Scan Options	Server Page:
Data Process Bluetooth System Config	Server Protocol: HTTP_POST
MSR Config NFC/RFID Config Factory Default	AP SSID
	AP Passcode
WiFi Config UHF Config	Response Timeout 10 sec(ond(s)
Exit	

3. Wi-Fi Configuration Special Barcodes

3.1 KDC380C























Resp Timeout = 2 seconds









3.2 KDC380L/KDC380D







Resp Timeout = 7 seconds







Resp Timeout = 2 seconds









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" \rightarrow "Power" \rightarrow "Enable".

Step 2. Configure server information

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

Wireless LAN adapter Wireless Network Connection:

Connection-specific DNS Suffix .: Link-local IPv6 Address : fe80::4d95:e523:204:5d74%13 IPv4 Address. : 192.168.1.59 Subnet Mask : 255.255.255.0 Default Gateway : 192.168.1.1

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/CommC	perator/CommOperator.zip
--	--------------------------

Ne Edit View Oper	• == @				
	0 = 0 - 1 0	Locath 0.0 Film	· · · · · · · · · · · · · · · · · · ·	Send Send Send Repeatedly	TEXT • Edit Calc
		and an and fridity			
erminal Window		•••••		Format • Text • He	ex O De
erminal window				Format • Text • He V Show Send V Show Time	Clear Copy
rminal window				Format Text He Show Send Show Time Repeatedly Rate: 10 Send	Clear Copy New Edit
rminal window				Format Text He Show Send Show Time Repeatedly Rate: 10 Send Automatically Interval:	Clear Copy New Edit Load

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" \rightarrow "Connect"

File Ec	dit View	Operate	Tools	Help						
Nuick Sc	and - Torm				- X (0					
						Lan ath: 0.0	[Hau]	E	Send Repeatedly Rate: 1	TEXT Edit Calc
	Clea	r 📃 Add	to List	V Add CH	1 📄 Check Su	m Length: UX9	[Hex]			
Termina	1 Window						L 1		Erment	
Termina	1 Window						N I		Format ⊙ Text ○ H	lex O C
Termina	1 Window								Format • Text • F V Show Send V Show Time	lex O C Clea Copy
Termina	1 Window				A.				Format • Text • H • Show Send • Show Time Repeatedly Rate: 10 ÷ Send Automatically Interval:	lex O C Clea Cop Ne Ec Lo Save

• 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.

O Comm Operator	
File Edit View Operate Tools Help	
No. 20 No. 10 No	
Cuick Send - Terminal	Send TEXT Send Repeatedly Edit Rate: 1 Calc
300697067182	• Text • Hex • Dec
	Show Send Clear Show Time Copy
	Repeatedly New Rate: 10 €dit 10 Send Load Automatically Interval: Save As 1 sec Save All ✓ Loop Start Close
Connected Link1 TCPServer 13000 Recv:196/9 Send: 0/0	

• 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" \rightarrow "Power" \rightarrow "Enable".

Step 2. Configure server information

- "Wi-Fi Config" \rightarrow "Server" \rightarrow "IP Address" \rightarrow "XXX.XXX.X.XX".
- "Wi-Fi Config" \rightarrow "Server" \rightarrow "Port Number" \rightarrow "13000".
- "Wi-Fi Config" \rightarrow "Server" \rightarrow "Protocol" \rightarrow "UDP".

Ocomm Operator	436.1 drs. rpm		⇔ □	0 X
File Edit View	Operate Tools Help			
Quick Send - Term	inal			
Ор	en Connection		Send X	EXT - Edit
	Serial Port TCP Server TCP Client UDP Profiles			Calc
	UDP Setting	Add to Profiles		
	IP Address 127 . 0 . 0 . 1	Name Link1	Add	
	Send Port 13001			
Terminal Win	Listen Port 13000			
	*********			ODee
			lex	ODec
				Clear
				Сору
				New
				Edit
	Open Cancel			
				Save As
			Interval:	Save All
			· · · sec · ·	
			Coop Start	0.036

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

O Comm Operator		
File Edit View Operate Tools Help		
No. No. <th></th> <th></th>		
	Send T	EXT • Edit Calc
Clear Add to List V Add CR Check Sum Length: 0x1F [Hex]		
Terminal Window	Format	
	 Text ○ Hex ✓ Show Send ✓ Show Time 	O Dec Clear Copy
	Repeatedly	New
	Rate:	Edit
	IO E Sella	Load
	Automatically	Save As
	1 Coc -	Save All
		Close
	Cooh Start	Close
Connected Ginki ODP 127.0.0.1 III. 15000 Out. 15001 Recv.0/0 Send. 0/0		

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" \rightarrow "Connect". •
- •

Step 4. Send barcode data to server

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

Comm Operator	
File Edit View Operate Tools Help Image: Space - Toronal Image: Space - Toronal Image: Space - Toronal	
Clear Add to List V Add CR Check Sum Length: 0x20 [Hex]	Send Repeatedly Edit Rate: 1 Calc
Terminal Window US37474169yUS37474169yUS37474169y	Format • Text • Hex • Dec V Show Send Clear V Show Time Copy
	Repeatedly New Rate: Edit 10 Send Automatically Load Interval: Save As 1 sec V Loop Start
Connected Link1 UDP 127.0.0.1 In: 13000 Out: 13001 Recv:33/3 Send: 0/0	

4.3 HTTP GET&POST

Step 1. Install Apache Server (XAMPP)

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

Version		Check	sum		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.

XAMPI	P Control Panel v3.2.	1				P Config	
Modules Service Module Pl	D(a) Deat(a) As	ctions				Setstat .	
Apache 13	072 80, 443	Stop	Admin	Config	Logs	Shell	
MySQL 17	616 3306	Stop	Admin	Config	Logs	Explorer	
FieZita		Start	Admin	Config	Logs	Senices	
Mercury	E	Start	Admin	Config	Logs	9 Help	
Torncat	6	Start	Admin	Config	Logs	Qut	
# 41842 [Apache] # 41842 [Apache] # 41842 [Apache] # 41843 [Apache]	The Windows Event New It you need more help, or entire log window on the Problem detected! Port B0 in use by "CMPP Apache WILL NOT start v You need to unisstal/de or reconfigure Apache a Problem detected!	er for mor opy and p forums rogram Fill without the sable/rec and the Co	e clues post this les (x860% onfigure t primol Pani	SkypeWPh ed ports fre te blocking el to listen d	oneWSkype el application n a different	exe" with PID 58601 port	

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
 - 金[..] [dashboard] [datacollector] [iorbidden] [gswebserver] 🔁 [img]- [restricted] 🗀 (xampp) o applications 🕼 bitnami apache_pb 😃 apache_pb 😃 apache_pb2 😃 apache_pb2 😃 apache_pb2_ani 🗋 index
- Make sure that the Apache server has been installed correctly by accessing <u>http://localhost/gswebserver/index.html</u>. You should see the following screen.

\$9	Http://localhost/gswebserver/index.html	Q + C
Gai	nSpan.	
enter yo	ur name and email address, and the	n click Ente
Enter		

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".

KoamTac Data Synchronizer	WiEi Configuration
File Settings Application About Synchronize KDC Menu Information Connection: Connected to COM3 Data transfer: None	WiFi Power Auto Connect SSL Download Certification Server IP Addr: 0.0.0 Server URL Addr:
Set Barcodes Code Options Scan Options	Server Port #: 80 Server Page:
Data Process Bluetooth System Config	Server Protocol: HTTP_POST
MSR Config NFC/RFID Config Factory Default	AP SSID AP Passcode
WiFi Config UHF Config	Response Timeout 10 <u>*</u> sec(ond(s)
Exit	OK Cancel

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

×	XA	MPP Contr	ol Panel v3	.2.1				Config
Modules Service	Module	PID(s)	Port(s)	Actions				Wetstat
	Apache	13072 17224	80, 443	Stop	Admin	Config	Logs	Shell
	MySQL	17616	3306	Stop	Admin	Config	Logs	Explorer
	FileZilla			Start	Admin	Config	Logs	Services
	Mercury			Start	Admin	Config	Logs	😣 Help
	Torncat			Start	Admin	Config	Logs	Quit

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

phpMuAdmin	← 🗐 Server(1	27.0.0.1 » 🍵	Database: tes	l.	~
ې 💿 😡 🚓	M Structure	SQL	Search	Query	▼ More
Recent Favorites	No tables found	in databaca			
New					
e cdcol	Create 1	able			
information_schema					
🖶 mysql	Name: data	collector	>		
performance_schema			\leq		
🛖 🔄 phpmyadmin	Number of co	olumns: 2) ‡		
(Eu) test					
e webauth					Go

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

php MyAdmin	← 📑 Servert	127.0.0.1 » 🕤 Database: te	st » 🔝 Table: dat	acollector			7
🏠 🗟 🕑 🗊 😋	Browse	🛃 Structure 📃 SQL	. 🔍 Search	👫 Insert 🗔	Export 📑	Import V More	
Recent Favorites	Table name:	datacollector		Add 1	column(s	s) Go	
E cdcol							
information_schema	Name	Туре 😡	Length/V	alues 😡 🛛 De	efault 😡	Collation	Att
🕀 🗐 mysql						_	
🖶 🗐 performance_schema	barcode_data	TEXT	·)		None	•	•
🖶 🔄 phpmyadmin			\leq $=$				
🖶 test	timestamp	TIMESTAMP)		None	•	•
🖶 webauth							
	Table commer	ts		Storage Engine	Collati	ion:	
				InnoDB	•		•
	PARTITION de	inition: 😡					
		li.					
							Save

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



Barcode data received from KDC [num: 0]

0 results

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



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.
- ٠

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		C0	Y0	D0	Т0	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	Months	Days	AM/PM	Hours	Minutes	Seconds
(6 bits)	(4 bits)	(5 bits)	(1 bit)	(4 bits)	(6 bits)	(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)	Туре (3)	Timestamp (14)	Data Length (4)	Data (N)
------------	-------------	-------------	-------------------	-----------------------	-------------

• Stored data

TAG	UID	Туре	Timestamp	Data	Data	Туре	Timestamp	Data	Data
(1)	(10)	(3)	(14)	(4)	(N)	 (3)	(14)	(4)	(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 \rightarrow '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

• $0 \rightarrow \text{Real time data}$

- ◆ 15X5013527 → Device serial number
- 027 \rightarrow '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 #	Тад Туре
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 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.

