

ALINKET Alinket wireless controller

ALXC12B User Manual

Version 2.0

September 20, 2016

Alinket Technology Corp. All Rights Reserved. www.alinket.com E-mail: sales@alinket.com Proprietary & Confidential Information 1





Copyright

©2015-2016 Alinket Technologies Corporation. All rights reserved.

This document is the property of Alinket Electronic Technologies Corp and is delivered on the express condition that it not be disclosed, reproduced in whole or in part, or used for manufacture for anyone other than Alinket Technologies Corp without its written consent, and that no right is granted to disclose or so use any information contained in said document. This restriction does not limit the right to use information obtained from other sources.

Trademarks

ALXC12B is a registered trademark of Alinket Electronic Technologies Corp. Alinket is a registered trademark of Alinket Technologies Corp. Other products and company names J. narks on mentioned here in may be the trademarks of their respective owners.

Alinket Technology Corp. <u>www.alinket.com</u> All Rights Reserved.

E-mail: sales@alinket.com



Revision History

Date(M/D/Y)	Revision Content	Revision By	Version
5/18/2016	Initialization Version	Shi Qi	1.0
9/20/2016 Change to New Template		Nigel Ding	2.0

tinket

Alinket Technology Corp. All Rights Reserved.



List of Contents

1.	INTR	ODUCTION	9
1.	1	OVERVIEW	9
1.	2	Hardware Architecture	10
1.	3	INTERFACE AND PERIPHERALS	10
1.	4	Physical Dimensions	11
	1.4.1	Mechanical Size	
	1.4.2	PCB Footprint	11
1.	5	PIN Assignment	12
1.	6	PIN DESCRIPTION	12
2.	HAR	DWARE DESIGN GUIDE	14
9	1	SNANL FOT SVETTNA	11
2.	1		14
2.1	2		14
2.	3 4		15
2.	т 5		10
2.	6	12C INTERFACE	10
2.	7	ADC & GPIO	10
2.1	8	NRST	17
3.	SOFT	WARE DESIGN GUIDE	18
3.	1	UART TRANSPARENT MODE	
3.2	2	ACM Mode	
4. ·	TEST	& DEBUG MANUAL	19
4	1	PREPARATION	19
1.	1 111	Tools	
	4.1.2	P Evaluation Kit	
	4.1.3	Set Up	
4.	2	PROCESS INTRODUCTION	24
	4.2.1	Wi-Fi Transparent Mode	24
	4.2.2	ACM Mode for Wi-Fi	27
	4.2.3	ACM Mode for BT	
	4.2.4	ACM Mode for BLE	
5.	WOR	K CONDITION	38
F	1		20
э. 5	1 9		
0.	4		
6.	MAN	IUFACTURING	



ALXC12B User Manual

6	.1	RECOMMENDED REFLOW PROFILE	39
6	. 2	ROHS DECLARATION	39
7.	ORD	ERING INFORMATION	40
•	TEC		
8.	TECH	INICAL SUPPORT	40
9.	REFE	RENCE	40
APP	ENDIX	: ACRONYMS AND ABBREVIATIONS	41

Alinket

Alinket Technology Corp. All Rights Reserved.



List of Figures

Figure 1	Top View	9
Figure 2	Block Diagram	10
Figure 3	Pad Dimension (Top View)	11
Figure 4	Ball Maps	12
Figure 5	Smallest System	14
Figure 6	Typical Application	14
Figure 7	Power Circuit	15
Figure 8	VDDIO Circuit	15
Figure 9	PUART Circuit	16
Figure 10	SPI Circuit	16
Figure 11	I2C Circuit	16
Figure 12	NRST	17
Figure 13	Antenna Area	18
Figure 14	ALXC12X EVK	21
Figure 15	Without HW Flow Control	22
Figure 16	With HW Flow Control	22
Figure 17	Connection Diagram – Without HW Flow Control	23
Figure 18	Connection Diagram – With HW Flow Control	23
Figure 19	Connection Map – Normal Case	24
Figure 20	Connection Map – Roaming	24
Figure 21	Connection Map - EAP	24
0		
Figure 22	Set up a Server	25
Figure 22 Figure 23	Set up a Server Network Configuration – Flashlink	25
Figure 22 Figure 23 Figure 24	Set up a Server Network Configuration – Flashlink TCP Connected	25 26 27
Figure 22 Figure 23 Figure 24 Figure 25	Set up a Server Network Configuration – Flashlink TCP Connected ACMTH Function Blocks	25 26 27 28
Figure 22 Figure 23 Figure 24 Figure 25 Figure 26	Set up a Server Network Configuration – Flashlink TCP Connected ACMTH Function Blocks Add Serial Port in ACMTH	25 26 27 28 29
Figure 22 Figure 23 Figure 24 Figure 25 Figure 26 Figure 27	Set up a Server Network Configuration – Flashlink TCP Connected ACMTH Function Blocks Add Serial Port in ACMTH ACM Operation	25 26 27 28 29 29
Figure 22 Figure 23 Figure 24 Figure 25 Figure 26 Figure 27 Figure 28	Set up a Server Network Configuration – Flashlink TCP Connected ACMTH Function Blocks Add Serial Port in ACMTH ACM Operation Roaming Setup	25 26 27 28 29 29 29
Figure 22 Figure 23 Figure 24 Figure 25 Figure 26 Figure 27 Figure 28 Figure 29	Set up a Server Network Configuration – Flashlink TCP Connected ACMTH Function Blocks Add Serial Port in ACMTH ACM Operation Roaming Setup Get AP Information	25 26 27 28 29 29 29 30 30
Figure 22 Figure 23 Figure 24 Figure 25 Figure 26 Figure 27 Figure 28 Figure 29 Figure 30	Set up a Server Network Configuration – Flashlink TCP Connected ACMTH Function Blocks Add Serial Port in ACMTH ACM Operation Roaming Setup Get AP Information Set Roaming Parameters	25 26 27 28 29 29 29 30 30 31
Figure 22 Figure 23 Figure 24 Figure 25 Figure 26 Figure 27 Figure 28 Figure 29 Figure 30 Figure 31	Set up a Server Network Configuration – Flashlink TCP Connected ACMTH Function Blocks Add Serial Port in ACMTH ACM Operation Roaming Setup Get AP Information Set Roaming Parameters EAP Configuration	
Figure 22 Figure 23 Figure 24 Figure 25 Figure 26 Figure 27 Figure 28 Figure 29 Figure 30 Figure 31 Figure 32	Set up a Server Network Configuration – Flashlink TCP Connected ACMTH Function Blocks Add Serial Port in ACMTH ACM Operation Roaming Setup Get AP Information Set Roaming Parameters EAP Configuration Wi-Fi Join for EAP	25 26 27 28 29 29 29 30 30 31 32 32
Figure 22 Figure 23 Figure 24 Figure 25 Figure 26 Figure 27 Figure 28 Figure 29 Figure 30 Figure 31 Figure 32 Figure 33	Set up a Server Network Configuration – Flashlink TCP Connected ACMTH Function Blocks Add Serial Port in ACMTH ACM Operation Roaming Setup Get AP Information Set Roaming Parameters EAP Configuration Wi-Fi Join for EAP Wi-Fi On	25 26 27 28 29 29 30 30 30 31 31 32 32 33
Figure 22 Figure 23 Figure 24 Figure 25 Figure 26 Figure 27 Figure 28 Figure 29 Figure 30 Figure 31 Figure 32 Figure 33 Figure 34	Set up a Server Network Configuration – Flashlink TCP Connected ACMTH Function Blocks Add Serial Port in ACMTH ACM Operation Roaming Setup Get AP Information Set Roaming Parameters EAP Configuration Wi-Fi Join for EAP Wi-Fi On BT On	25 26 27 28 29 29 29 29 30 30 30 31 32 32 32 33 33
Figure 22 Figure 23 Figure 24 Figure 25 Figure 26 Figure 27 Figure 27 Figure 28 Figure 29 Figure 30 Figure 31 Figure 32 Figure 33 Figure 34 Figure 35	Set up a Server Network Configuration – Flashlink TCP Connected ACMTH Function Blocks Add Serial Port in ACMTH ACM Operation Roaming Setup Get AP Information Set Roaming Parameters EAP Configuration Wi-Fi Join for EAP Wi-Fi On BT On Ready for Pairing	25 26 27 28 29 29 30 30 30 30 31 32 32 33 33 33 33
Figure 22 Figure 23 Figure 24 Figure 25 Figure 26 Figure 27 Figure 27 Figure 28 Figure 29 Figure 30 Figure 31 Figure 32 Figure 33 Figure 34 Figure 35 Figure 36	Set up a Server Network Configuration – Flashlink TCP Connected ACMTH Function Blocks Add Serial Port in ACMTH ACM Operation Roaming Setup Get AP Information Set Roaming Parameters EAP Configuration Wi-Fi Join for EAP Wi-Fi On BT On Ready for Pairing Pairing Successful	25 26 27 28 29 29 29 29 29 29 29 29 30 30 30 31 32 32 33 33 34 34
Figure 22 Figure 23 Figure 24 Figure 25 Figure 26 Figure 27 Figure 28 Figure 29 Figure 30 Figure 30 Figure 31 Figure 33 Figure 34 Figure 35 Figure 36 Figure 37	Set up a Server Network Configuration – Flashlink TCP Connected ACMTH Function Blocks Add Serial Port in ACMTH ACM Operation Roaming Setup Get AP Information Set Roaming Parameters EAP Configuration Wi-Fi Join for EAP Wi-Fi On BT On Ready for Pairing Pairing Successful Connecting through RFCOMM	25 26 27 28 29 29 30 30 30 30 31 32 32 32 33 33 33 33 33 33
Figure 22 Figure 23 Figure 24 Figure 25 Figure 26 Figure 27 Figure 27 Figure 28 Figure 29 Figure 30 Figure 30 Figure 31 Figure 33 Figure 34 Figure 35 Figure 36 Figure 37 Figure 38	Set up a Server Network Configuration – Flashlink TCP Connected ACMTH Function Blocks Add Serial Port in ACMTH ACM Operation Roaming Setup Get AP Information Set Roaming Parameters EAP Configuration Wi-Fi Join for EAP Wi-Fi On BT On Ready for Pairing Pairing Successful Connecting through RFCOMM Connected Status Indication	
Figure 22 Figure 23 Figure 24 Figure 25 Figure 26 Figure 27 Figure 28 Figure 29 Figure 30 Figure 30 Figure 31 Figure 32 Figure 33 Figure 34 Figure 35 Figure 36 Figure 37 Figure 38 Figure 39	Set up a Server Network Configuration – Flashlink TCP Connected ACMTH Function Blocks Add Serial Port in ACMTH ACM Operation Roaming Setup Get AP Information Set Roaming Parameters. EAP Configuration Wi-Fi Join for EAP Wi-Fi On BT On Ready for Pairing Pairing Successful Connecting through RFCOMM Connected Status Indication Master & Slave Test Connection	25 26 27 28 29 29 30 30 30 30 30 31 32 32 33 33 33 33 33 33 33 33 33 33 33
Figure 22 Figure 23 Figure 24 Figure 25 Figure 26 Figure 27 Figure 28 Figure 29 Figure 30 Figure 30 Figure 31 Figure 33 Figure 33 Figure 34 Figure 35 Figure 36 Figure 37 Figure 38 Figure 39 Figure 40	Set up a Server Network Configuration – Flashlink TCP Connected ACMTH Function Blocks Add Serial Port in ACMTH ACM Operation Roaming Setup Get AP Information Set Roaming Parameters EAP Configuration Wi-Fi Join for EAP Wi-Fi On BT On Ready for Pairing Pairing Successful Connecting through RFCOMM Connected Status Indication Master & Slave Test Connection Port Configuration by ACMTH	
Figure 22 Figure 23 Figure 24 Figure 25 Figure 26 Figure 27 Figure 28 Figure 29 Figure 30 Figure 30 Figure 31 Figure 32 Figure 33 Figure 33 Figure 34 Figure 35 Figure 36 Figure 37 Figure 38 Figure 39 Figure 40 Figure 41	Set up a Server Network Configuration – Flashlink TCP Connected ACMTH Function Blocks Add Serial Port in ACMTH ACM Operation Roaming Setup Get AP Information Set Roaming Parameters EAP Configuration Wi-Fi Join for EAP Wi-Fi On BT On Ready for Pairing Pairing Successful Connecting through RFCOMM Connected Status Indication Master & Slave Test Connection Port Configuration by ACMTH Setup Connection between Master & Slave	25 26 27 28 29 29 30 30 30 30 31 32 32 33 33 33 33 33 33 33 33 33 33 33



ALXC12B User Manual

Figure 42	Connection Successful Indication	37
Figure 43	BLE On	38
Figure 44	BLE Operation	38
Figure 45	Reflow Profile	40

Alinket

Alinket Technology Corp. All Rights Reserved.



List of Tables

Table 1	Product Family9
Table 2	MCU and Interfaces10
Table 3	Mechanical Dimensions11
Table 4	Pin Descriptions12
Table 5	GPIO List
Table 6	Hardware Tools
Table 7	Software Tools
Table 8	USB – UART Convertor PIN
Table 9	Roaming Parameters
Table 10	Range of Operation – General Specification
Table 11	Recommended Voltage
Table 12	Recommended Temperature and Humidity
Table 13	Order Information
	Alinket

Alinket Technology Corp. All Rights Reserved.



1. Introduction

1.1 Overview

Alinket ALXC12B , which has Wi-Fi 802.11b/g/n and Bluetooth 4.1 functionalities, is a portfolio of low-powered, self-contained, embedded wireless module solutions that address the connectivity demands of machine to machine applications.

ALXC12B supports a U.FL connector which provides the flexibility for customer to pick up its own proper external antenna.

Table 1 Product



Figure 1 Top View



1. 2 Hardware Architecture

ALXC12B integrates an ARM[®] 32-bit Cortex[®]-M4 micro-controller, a Wi-Fi 2.4GHz & Bluetooth 4.1 SoC, an On-Board SPI Flash into the small factor module.



1. 3 Interface and Peripherals

The controller family includes various different host interfaces to communicate with Host CPU. Below table lists the basic descriptions of the MCU, Wi-Fi SoC and the interfaces.

Model		ALXC12B	
Wi-Fi Technology	7	IEEE 802.11 b/g/n, Wi-Fi 2.4G	
Frequency Band – Wi-Fi		2,400MHz ~ 2,500MHz	
Bluetooth Technolog	ξγ	Bluetooth 4.1 (BR/EDR/LE)	
Frequency Band – B	Г	2,402 MHz ~ 2,480 MHz	
	Core	ARM [®] Cortex [®] - M4 @100MHz	
MCU	RAM	128KB	
	ROM	512KB	
Flash (On-Board)		1MB	
llast interfaces	UART x 1	Up to 6.25Mbps	
Host interfaces	SPI x 1	50MHz, multiplexing with USB	
	I2C x 1	Support 100KHz, 400KHz & 1MHz	
Peripherals	ADC x 6	12bit, 16 channel, multiplexing with GPIO	
	GPIO x 16	Max., multiplexing with interface & peripherals	

Table 2MCU and Interfaces

Note: SPI, I2C interfaces are for customized projects only, not for standard product, please contact your local Alinket sales office or distributors for more information.



1. 4 Physical Dimensions

1.4.1 Mechanical Size

Table 3	Mechanical	Dimensions
---------	------------	------------

Parameter	Typical	Units
Dimensions (L x W x H)	32 x 16 x 3.1	mm
Dimensions tolerances (L x W x H)	±0.2	mm

1.4.2 PCB Footprint



Figure 3 Pad Dimension (Top View)





1.5 PIN Assignment

ALXC12B PIN ball maps are described as follows.

	ANT_PAD
	NAME NAME AND A STRAND AND A
	2 7
******	2.2.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1
****************	40
GPIO1 X	J1 J40 39 VDD 3V3
SPI1_MOSI × 3 SPI1_MOSI × 4	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
SPI1 SCK 6	J5 J36 <u>35</u>
SPI1_MISO 7	J_{17} J_{124} J_{34}
USART_TX 8	10 122 33
GPIO2 9 VDD 3V3 10	J9 J32 31 CPIO3
VDD_5V3 10 USART_RX 12 NRST 13 MICRO_WKUP 14 × 16 12C_SCL 17 12C_SDA 18 12C_SMBA 19 20	J10 J31 30 J11 J30 29 J12 J29 28 J13 J28 27 J14 J27 26 JTAG_TMS/SWDIO J15 J26 25 JTAG_TCK/SWCLK J16 J25 24 JTAG_TRST J17 J24 23 JTAG_TDI/SPICont J18 J23 22 JTAG_Tdo J19 J22 21
aaccaa <mark>. T</mark> aka sa	
	Figure 4 Ball Maps

1.6 PIN Description

Table 4	Pin Descriptions
---------	------------------

Pins	Туре	Name Main function	Alternate functions	PIN connection (when not using)
1		NC		
2	I/O	GPIO1	GPIO	floating
3				
4	I/O	SPI1_MOSI	GPIO	floating



ALXC12B User Manual

5	I/O	SPI1_NSS	GPIO/ADC	floating
6	I/O	SPI1_SCK	GPIO	floating
7	I/O	SPI1_MISO	GPIO	floating
8	I/O	USART_TX	GPIO/ADC	floating
9	I/O	GPIO2	ADC	floating
10	V	VBAT	3.3V	
11		NC		
12	I/O	USART_RX	GPIO/ADC	floating
13	I	NRST	Active-low reset input	PULL UP
14	I	MICRO_WKUP	Wake up	floating
15		NC		
16		NC		
17	I/O	I2C_SCL	GPIO	floating
18	I/O	I2C_SDA	GPIO	floating
19	I/O	I2C_SMBA	GPIO	floating
20	S	GND		
21	S	GND		
22	I/O	JTAG_Tdo	GPIO	floating
23	I/O	JTAG_TDI/SPICont	GPIO	floating
24		JTAG_TRST	floating	
25	I/O	JTAG_TCK/SWCLK	JTCK-SWCLK	floating
26	I/O	JTAG_TMS/SWDIO	JTCK-SWDIO	floating
27		NC		
28		NC		
29		NC		
30		NC		
31	I/O	GPIO3	GPIO	floating
32	5	NC		
33		NC		
34		NC		
35		NC		
36	I/O	GPIO4	ADC	floating
37	I/O	GPIO5	ADC	floating
38		NC		
39	V	VDD_3V3	3.3V	
40	V	VDD_3V3	3.3V	
41	ANT	ANT_PAD	RF OUTPUT	floating



2. Hardware Design Guide

2.1 Smallest System

The ALXC12B embedded a Cortex-M4 MCU, Wi-Fi + BT combo SoC, Flash memory and an onboard or external antenna, when it's power on and pulled up the 10K Ohm connected to NRST (PIN13), it can start to work, shown as below Figure.



2.2 Typical Application

ALXC12B provides multiple host interface and peripheral interfaces such as UART, SPI, I2C and GPIO. A typical application is ALXC12B to be connected by a customer host through UART or SPI interface and GPIO for status or application controls. Then the ALXC12B device can connect and communicate with an AP/router or Bluetooth devices and transmit or receive data with a server.







2.3 Power

ALXC12B module default power is 3.3V, reference power circuit shown below. Please note that the power ripple should be controlled within 50mV.



The power access to the VDDIO pin needs a filtering circuit shown below.



Figure 8 VDDIO Circuit



2.4 UART Interface

ALXC12B has one standard UART with a maximum data rate up to 6 Mbps. The default baud rate is 115,200 which can be configured by Alinket ACM (Alinket Control Messages) command.

The PINs for UART interface is: UART_Tx/PIN 8, UART_Rx/PIN 12, its reference circuit to a host MCU is shown below.





2.5 SPI Interface

The ALXC12B has one independent SPI interface. It can be either a master or a slave. It can communicate at up to minimum 25 Mbps to 50MHz.

The PINs for SPI interface is: SPI_MOSI/PIN 4, SPI_NSS/PIN 5, SPI_CLK/PIN 6, SPI_MISO/PIN 7, SPI reference circuit to MCU is shown below.

MOLL SPL NSS	MCU_SPI_NSS	R22 0R	SPI1_NSS
MCU SPI CIK	MCU_SPI_CLK	R23, OR	SPI1_SCK
MCU SPI_CLK	K MCU SPI MISO	R24 OR	SPI1 MISO
MCU SPI_MISO	MCU_SPI_MOSI	R25 OR	SPI1 MOSI
NCU_3PI_NU3	/		

Figure 10 SPI Circuit

2. 6 I2C Interface

I2C bus interfaces can operate in both master and slave modes. It can support the standard (up to 100 kHz) and fast (up to 400 kHz) modes. Its frequency can be increased up to 1 MHz.

The PINs for I2C interface is I2C_SDA/PIN 5, I2C_CSL/PIN 6. Reference circuit is shown below.



Figure 11 I2C Circuit



2. 7 ADC & GPIO

ALXC12B has 6 ADC and 16 GPIO interfaces. All of GPIO ports support programmable pull-up and pull-down resistors and can be directly connected. The ADC and GPIO are multiplexed & list below. Table 5 GPIO List

No.	Pin#	Main function	Alternate functions
1	2	GPIO1	GPIO
2	4	SPI1_MOSI	GPIO
3	5	SPI1_NSS	GPIO/ADC
4	6	SPI_SLK	GPIO
5	7	SPI_MISO	GPIO
6	8	USART_TX	GPIO/ADC
7	9	GPIO2	ADC
8	12	USART_RX	GPIO/ADC
9	17	I2C_SCL	GPIO
10	18	I2C_SDA	GPIO
11	19	I2C_SMBA	GPIO
12	22	JTAG_Tdo	GPIO
13	23	JTAG_TDI/SPICont	GPIO
14	31	GPIO3	GPIO
15	36	GPIO4	ADC
16	37	GPIO5	ADC

2.8 NRST

Under some circumstance, ALXC12B need to be reset to recovery its system. An external signal needs to be provide to the NRST of ALXC12B. NRST (PIN 13) reference circuit is shown below.



Figure 12 NRST

www.alinket.com E-mail: sales@alinket.com



3. Software Design Guide

ALXC12B support two work modes: UART Transparent Mode and ACM Mode.

3. 1 UART Transparent Mode

ALXC12B supports serial interface transparent transmission mode when Bluetooth is not used. The benefits of this mode are a plug and play serial data port, and reduced user complexity. In this mode, the user should only configure the necessary parameters. After power on, the module can automatically connect to the default master.

If Bluetooth is used, only ACM mode is supported.

3.2 ACM Mode

ACM (Alinket Controller Message) is a message system and protocol for the communications between customer host MCU and Alinket IoT controllers. It is developed by Alinket itself and is applicable to all Alinket controllers.

ACM system works with the host control interfaces between customer host MCU and Alinket controllers. The messages include host control commands, controller command response, and alarm events from Alinket controller as well.

Detailed message definition, the implementation of massage Flow Control and Power Save functions can be found in documents of *Alinket Controller Message Specification, Alinket Host Control Interface Guide* (* Please contact your local Alinket sales office or distributors to get the related documents).



4. Test & Debug Manual

4.1 Preparation

4.1.1 Tools

4.1.1.1 Hardware Tools

Hardware tools include ALXC12B module, EVK, PC, USB-to-Serial converter (TTL interface), Wi-Fi

AP, Wi-Fi AC.

Table 6 Hardware Tools

No.	Tools	Note	Quantity	
1	DC	Used for send/receive commands, connect	1	
T	PC	the module, OS: Win 8.0 or above	Ţ	
2	ALXC12B EVK	Perform Wi-Fi & Bluetooth functions	2	
2	Dupontling	Connect from FT232 USB – UART Board	1	
5	Dupont Line	to ALXC12BEVK	Ţ	
4	FT232 USB to UART Board	USB-to-Serial converter (TTL interface)	2	
5	AP	Wi-Fi AP (Access Point)	2	
6	AC	Wi-Fi AC (AP Controller)	1	

4.1.1.2 Software Tools

Software tools include PC (Win 8.0 or above), Serial Debugger Tool (UARTAssist), ACMTH, Alinket SocketRunner, Flashlink & RFCOMM.

Table 7 Software Tools

No.	Tools	Note	Quantity
1	ACMTH	Alinket Controller Message Test Host	/
2	UartAssist	UART send/receive commands tool	/
3	SocketRunner	Simulator a Server on PC	/
4	Flashlink	Network configuration (AP and Server)	/
E		Alinket RFCOMM Test Host, it can send and	/
5	KFCOIVIIVI	receive data between BT module and BT of PC	/



4.1.2 Evaluation Kit

Alinket provides the evaluation kit to let users to familiarize module and develop prototypes and dedicated software. Evaluation Kit normally work with a USB to UART convertor, which provide connection between PC and the EVK.

4.1.2.1 ALXC12B EVK

ALXC12B EVK is shown below with its major function bloacks.



Figure 14 ALXC12**B** EVK

- > One micro-USB connector supporting USB interfaces and power supply (+5V)
- Direct +3.3V DC power supply via PINs
- A reset button to reset EVK
- > Two Key buttons to test GPIO function
- > Two LEDs to indicate two GPIO status
- A JTAG debug interface connector
- > A pad of the headers to access the I/O pins of ALXC12B
- > An ALXC12B controlller



4.1.2.2 USB to UART Convertor

The convertor is used for connecting between the EVK with PC. Its PIN definition is described below.



Figure 16 With HW Flow Control

Table 8	USB – UART Convertor PIN	

Pin#	Function
1	VCCIO
2	GND
3	TXD
4	RXD
5	RTS
6	CTS



4.1.3 Set Up

Connect the EVK and PC (Host) with USB-to-Serial converter.

4.1.3.1 Connection Diagram



Figure 17 Connection Diagram – Without HW Flow Control



Figure 18 Connection Diagram – With HW Flow Control



4.1.3.2 Connection Map



UART+ USB power

Figure 21 Connection Map - EAP

(EAP supported)

Alinket Technology Corp. All Rights Reserved.

<u>www.alinket.com</u> E-mail: <u>sales@alinket.com</u> Proprietary & Confidential Information 23

Server



4.2 Process Introduction

4.2.1 Wi-Fi Transparent Mode

ALXC12B supports serial interface transparent transmission mode. Under transparent mode, users need only to configure the necessary parameters. After power on, the module can be connected to the master. TCP & UDP is common protocol for network connections.

4.2.1.1 TCP

Step1. Set up a server on a computer attached to an AP.



Figure 22 Set up a Server

Step2. Install Alinket Flashlink software on a mobile device, which can join the same AP as the computer.



ALXC12B User Manual

Step3. Network configuration by using Flashlink software as shown below.

AlinketSample.Ail	DKTransparent			
FlashLink	Management	Logcat	Se	
Allaket FlashL	linket Ink Service Stop			
WiFI SSID	aetest			
WiFi Password				
WiFi Security	WPA2 Mixed PS	sk	-	
Server URL	tcp://192.168.11.	197:40010		
Server Usernam	e			
Server Password	d			
AlinketWi product, (192.168.1	FiDevice(Alin)2:0A:F7:34:C 11.131)	ket 8:7F,		
\bigtriangledown	0			

Figure 23 Network Configuration – Flashlink

Step4. WIFI SSID is the name of the AP that the computer attached to.

Step5. Server URL is the server IP and port number.

Step6. Stop/Start button will launch the "Flashlink" function.

Step7. When configuration is finished, click "Start" button, if flash link is successful, the module will automatically configured.



Step8. After the module connects to the server successfully, message can be exchanged between the computer and the module as shown in below figure.

Operation Host List Operation Operation Image: Clear Statistics Clear Received Stop Sending Image: Clear Statistics Clear Statistics Image: Clear Statistics Image: Clear	
Host List Operation Operation Image: Clear Statistics Clear Received Stop Sending TCP Servers Client: 192.168.17.65:59940	
Clear Statistics Clear Received Stop Sending Clear Statistics 192.168.17.65:59940	
▲	÷
 Ipplay the lex value of both sent and received data Ipplay the lex value of both sent and received data Ipplay Time Stamp: Ipplay the received data time stamp Ipplay Data: Received Data 	<
Send Data Sytes Received: 0 Bytes Sent: 0	
Log	ogs
Time Stamp Headline	
Ø 09/19/2016 17:32:55.756 TCP Server 192.168.17.53:2200 Added	
Ø 09/19/2016 17:34:40.037 TCP Client 192.168.17.65:59940 Connected to Server 192.168.17.53:	

Figure 24 TCP Connected

4.2.1.2 UDP

Step1. Set up a client on computer, configure the UDP setting.

Step3. Repeat step 2~7 in chapter 4.2. But server URL in step 3 should be udp://XXX.XXX.X.X:port number.



4.2.2 ACM Mode for Wi-Fi

4.2.2.1 ACMTH

ACMTH (ACM Test Host) is a tool for ACM test simulated as a host. It includes mainly 4 functions.

R Alinket ACM Test Host 1.0.0).86		– 🗆 X
Operation Tools Help			
🙊 Traffic Test 🚏 Show Serial	Ports 🛞 Playback Editor 🥜 Hex String Edito	or 🌍 OTA Server 😻 EAP Configura	ation
Module Port	Request Messages	Message Sender	
Local port COM3:115200	-SYS-Get System Info 0x02	Request Response	
Local port COM92:115200	-SYS-Software Reset 0x01	Version	
Local port COM18:115200	-SYS-Set Checksum Type 0x03	Version	
	-SYS-Get Checksum Type 0x04	Version	2
	-SYS-Set Flow Control 0x05	Reseved	
	-SYS-Get Flow Control 0x06	Confirmation flag	0
	-SYS-Set Log Level 0x07	Message ID	1
	-SYS-Get Log Level 0x08	Op Code 🔒	Response
	-SYS-Set Power Save Configuration	Length 🔒	169
	-SYS-Get Power Save Configuration on	Value	Branch Response System Management
	SVS Get Hart Baud Rate 0.08	Branch <classifier></classifier>	System Management
	-SYS-Enter Lingrade Mode e.co	Leaf	System Management Response Leaf Attribute Get Sy
	-SYS-Enter Flash Link Mode OxOE	Leaf <classifier></classifier>	Get System Information
	-SYS-Get Flash Link Info DODF	Manufacture Length	7
	-WIFI-Wifi On 0x00	Manufacture	41 6C 69 6E 6B 65 74 00 00 00 00 00 00 00 00
	-WIFI-Wifi Off 0x01	Product Los ath	
	-WIFI-Wifi Join 0x02	Product Length	° 3
	-WIFI-Wifi Leave 0x03	< Product	41 4C 58 43 32 58 00 00 00 00 00 AI
CAdd CDelete	ALL		🙊 Send
Message Log			🟥 🗸 Auto Scrolling 💥 Clear
Time Stamp	UART	Message C	Content
➡ 09-19-2016 10:57:46.436	Local port COM3:115200 <request>0b 20</request>	01 20 00 01 02 00	
 09-19-2016 10:57:46.536 	Local port COM3:115200 <response-succe< td=""><td>ess>0b 20 01 30 a9 01 02 07 41 6c 6</td><td>9 6e 6b 65 74 00 00 00 00 00 00 00 00 00 00 06 41 4 4</td></response-succe<>	ess>0b 20 01 30 a9 01 02 07 41 6c 6	9 6e 6b 65 74 00 00 00 00 00 00 00 00 00 00 06 41 4 4
Status: Idle Total: 2 Reques	st: 1 Response: 1 Indication: 0 Confirmatio	n: 0	OK

Figure 25 ACMTH Function Blocks

Part 1: Show different function which can set module in different status.

Part 2: Each function in part1 have child configuration.

Part 3: Execute the current setting or get message from module.

Part 4: Show the send and receive message.



4.2.2.2 Configuration Process

Users can send ACM commands to module for executions such as ON or OFF WIFI, Join or Leave AP and so on. It is described below on how to use ACM tool to send command. Detailed commands please refer to AN_ACM_User Manual.

Step1. Connect EVK and PC with USB-to-Serial

Step2. Open ACMTH

Step3. Click "Add" to add port in "Module Port" (Double click/right click port to open or close port)

Operatic Trafi Module	on Tools Help ffic Test 🚏 Show Serial Ports 🖲 Playback Editor 🥜 Hex String I Port	Editor
	✓ Pick a Serial Port × Built-In Serial Port Serial Port via TCP USB Dongle COM Port 3 ② 3 ③ 3	
	() CK Cancel	

Figure 26 Add Serial Port in ACMTH

Step4. Choice message you want to send in "Request Messages"

Step5. Clink "Send" button. If Send message successful, tool can get response from module

Iodule Port		Request Messages	Message Sender			
Local port C	DM3:115200	-SYS-Get System Info 0x02	Request Response			
General port COM92:115200		-SYS-Software Reset 0x01	Version			
Local port COM18:115200		-SYS-Set Checksum Type 0x03	Version			
		-SYS-Get Checksum Type 0x04	Version	1		
		-SYS-Set Flow Control 0x05	Reseved	0		
		-SYS-Get Flow Control 0x06	Confirmation flag	0		
		-SYS-Set Log Level 0x07	Message ID	1		
		-SYS-Get Log Level 0x08	Op Code	Response		
		-SYS-Set Power Save Configuration Doc	Length	169		
		-SYS-Get Power Save Configuration Date	Value	Reanch Personne System Management		
		-SYS-Set Uart Baud Rate 0x08				
		-SYS-Get Uart Baud Rate DKOC	Branch <classifier></classifier>	System Management		
		-SYS-Enter Upgrade Mode 0x00	Leaf	System Management Response Leaf Attribute Get System		
		-SYS-Enter Flash Link Mode DADE	Leaf <classifier></classifier>	Get System Information		
		-SYS-Get Flash Link Info DADE	Manufacture Length	7		
		-WIFI-Wifi On 0x00	Manufacture	41 6C 69 6E 6B 65 74 00 00 00 00 00 00 00 00 00 A		
		-WIFI-Wifi Off 0x01	Product Length	6		
		-WIFI-Wifi Join 0x02	Product	41 40 58 42 22 58 00 00 00 00 00 00 00 00 00 00 00 31		
		-WIFI-Wifi Leave 0x03	<	>		
Add	Delete	ALL	v 🔗 Send			
essage Log		-1	J h	Auto Scrolling XCle		
Time	e Stamp	UART	Message	Content		
09-19-201	6 10:57:46.436	Local port COM3:115200 <request>0b 20</request>	01 20 00 01 02 00			
09-19-201	6 10:57:46.536	Local port COM3:115200 <response-succ< td=""><td>ess>0b 20 01 30 a9 01 02 07 41 6c</td><td>š9 бе бb б5 74 00 00 00 00 00 00 00 00 00 00 06 41 4</td></response-succ<>	ess>0b 20 01 30 a9 01 02 07 41 6c	š9 бе бb б5 74 00 00 00 00 00 00 00 00 00 00 06 41 4		

Figure 27 ACM Operation

Alinket Technology Corp. All Rights Reserved.



4.2.2.3 Roaming

Step1: setup test environment as below:



Figure 28 Roaming Setup

Note: The SSID and password of AP1 and AP2 must be the same.

Step2: Start TCP or UDP traffic between module and server

Step3: Check AP info and RSSI by ACM command "Get AP Information"

Request Messages	Message	Sender								
-WIFI-Wifi Off 0x01	 Request	Response								
-WIFI-Wifi Join 0x02	Leaf		Wifi Managament Perpansa Loof Attribute C							
-WIFI-Wifi Leave 0x03	Leai	6	win Management Response Lear Attribute C							
-WIFI-Set Country Code 0x04	Le	at <classifier< th=""><th>> Get Ap Info</th></classifier<>	> Get Ap Info							
-WIFI-Get Country Code 0x05	Re	eturn Code	Success							
-WIFI-Scan Wifi Networks 0x06	Ss	id Length	8							
-WIFI-Get AP Information 0x08	Ss	id	71 61 5F 74 65 73 74 32 00 00 00 00 00 00 00 00							
-WIFI-Get Sta Status 0x09										
-WIFI-Set Roaming Control 0x08	Bs	sid	24696816B82D							
-WIFI-Get Roaming Control 0x0C	Se	curity Code	Wpa2_Mixed_Psk							
-WIFI-Set Wifi Band 0x0D	Ba	and Type	Default							
-WIFI-Get Wifi Band OxOE	Rs	si	-34							
-WIFI-Set Wifi Sleep Parameter OxOF	C	annel	7							
-WIFI-Get Wifi Sleep Parameter 0x10	Charless									
-WIFI-Get Wifi Mac Address _{0x11}	Спескѕи	m	0							
-WIFI-Setup AP Mode 0x12	<		>							
WIFI			👰 Send							
			🔠 🔽 Auto Scrolling 💥 Cle							



Step4: Set roaming parameters.

Request Messages	Message Sender	
-WIFI-Wifi Leave 0x03	Request Respon	nse
-WIFI-Set Country Code 0x04	NeedConfirm	
-WIFI-Get Country Code 0x05	NeedConfirm	
-WIFI-Scan Wifi Networks 0x06	Trigger	-70
-WIFI-Get AP Information 0x08	Delta	5
-WIFI-Get Sta Status 0x09	Period	10
-WIFI-Set Roaming Control 0x08		
-WIEL-Get Roaming Control and		

Figure 30 Set Roaming Parameters

Table 9	Roaming Parameters
---------	---------------------------

Parameter	Value	Unit
Trigger	-1 to -100	dBm
Delta	1 to 100	dBm
Period	1 to 100	Second

Ket

Step5: Move the module from the coverage of AP1 to AP2, check the BSSID and RSSI of AP2.

Note: A successful roaming must

1) IP address of module won't change.

2) Traffic won't stop.



4.2.2.4 EAP

Step1. Open port with baud rate as SW default

Step2. Click "EAP Configuration" tool in ACM tool and configure it as follows

😻 EAP Configuration - Local port COM3:115200							
General Config							
Phase1 Method	Реар						
Phase2 Method	Gtc						
Authentication Id	testuser						
Password	testpw						
Anonymous Id							



Note: Phase1 Method must be "PEAP"; Phase2 Method can be "GTC" or "MsChapV2"; Authentication ID and Password is defined by Radius server.

Step3: Send "WIFI on" message;

Step4: Fill in destination AP SSID, and set security as "Wpa2_8021X_Eap_Secure", leave password as blank, then send "WIFI Join" message.

Request Messages	Message Sender	
-WIFI-Wifi On 0x00	Request Response	
-WIFI-Wifi Off 0x01	NeedConfirm	
-WIFI-Wifi Join 0x02		
-WIFI-Wifi Leave 0x03	Ssid	EAP_2.40
-WIFI-Set Country Code 0x04	Code	Wpa2_8021x_Eap_Secure
-WIFI-Get Country Code 0x05	Password	
-WIFI-Scan Wifi Networks 0x06	Channel	0
-WIFI-Get AP Information 0x08	BssType	Default
-WIFI-Get Sta Status 0x09	Rand	Default
-WIFI-Set Roaming Control 0x08	Daliu	Deladit
-WIFI-Get Roaming Control 0x0C	Bssid	00000000000

WIEL Cot Wifi Band a an

Figure 32 Wi-Fi Join for EAP



4.2.3 ACM Mode for BT

EVK to PC 4.2.3.1

Step1: ALXC12B EVK connects to the USB port of your PC and gets this EVK COM port (COM3) from Device Manager of PC.

✓ ∰ 端口 (COM 和 LPT) Silicon Labs CP210x USB to UART Bridge (COM3)

Step2: Open ACMTH tool and send "WIFI on" command.

Ope	ration Too	ls Help 🗐 Shaw Sarial	Parts 🛞 Dlauback Editor	🦉 Hay String Edite		EAD Configuration				
Mod	iule Port	Tr Show Serial	Request Messages	 Hex String Edito 	Message Sender	EAP Configuration				
Ŷ۵	ocal port C	DM3:115200	-WIFI-Wifi On 0x00	^	Request Respons	;e				
			-WIFI-Wifi Off 0x01		Version	ACM Version				^
			-WIFI-Wifi Leave 0x03		Version	1				*
			-WIFI-Set Country Code	2 0x04	Reseved	0				*
			-WIFI-Get Country Cod	e 0x05	Confirmation f	0				A
	🔁 Add	Oelete	WIFI	v		d				
Mes	sage Log						68	✓ Auto Scrolli	ng 🔰	Clear
	Tim	e Stamp	UART			Message Content				
⇒	09-27-201	6 19:02:30.297	Local port COM3:115200	<request>0b 20</request>	05 20 00 02 00 00					
÷	09-27-201	6 19:02:32.162	Local port COM3:115200	<response-succe< td=""><td>ss>0b 20 05 30 01 02</td><td>2 00 00 00</td><td></td><td></td><td></td><td></td></response-succe<>	ss>0b 20 05 30 01 02	2 00 00 00				
					$\langle \cdot \rangle$					

Step3: After Wi-Fi On successfully, send "BT On" command.

🗖 Alinket ACM Test Host 1.	.0.89				
Operation Tools Help					
🕅 Traffic Test 🐺 Show Seri	al Ports 🝥 Playback Editor ,	🥖 Hex String Editor	r 🌍 OTA S	Server 💛 EAP (Configuration
Module Port	Request Messages		Message	Sender	
Local port COM3:115200	-BT-Bt On 0x00	^	Request	Response	
	-BT-Bt Off 0x01		Version		
	-BT-Set Bt Address 0x02		version		
	-BT-Get Bt Address 0x03	3	Versio	on	1
	-BT-Set BT Advertisem	ent Tx Power	Resev	ved	0
		`	Confi	rmation flag	n
🗘 Add 🔅 Delete	BT	v			🙊 Send
Message Log					68
Time Stamp	UART			M	lessage Content
⇒ 09-27-2016 19:08:04.44	Local port COM3:115200	<request>0b 20 0</request>	7 20 00 02	00 00	
🗢 09-27-2016 19:08:06.31	/ Local port COM3:115200	<response-succes< td=""><td>ss>0b 20 0</td><td>7 30 01 02 00 0</td><td>0 00</td></response-succes<>	ss>0b 20 0	7 30 01 02 00 0	0 00
→ 09-27-2016 19:08:09.72	2 Local port COM3:115200	<request>0b 20 0</request>	8 20 00 04	00 00	
← 09-27-2016 19:08:09.74	Local port COM3:115200	<response-succes< td=""><td>ss>0b 20 0</td><td>8 30 01 04 00 0</td><td>0 00</td></response-succes<>	ss>0b 20 0	8 30 01 04 00 0	0 00

Figure 34 BT On



Step4: Setting BT mode to "slave " and send "set BT Mode" on ACMTH tool.

Step5: Connect with PC Bluetooth, Click "win10"---"setting"—"device"---"Bluetooth" and pair corresponding device in list.



Figure 36 Pairing Successful



ALXC12B User Manual

Step7: Open Alinket RFCOMM Test Host tool, chose corresponding device and click "connect"

≡ Alink	et RFCOMM Te	st Tool						2			×
	Alinket RFCOMM Test Host										
Refresh	Connect	Discon	nect								
AL	X		Frame	Count:	1	Interval(ms):	100	Fram	e Lengtl	n: 10	0
(43:34:1B:0	0:1F:AC)										

Figure 37 Connecting through RFCOMM

Step8: ALXC12B should receive a message indicating that the connecting was successful.

Module Port			Request Messages		Message Sender					
Cocal port COM3:115200			-BT-Bt On 0x00	^	Request Response					
			-BT-Bt Off DeD1							
			-BT-Set Bt Address 0x02		Version	1				
			-BT-Get Bt Address 0:03		Reseved	0				
			.RT.Sot RT Advorticom	ant Ty Dower	Confirmation flag	0				
OAdd ODelete BT			BT	v		🙊 Send				
Mes	sage Log					68				
	Time	Stamp	UART			Message Content				
	09-27-2016	19:11:48.588	Local port COM3:115200	<request>0b 20</request>	0e 20 00 04 09 00					
-	09-27-2016	19:11:48.665	Local port COM3:115200	<response-succe< td=""><td>ss>0b 20 00 30 09 04 09</td><td>00 07 38 35 58 2d 4a 54 4d</td></response-succe<>	ss>0b 20 00 30 09 04 09	00 07 38 35 58 2d 4a 54 4d				
Î	09-27-2016	19:13:35.327	Local port COM3:115200	<indication>0b 2</indication>	0 00 10 01 01 00 00 00					
-	09-27-2016	19:13:40.047	Local port COM3:115200	<request>0b 20</request>	of 20 00 04 00 00					
-	09-27-2016	19:13:40.065	Local port COM3:115200	<response-succe< td=""><td>ss>0b 20 0f 30 01 04 00</td><td>00 00</td></response-succe<>	ss>0b 20 0f 30 01 04 00	00 00				
-	09-27-2016	19:13:53.541	Local port COM3:115200	<request>0b 20</request>	10 20 01 04 0c 00 00					
¢	09-27-2016	19:13:53.558	Local port COM3:115200	<response-succe< td=""><td>ss>0b 20 10 30 01 04 0c</td><td>00 00</td></response-succe<>	ss>0b 20 10 30 01 04 0c	00 00				
-	09-27-2016	19:18:11.378	Local port COM3:115200	<request>0b 20</request>	11 20 00 04 0a 00					
	Sector Sector		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		01 20 11 20 01 04 0-	00.00				

Figure 38 Connected Status Indication



4.2.3.2 EVK to EVK

Step1: Prepare 2ps ALXC12B, one is as master role and the other is as slave role. For example, ALXC12B_Local port com3 is as master and ALXC12B_Local port com307 is as slave;





Step2: Send "WIFI ON" and "BT ON" command respectively from local port COM3 and COM307.

Module Port	Request Messages	Message Sender				
Cocal port COM3:115200	-8T-Bt On 0x00	R	equest	Response		
Cocal port COM307:115200	-BT-Bt Off 0x01	V	larsion	• 1		CM Verriv
	-BT-Set Bt Address 0x02		reision ·			CIVI VEISIC
	-BT-Get Bt Address 0x03		Versio	n	1	
	-BT-Set BT Advertisement Tx Power		Reseve	ed	0	
	-BT-Get BT Advertisement Tx Power		Confir	mation flag	0	
	-BT-Set BT Connection Tx Power 0x06	N	Message ID Op Code		20	
	-BT-Get BT Connection Tx Power 0x07	C			Re	sponse
	-BT-Set BT Advertisement Name 0x08				A 1	
	-BT-Get BT Advertisement Name 0x09		engui			
	-BT-Enable BT Advertise DodA		/alue			Branch Res
	-BT-Disable BT Advertise 0x08		Branch	< Classifier:	> Blu	uetooth M
	-BT-Set BT Mode OxOC		Leaf		- E	luetooth I
	-BT-Get BT Mode Dido		Lea	f <classifier< td=""><td>> BT</td><td>On</td></classifier<>	> BT	On
	-8T-BT Send Data 0x14		Ret	urn Code	Su	ccess
	-BT-BT Send Data Raw 0x14		The elision		0	

Figure 40 Port Configuration by ACMTH

Step3: Send "Enable BT advertise" from the slave role (local port com307).



Step4: Use "BT Master Connect" to setup the connection with slave's MAC address.

Module Port	Request Messages	Message Sender						
Cocal port COM3:115200	-BT-Bt On 0x00	Re	equest	Response				
Cocal port COM307:115200	-BT-Bt Off 0x01	V	arsion			M Versie		
	-BT-Set Bt Address 0x02		ersion ·			AN VEISIC		
	-BT-Get Bt Address 0x03		Versi	on				
	-BT-Set BT Advertisement Tx Power		Resev	Reseved				
	-BT-Get BT Advertisement Tx Power		Confi	rmation flag	0			
	-BT-Set BT Connection Tx Power 0x06	N	Message ID Op Code					
	-BT-Get BT Connection Tx Power 0x07	0				ponse		
	-BT-Set BT Advertisement Name 0x08		Length 🔒		8 1			
	-BT-Get BT Advertisement Name 0x09					1.0		
	-BT-Enable BT Advertise OxOA	Value			Br	anch Res		
	-BT-Disable BT Advertise 0x08		Branc	h <classifier< td=""><td>> Blue</td><td>tooth Ma</td></classifier<>	> Blue	tooth Ma		
	-BT-Set BT Mode OxOC		Leaf		🖃 Bl	uetooth N		
	-BT-Get BT Mode DKDD		Le	af <classifier< td=""><td>r> BT (</td><td>Dn</td></classifier<>	r> BT (Dn		
	-BT-BT Send Data 0x14		Re	turn Code	Suc	cess		
	-BT-BT Send Data Raw _{0x14} ~		haeleen	m	0			
OAdd ODelete	BT							

Figure 41 Setup Connection between Master & Slave

Step5: Master gets response with success return code and connect up indication.

P/Alinket ACM Test Host 1.0.0.89						- ×		
Operation Too Traffic Test	ols Help Show Serial P	orts 🖲 Playback Editor	Hex String Editi	or 🌍 OTA Server 💛 EAP	Configuration			
Module Port Request Messages O Local port COM3:115200 -BT-Get BT Advertisement N O Local port COM307:115200 -BT-Enable BT Advertise on A -BT-Disable BT Advertise on A -BT-Disable BT Advertise on A -BT-Disable BT Advertise on A -BT-Disable BT Advertise on A			Message Sender					
		-8T-Get BT Advertisement Name 0x09 -8T-Enable BT Advertise 0x0A -8T-Disable BT Advertise 0x08 -8T-Set BT Mode 0x00		Request Response				
				Reseved Confirmation flag	0			
		-BT-Get BT Mode 0x00		Message ID	1			
OAdd	Delete	BT Cond Data			👧 Ser	nd		
Message Log						66	Auto Scrolling	KClea
Tim	e Stamp	UART		N	lessage Content			
	6 20:03:11.574	Local port COM3:115200	<request>0b 20</request>	21 20 05 04 18 43 43 a1 12	2 1f af 00			
09-27-201	6 20:03:12.165	Local port COM307:1152 Local port COM3:115200	<indication>0b 2 <response-succi< td=""><td>ess>0b 20 01 30 01 04 18 0</td><td>00 ff ac 01 00</td><td></td><td></td><td></td></response-succi<></indication>	ess>0b 20 01 30 01 04 18 0	00 ff ac 01 00			
1 09-27-201	6 20:03:12.184	Local port COM3:115200	<indication>0b 2</indication>	0 02 10 07 04 20 43 43 a1	12 1f af 01 00			

Figure 42 Connection Successful Indication



4.2.4 ACM Mode for BLE

Same procedure as ACM Mode for BT

Step1: Add local port.

Step2: Open ACMTH tool and send "WIFI on" command.

Step3: After Wi-Fi On successfully, send "BLE On" command.



Figure 43 BLE On

Step4. Chose message you want to send in "Request Messages"

Step5. Clink "Send" button. If Send message successful, tool can get response from module

Operation Tools Help			
Traffic Test 🐺 Show Se	rial Ports 🖲 Playback Editor 🥜 Hex String Edit	tor 🌍 OTA Server 💛 EAP Con	nfiguration
Module Port	Request Messages	Message Sender	
Local port COM3:11520	0 -SYS-Get System Info 0x02	Request Response	
Local port COM92:1152	00 -SYS-Software Reset 0x01	Maria	
Local port COM18:1152	00 -SYS-Set Checksum Type 0x03	version	ACM Version
	-SYS-Get Checksum Type 0x04	Version	1
	-SYS-Set Flow Control 0x05	Reseved	0
	-SYS-Get Flow Control 0x06	Confirmation flag	0
	-SYS-Set Log Level 0x07	Message ID	1
	-SYS-Get Log Level DKD8	Op Code	Response
	-SYS-Set Power Save Configuration 🖂	Length	A 169
	-SYS-Get Power Save Configuration 🗤	Lengui	
	-SYS-Set Uart Baud Rate Dx08	Value	Branch Response System Management
	-SYS-Get Uart Baud Rate OxOC	Branch <classifier></classifier>	System Management
	-SYS-Enter Upgrade Mode DKOD	Leaf	System Management Response Leaf Attribute Get System
	-SYS-Enter Flash Link Mode DKOE	Leaf <classifier></classifier>	Get System Information
	-SYS-Get Flash Link Info OxOF	Manufacture Length	7
	-WIFI-Wifi On 0x00	Manufacture	41 6C 69 6E 68 65 74 00 00 00 00 00 00 00 00 00 A
	-WIFI-Wifi Off 0x01	Desiduat Las ath	6
	-WIFI-Wifi Join 0x02	Product Length	0
	-WIFI-Wifi Leave 0x03	< Product	41 4C 58 43 32 58 00 00 00 00 00 00 00 00 00 00 X1
			© Cond
	ALL		No Senu
Message Log			🔠 🗹 Auto Scrolling 💥 Clea
Time Stamp	UART	Mess	sage Content
O9-19-2016 10:57:46.4	36 Local port COM3:115200 <request>0b 20</request>	01 20 00 01 02 00	
09-19-2016 10:57:46.5	36 Local port COM3:115200 <response-succ< td=""><td>ess>0b 20 01 30 a9 01 02 07 4</td><td>1 6c 69 6e 6b 65 74 00 00 00 00 00 00 00 00 00 06 41 4</td></response-succ<>	ess>0b 20 01 30 a9 01 02 07 4	1 6c 69 6e 6b 65 74 00 00 00 00 00 00 00 00 00 06 41 4
Stature Idla Tatali 2 Ra	west 1 Bernance 1 Indication 0 Confirmati		04

Figure 44 BLE Operation

Alinket Technology Corp. All Rights Reserved.



5. Work Condition

5.1 Range of Operation

Symbol	Description	Min.	Max.	Unit
Tg	General operating temperature		85	°C
Ts	Storage temperature	-40	85	°C
VDDIO	IO power supply	2.8	3.6	V
VDDBAT	Power supply	2.8	3.6	V
MSL	Moisture Sensitivity Level 3			
RoHS	Restriction of Hazardous Substances	Compliant		

Table 10 Range of Operation – General Specification

5. 2 Recommended Operation Range

Symbol	Min.	Тур.	Max.	Unit
VDD	3.0	3.3	3.6	V

Table 12 Recommended Temperature and Humidity

Operating temperature	-20°C to 70°C
Storage Temperature	5°C to 35°C
Humidity Range	40% ~ 70%, relative humidity



6. Manufacturing

6. 1 Recommended Reflow Profile

Referred to IPC/JEDEC Standard,

Peak Temperature < 250 °C,

Number of Times <= 2Times.



6.2 ROHS Declaration

To the best of our present knowledge, given our supplier declarations, this product does not contain any substance that is banned by EU RoHS Directive 2011/65/EU and its amendment directives – XRF. RoHS restricted substances are list below.

- ➤ Cadmium (Cd)
- Lead (Pb)
- Mercury (Hg)
- Hexavalent Chromium (Cr(VI))
- Polybrominated biphenyls (PBBs)
- Polybrominated diphenylether (PBDEs)



7. Ordering Information

Table 13 Order Information

ALXC12A	Wi-Fi 2.4GHz + BT 4.0 Combo IoT Controller, On-Board Antenna
ALXC12B	Wi-Fi 2.4GHz + BT4.0 Combo IoT Controller, External Antenna (U.FL)

8. Technical Support

For technical support, please contact:

Alinket Electronic Technology (Shanghai) Co., Ltd.

E-Mail: <u>support@alinket.com</u>

Tel: +86 21 6104 8128

Address: Floor 4, No.10, Lane 198, Zhangheng Road, Shanghai, 201204 P. R. China

9. Reference

- [1] ALXC12B Product Brief, Alinket
- [2] ALXC12B Schematic Diagram, Alinket
- [3] ALXC12B Datasheet, Alinket



Appendix: Acronyms and Abbreviations

The following list of acronyms and abbreviations may appear in this document.

-16QAM	16Quadrature Amplitude Modulation
-64QAM	64Quadrature Amplitude Modulation
-ADC	Analog-to-Digital Converter
-ARM	Advanced RISC Machines
-ART	Adaptive Real-Time Memory
-AiDK	Alinket IoT Development Kit
-AES	Audio Engineering Society
-BPSK	Binary Phase Shift Keying
-CMOS	Complementary Metal Oxide Semiconductor
-CE	Conformite Europeenne
-CRC	Cyclic Redundancy Code
-CCK	Complementary Code Keying
-DAC	Digital-to-Analog Converter
-DMIPS	Dhrystone Million Instructions executed Per Second
-DSP	Digital Signal Processor
-DMA	Direct Memory Access
-DSS	Direct Sequence Spread Spectrum
-EAP	Extension Authentication Protocol
-EVK	Evaluation Kit
-EVM	Error Vector Magnitude
-FIFO	First In First Out
-GPIO	General-Purpose Input-Output
-HNP	Host Negotiation Protocol
-I2C	Inter-Integrated Circuit
-I2S	Inter-IC Sound
-ISM	Industrial
-IEEE	Institute of Electrical and Electronics Engineers
-IP	Internet Protocol
-IC	Integrated Circuit
-JTAG	Joint Test Action Group
-LQFP	Low-profile Quad Flat Package
-MAC	Medium Access Control
-MSL	Moisture Sensitivity Level
-OFDM	Orthogonal Frequency Division Multiplexing
-PWM	Pulse Width Modulation
-PER	Packet Error Rate
-PEAP-GTC	Protected Extensible Authentication Protocol- Good Till Cancelled
-PEAP-MSCHAP	Microsoft Challenge Handshake Authentication Protocol



-PBB	Poly Brominated Biphenyl
-PBDE	Poly Brominated Biphenyl Ether
-PLL	Phase Locked Logic
-QPSK	Quadrature Phase Shift Keying
-ROHS	Restriction of Hazardous Substances
-RC	Real Clock
-RTC	Real Time Clock
-RF	Radio Frequency
-SPI	Serial Peripheral Interface
-SDIO	Secure Digital Input and Output Card
-SRAM	Static Random Access Memory
-SKU	Stock Keeping Unit
-SRP	Session Request Protocol
-TLS	Transport Layer Security
-TCP	Transmission Control Protocol
-TKIP	Temporal Key Integrity Protocol
-USBH	Universal Serial Bus Host Mode
-USBD	Universal Serial Bus Device Mode
-UDP	User Datagram Protocol
-UART	universal asynchronous receiver/transmitter
-WiFi	Wireless Fidelity
-WLAN	Wireless Local Area Network
-WAPI	WLAN Authentication and Privacy Infrastructure
-WPA	Wi-Fi Protected Access
	HINKEL

Alinket Technology Corp. All Rights Reserved.

FCC Statement

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and

(2) This device must accept any interference received, including interference that may cause undesired operation.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment .This equipment should be installed and operated with minimum distance 20cm between the radiator& your body.

FCC Label Instructions

The outside of final products that contains this module device must display a label referring to the enclosed module. This exterior label can use wording such as:

"Contains Transmitter Module FCC ID:2AELJ-ALXC12B" or "Contains FCC ID:2AELJ-ALXC12B" Any similar wording that expresses the same meaning may be used.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-Reorient or relocate the receiving antenna.

-Increase the separation between the equipment and receiver.

-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-Consult the dealer or an experienced radio/TV technician for help.