LAMPIRAN

Lampiran 1 Coding Aplikasi Blink

SCRRIP CODING APLIASI BLINK

```
#define BLYNK_PRINT Serial
#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>
#include <Wire.h>
#include <PZEM004Tv30.h>
#define PZEM_DEFAULT_ADDR 0xF8


int sensor = A0;
int nilai;

//inisialisasi objek untuk PZEM (sensor arus dan tegangan)
PZEM004Tv30 pzem_r (0, 2, 0x01);
PZEM004Tv30 pzem_s (14, 12, 0x000);
PZEM004Tv30 pzem_t (13, 15, 0x00);


char auth[] = "QCc57rNmM90KKnuvhaRXbtZT44_1E0lM"; //Enter your Blynk
application auth token
char ssid[] = "SUKSES ANGGA"; //Enter your WIFI name
char pass[] = "susucoklat"; //Enter your WIFI passowrd

//variabel penampung untuk nilai sensor arus dan tegangan
float CurrentR, VoltaseR, CurrentS, VoltaseS, CurrentT, VoltaseT;

WidgetLCD lcd(V5);

void setup () {


  Blynk.begin(auth, ssid, pass);

  //aktifkan serial
  Serial.begin(9600);
```

```
  lcd.clear();
  lcd.print(0, 0, "NILAI SENSOR :");

}

void loop() {
  Blynk.run();
  nilai = analogRead (sensor);
  Serial.print("Sensor BBM:");
  Serial.println(nilai);
  lcd.clear();
  lcd.print(0, 0, "--SENSOR BBM--");
  lcd.print(4, 1, nilai);
  Serial.println();
  delay(1000);

  //baca nilai current (A)
  CurrentR = pzem_r.current();
  //jika gagal membaca current
  if(isnan(CurrentR))
  {
    Serial.println("gagal membaca current R");
    lcd.clear();
    lcd.print(0, 0, "gagal membaca current R");
  }
  else
  {
    Serial.print("Current R : ");
    Serial.print(CurrentR);
    Serial.println("A");
    lcd.clear();
    lcd.print(0, 0, "Current R : ");
    lcd.print(4, 1, CurrentR);
  }
  //baca nilai voltase (V)
  VoltaseR = pzem_r.voltage();
  //jika gagal membaca voltase
  if(isnan(VoltaseR))
```

```
 {
   Serial.println("gagal membaca Voltase R");
   lcd.clear();
   lcd.print(0, 0, "gagal membaca Voltase R");
 }
 else
 {
   Serial.print("Voltase R : ");
   Serial.print(VoltaseR);
   Serial.println("V");
   lcd.clear();
   lcd.print(0, 0, "Voltase R : ");
   lcd.print(4, 1, VoltaseR);

 }

 Serial.println();
 delay(1000);

//baca nilai current (A)
 CurrentS = pzem_s.current();
 //jika gagal membaca current
 if(isnan(CurrentS))
 {
   Serial.println("gagal membaca current S");
   lcd.clear();
   lcd.print(0, 0, "gagal membaca current S");
 }
 else
 {
   Serial.print("Current S : ");
   Serial.print(CurrentS);
   Serial.println("A");
   lcd.clear();
   lcd.print(0, 0, "Current S :  ");
   lcd.print(4, 1, CurrentS );
 }
 //baca nilai voltase (V)
```

```
 VoltaseS = pzem_s.voltage();
 //jika gagal membaca voltase
 if(isnan(VoltaseS))
 {
   Serial.println("gagal membaca Voltase S");
   lcd.clear();
   lcd.print(0, 0, "gagal membaca Voltase S");
  }
 else
 {
   Serial.print("Voltase S : ");
   Serial.print(VoltaseS);
   Serial.println("V");
   lcd.clear();
   lcd.print(0, 0, "Voltase S : ");
   lcd.print(4, 1, VoltaseS);
 }
 Serial.println();
 delay(1000);

 //baca nilai current (A)
 CurrentT = pzem_t.current();
 //jika gagal membaca current
 if(isnan(CurrentT))
 {
   Serial.println("gagal membaca current T");
   lcd.clear();
   lcd.print(0, 0, "gagal membaca current T");
 }
 else
 {
   Serial.print("Current T : ");
   Serial.print(CurrentT);
   Serial.println("A");
   lcd.clear();
   lcd.print(0, 0, "Current T : ");
   lcd.print(4, 1, CurrentT );
  }
```

```
  //baca nilai voltase (V)
  VoltaseT = pzem_t.voltage();
  //jika gagal membaca voltase
  if(isnan(VoltaseT))
  {
    Serial.println("gagal membaca Voltase T");
    lcd.clear();
    lcd.print(0, 0, "gagal membaca Voltase T");
  }
  else
  {
    Serial.print("Voltase T : ");
    Serial.print(VoltaseT);
    Serial.println("V");
    lcd.clear();
    lcd.print(0, 0, "Voltase T : ");
    lcd.print(4, 1, VoltaseT );

  }

  Serial.println();
  delay(1000);
}
```

Lampiran 2 Data Sheet Node MCU

DATA SHEET NODE MCU

1. General Overview

1.1. Introduction

Espressif Systems' Smart Connectivity Platform (ESCP) is a set of high performance, high integration wireless SOCs, designed for space and power constrained mobile platform designers. It provides unsurpassed ability to embed WiFi capabilities within other systems, or to function as a standalone application, with the lowest cost, and minimal space requirement.

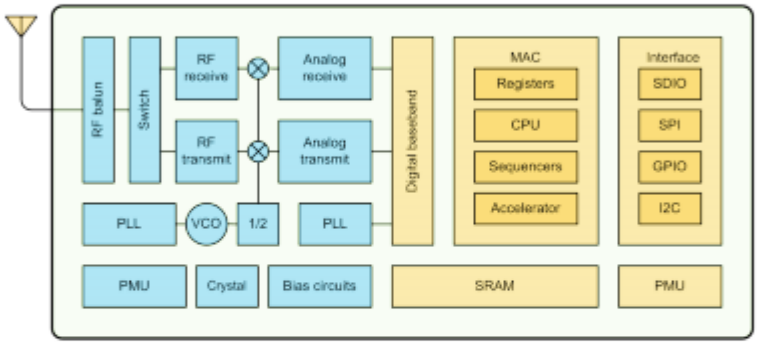


Figure 1 ESP8266EX Block Diagram

ESP8266EX offers a complete and self-contained WiFi networking solution; it can be used to host the application or to offload WiFi networking functions from another application processor.

When ESP8266EX hosts the application, it boots up directly from an external flash. In has integrated cache to improve the performance of the system in such applications.

Alternately, serving as a WiFi adapter, wireless internet access can be added to any micro controller-based design with simple connectivity (SPI/SDIO or I2C/UART interface).

ESP8266EX is among the most integrated WiFi chip in the industry; it integrates the antenna switches, RF balun, power amplifier, low noise receive amplifier, filters, power management modules, it requires minimal external circuitry, and the entire solution, including front-end module, is designed to occupy minimal PCB area.

ESP8266EX also integrates an enhanced version of Tensilica's L106 Diamond series 32-bit processor, with on-chip SRAM, besides the WiFi functionalities. ESP8266EX is often integrated with external sensors and other application specific devices through its GPIOs; sample codes for such applications are provided in the software development kit (SDK).

Espressif Systems' Smart Connectivity Platform (ESCP) demonstrates sophisticated system-level features include fast sleep/wake context switching for energy-efficient VoIP, adaptive radio biasing for low-power operation, advance signal processing, and spur cancellation and radio co-existence features for common cellular, Bluetooth, DDR, LVDS, LCD interference mitigation.

1.2. Features

- 802.11 b/g/n
- Integrated low power 32-bit MCU
- Integrated 10-bit ADC
- Integrated TCP/IP protocol stack
- Integrated TR switch, balun, LNA, power amplifier and matching network
- Integrated PLL, regulators, and power management units
- Supports antenna diversity
- WiFi 2.4 GHz, support WPA/WPA2
- Support STA/AP/STA+AP operation modes
- Support Smart Link Function for both Android and iOS devices
- SDIO 2.0, (H) SPI, UART, I2C, I2S, IR Remote Control, PWM, GPIO
- STBC, 1x1 MIMO, 2x1 MIMO
- A-MPDU & A-MSDU aggregation & 0.4s guard interval
- Deep sleep power <10uA, Power down leakage current < 5uA
- Wake up and transmit packets in < 2ms
- Standby power consumption of < 1.0mW (DTIM3)
- +20 dBm output power in 802.11b mode
- Operating temperature range -40C ~ 125C
- FCC, CE, TELEC, WiFi Alliance, and SRRC certified

1.3. Parameters

Table 1 Parameters

Categories	Items	Values
WiFi Paramters	Certificates	FCC/CE/TELEC/SRRC
	WiFi Protocles	802.11 b/g/n
	Frequency Range	2.4G-2.5G (2400M-2483.5M)
	Tx Power	802.11 b: +20 dBm
		802.11 g: +17 dBm
		802.11 n: +14 dBm
	Rx Sensitivity	802.11 b: -91 dbm (11 Mbps)
		802.11 g: -75 dbm (54 Mbps)
		802.11 n: -72 dbm (MCS7)
	Types of Antenna	PCB Trace, External, IPEX Connector, Ceramic Chip
Hardware Paramaters	Peripheral Bus	UART/SDIO/SPI/I2C/I2S/IR Remote Control
		GPIO/PWM
	Operating Voltage	3.0~3.6V
	Operating Current	Average value: 80mA
	Operating Temperature Range	-40°~125°
	Ambient Temperature Range	Normal temperature
	Package Size	5x5mm
	External Interface	N/A
Software Parameters	WiFi mode	station/softAP/SoftAP+station
	Security	WPA/WPA2
	Encryption	WEP/TKIP/AES
	Firmware Upgrade	UART Download / OTA (via network)
	Ssoftware Development	Supports Cloud Server Development / SDK for custom firmware development
	Network Protocols	IPv4, TCP/UDP/HTTP/FTP

	User Configuration	AT Instruction Set, Cloud Server, Android/ iOS App

1.4. Ultra Low Power Technology

ESP8266EX has been designed for mobile, wearable electronics and Internet of Things applications with the aim of achieving the lowest power consumption with a combination of several proprietary techniques. The power saving architecture operates mainly in 3 modes: active mode, sleep mode and deep sleep mode.

By using advance power management techniques and logic to power-down functions not required and to control switching between sleep and active modes, ESP8266EX consumes about than 60uA in deep sleep mode (with RTC clock still running) and less than 1.0mA (DTIM=3) or less than 0.5mA (DTIM=10) to stay connected to the access point.

When in sleep mode, only the calibrated real-time clock and watchdog remains active. The real-time clock can be programmed to wake up the ESP8266EX at any required interval.

The ESP8266EX can be programmed to wake up when a specified condition is detected. This minimal wake-up time feature of the ESP8266EX can be utilized by mobile device SOCs, allowing them to remain in the low-power standby mode until WiFi is needed.

In order to satisfy the power demand of mobile and wearable electronics, ESP8266EX can be programmed to reduce the output power of the PA to fit various application profiles, by trading off range for power consumption.

1.5. Major Applications

Major fields of ESP8266EX applications to Internet-of-Things include:

- Home Appliances
- Home Automation
- Smart Plug and lights
- Mesh Network
- Industrial Wireless Control
- Baby Monitors
- IP Cameras
- Sensor Networks
- Wearable Electronics

2. Hardware Overview

2.1. Pin Definitions

The pin assignments for 32-pin QFN package is illustrated in Fig.2.

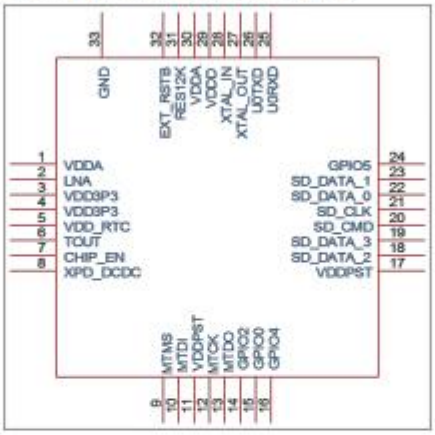


Figure 2 Pin Assignments

Table 2 below presents an overview on the general pin attributes and the functions of each pin.

Table 2 Pin Definitions

Pin	Name	Type	Function
1	VDDA	P	Analog Power 3.0 –3.6V
2	LNA	I/O	RF Antenna Interface. Chip Output Impedance=50Ω No matching required but we recommend that the n-type matching network is retained.
3	VDD3P3	P	Amplifier Power 3.0–3.6V
4	VDD3P3	P	Amplifier Power 3.0–3.6V
5	VDD_RTC	P	NC (1.1V)

6	TOUT	I	ADC Pin (note: an internal pin of the chip) can be used to check the power voltage of VDD3P3 (Pin 3 and Pin4) or the input voltage of TOUT (Pin 6). These two functions cannot be used simultaneously.
7	CHIP_EN	I	Chip Enable. High: On, chip works properly; Low: Off, small current
8	XPD_DCDC	I/O	Deep-Sleep Wakeup; GPIO16
9	MTMS	I/O	GPIO14; HSPI_CLK
10	MTDI	I/O	GPIO12; HSPI_MISO
11	VDDPST	P	Digital/IO Power Supply (1.8V~3.3V)
12	MTCK	I/O	GPIO13; HSPI_MOSI; UART0_CTS
13	MTDO	I/O	GPIO15; HSPI_CS; UART0_RTS
14	GPIO2	I/O	UART Tx during flash programming; GPIO2
15	GPIO0	I/O	GPIO0; SPI_CS2
16	GPIO4	I/O	GPIO4
17	VDDPST	P	Digital/IO Power Supply (1.8V~3.3V)
18	SDIO_DATA_2	I/O	Connect to SD_D2 (Series R: 200Ω); SPIHD; HSPIHD; GPIO9
19	SDIO_DATA_3	I/O	Connect to SD_D3 (Series R: 200Ω); SPIWP; HSPIWP; GPIO10
20	SDIO_CMD	I/O	Connect to SD_CMD (Series R: 200Ω); SPI_CS0; GPIO11
21	SDIO_CLK	I/O	Connect to SD_CLK (Series R: 200Ω); SPI_CLK; GPIO6
22	SDIO_DATA_0	I/O	Connect to SD_D0 (Series R: 200Ω); SPI_MSIO; GPIO7
23	SDIO_DATA_1	I/O	Connect to SD_D1 (Series R: 200Ω); SPI_MOSI; GPIO8
24	GPIO5	I/O	GPIO5
25	U0RXD	I/O	UART Rx during flash programming; GPIO3
26	U0TXD	I/O	UART Tx during flash progamming; GPIO1; SPI_CS1
27	XTAL_OUT	I/O	Connect to crystal oscillator output, can be used to provide BT clock input
28	XTAL_IN	I/O	Connect to crystal oscillator input
29	VDDD	P	Analog Power 3.0V~3.6V
30	VDDA	P	Analog Power 3.0V~3.6V
31	RES12K	I	Serial connection with a 12 kΩ resistor and connect to the ground
32	EXT_RSTB	I	External reset signal (Low voltage level: Active)

Note: GPIO2, GPIO0, MTDO can be configurable as 3-bit SDIO mode.

2.2. Electrical Characteristics

Table 3 ESP8266EX Electrical Characteristics

Parameters		Conditions	Min	Typical	Max	Unit
Storage Temperature Range			-40	Normal	125	°C
Maximum Soldering Temperature		IPC/JEDEC J-STD-020			260	°C
Working Voltage Value			3.0	3.3	3.6	V
I/O	V_{IL}/V_{IH}		-0.3/0.75V_{IO}		0.25V_{IO}/3.6	V
	V_{OL}/V_{OH}		N/0.8V_{IO}		0.1V_{IO}/N	
	I_{MAX}				12	mA
Electrostatic Discharge (HBM)		TAMB=25°C			2	KV
Electrostatic Discharge (CDM)		TAMB=25°C			0.5	KV

2.3. Power Consumption

The following current consumption is based on 3.3V supply, and 25°C ambient, using internal regulators. Measurements are done at antenna port without SAW filter. All the transmitter's measurements are based on 90% duty cycle, continuous transmit mode.

Table 4 Description on Power Consumption

Parameters	Min	Typical	Max	Unit
Tx802.11b, CCK 11Mbps, P OUT=+17dBm		170		mA
Tx 802.11g, OFDM 54Mbps, P OUT =+15dBm		140		mA
Tx 802.11n, MCS7, P OUT =+13dBm		120		mA
Rx 802.11b, 1024 bytes packet length , -80dBm		50		mA
Rx 802.11g, 1024 bytes packet length, -70dBm		56		mA
Rx 802.11n, 1024 bytes packet length, -65dBm		56		mA
Modem-Sleep①		15		mA
Light-Sleep②		0.9		mA
Deep-Sleep③		10		uA
Power Off		0.5		uA

①: Modem-Sleep requires the CPU to be working, as in PWM or I2S applications. According to 802.11 standards (like U-APSD), it saves power to shut down the WiFi Modem circuit while maintaining a WiFi connection with no data transmission. E.g. in DTIM3, to maintain a sleep 300ms-wake 3ms cycle to receive AP's Beacon packages, the current is about 15mA.

②: During Light-Sleep, the CPU may be suspended in applications like WiFi switch. Without data transmission, the WiFi Modem circuit can be turned off and CPU suspended to save power according to the 802.11 standard (U-APSD). E.g. in DTIM3, to maintain a sleep 300ms-wake 3ms cycle to receive AP's Beacon packages, the current is about 0.9mA.

③: Deep-Sleep does not require WiFi connection to be maintained. For application with long time lags between data transmission, e.g. a temperature sensor that checks the temperature every 100s, sleep 300s and waking up to connect to the AP (taking about 0.3~1s), the overall average current is less than 1mA.

2.4. Receiver Sensitivity

The following are measured under room temperature conditions with 3.3V and 1.1V power supplies.

Table 5 Receiver Sensitivity

Parameters	Min	Typical	Max	Unit
Input frequency	2412		2484	MHz
Input impedance		50		Ω
Input reflection			-10	dB
Output power of PA for 72.2Mbps	15.5	16.5	17.5	dBm
Output power of PA for 11b mode	19.5	20.5	21.5	dBm
Sensitivity				
DSSS, 1Mbps		-98		dBm
CCK, 11Mbps		-91		dBm
6Mbps (1/2 BPSK)		-93		dBm
54Mbps (3/4 64-QAM)		-75		dBm
HT20, MCS7 (65Mbps, 72.2Mbps)		-72		dBm
Adjacent Channel Rejection				
OFDM, 6Mbps		37		dB
OFDM, 54Mbps		21		dB
HT20, MCS0		37		dB
HT20, MCS7		20		dB

2.5. MCU

ESP8266EX is embedded with Tensilica L106 32-bit micro controller (MCU), which features extra low power consumption and 16-bit RSIC. The CPU clock speed is 80MHz. It can also reach a maximum value of 160MHz. Real Time Operation System (RTOS) is enabled. Currently, only 20% of MIPS has been occupied by the WiFi stack, the rest can all be used for user application programming and development. The following interfaces can be used to connect to the MCU embedded in ESP8266EX:

- Programmable RAM/ROM interfaces (iBus), which can be connected with memory controller, and can also be used to visit external flash;
- Data RAM interface (dBus), which can connected with memory controller;
- AHB interface, can be used to visit the register.

2.6. Memory Organization

2.6.1. Internal SRAM and ROM

ESP8266EX WiFi SoC is embedded with memory controller, including SRAM and ROM. MCU can visit the memory units through iBus, dBus, and AHB interfaces. All memory units can be visited upon request, while a memory arbiter will decide the running sequence according to the time when these requests are received by the processor.

According to our current version of SDK provided, SRAM space that is available to users is assigned as below:

- **RAM size < 36kB,** that is to say, when ESP8266EX is working under the station mode and is connected to the router, programmable space accessible to user in heap and data section is around 36kB.)
- There is no programmable ROM in the SoC, therefore, user program must be stored in an external SPI flash.

2.6.2. External SPI Flash

An external SPI flash is used together with ESP8266EX to store user programs. Theoretically speaking, up to 16 Mbyte memory capacity can be supported.

Suggested SPI Flash memory capacity:

- OTA is disabled: the minimum flash memory that can be supported is 512 kByte;
- OTA is enabled: the minimum flash memory that can be supported is 1 Mbyte.

Several SPI modes can be supported, including Standard SPI, Dual SPI, DIO SPI, QIO SPI, and Quad SPI.

Lampiran 3 Data Sheet Modul Wifi

DATA SHEET MODUL WIFI

muRata electric imp

Preliminary Specification Number : SP-ZZ1MD-E

WiFi Module Data Sheet

Cypress BCM43438 WLAN + ST Micro STM32F412 MCU for 802.11b/g/n

Electric Imp P/N : Imp004m
Tentative P/N : LBEE5ZZ1MD-TEMP

This Datasheet is preliminary version, and subject to change without notice.

Revision history

Issued Date	Revision Code	Revision Page	Changed Items	Change Reason
Jul. 6. 2016			First Issue	
Sep. 9. 2016	A	P3 P4 P6 P15 P17	2. Part Number 4.1. Dimensions 4.2. Terminal Configurations 11. Land pattern (Top View) 13. Tape and Reel Packing	
Oct. 11. 2016	B	P3 P4 P6 P10 P12	2. Part Number 4.1. Dimensions (LMK) 42 Terminal Configurations 8. Power up sequence 9. RF Characteristics	
Oct. 13. 2016	C	P6 P8 P9 P10 P11 P16 P17	4.2. Pin configurations 4.3. Pin mux table 5. LED drive 6. Phototransistor 7. SPI flash requirements 9. Operating condition 10. External 32kHz crystal 14. Reference circuit 15. Recommended components	
Oct. 20. 2016	D	P10	6. Phototransistor	Correct imp003 reference
Oct. 21. 2016	E	P3	1. Scope	Update cloud information

1. Scope

This specification is for the LBEE5ZZ1MD (imp004m) module that provides connectivity to the internet via WiFi. The fully maintained, secure OS that is part of the Electric Imp cloud service comes pre-loaded.

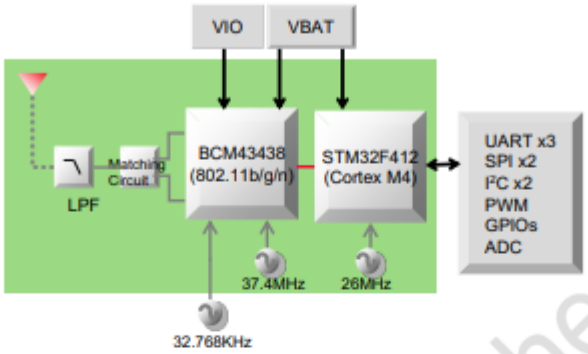
- 802.11 b/g/n 1x1 WiFi
  - 802.11b 17.0dBm +/-2.0dBm
  - 802.11g 13.0dBm +/-2.0dBm
  - 802.11n 12.0dBm +/-2.0dBm (20MHz channels)
  - RX Sensitivity -98dBm typical (@1Mbps)
  - On-board antenna
  - Supports WEP, WPA, WPA2, WPS
- 32-bit Cortex M4 processor
  - Robust embedded operating system with fail-safe firmware updates
  - Virtual machine for customer firmware
  - 256kB of application bytecode flash
  - Around 190kB of dedicated application RAM
- Electric Imp OS & service
  - Robust embedded operating system with fail-safe, secure OS & application updates
  - Pre-provisioned MAC address & per-device secrets
  - TLS1.2-RSA-ECDHE (forward secrecy) connection to cloud
  - Elliptic curve challenge-response to prevent device impersonation
  - Fully featured cloud VM for every device for easy integration with RESTful APIs
  - Open source integrations with AWS, Azure, etc services
- LED drive for red/green status LEDs
- Phototransistor input for Electric imp's patented BlinkUp™ technology for easy configuration from any smartphone, tablet, or web browser
- 23 user selectable I/Os
  - GPIO, PWM, Analog input & output, SPI, UART, I2C
  - Dedicated SPI bus for local storage
- Low power 4uA sleep mode (with external load switch)
  - Option for coin cell RTC battery backup
- Compliant with the RoHS directive

2. Part Number

Sample Part Number
LBEE5ZZ1MD-TEMP

Production Part Number
LBEE5ZZ1MD-011

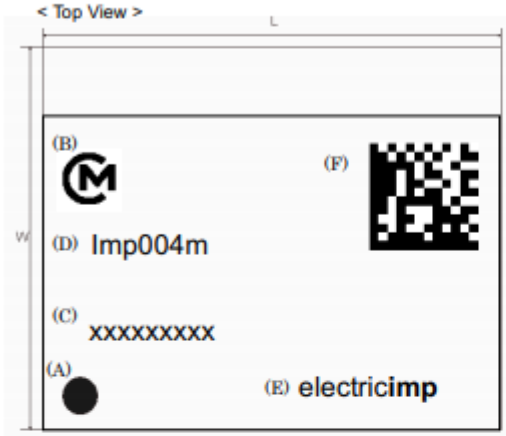
3. Block Diagram



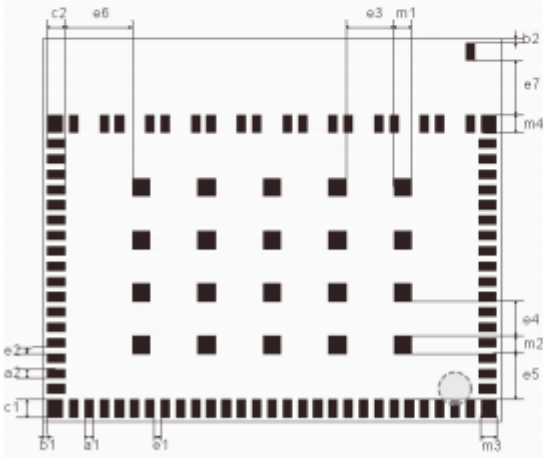
4. Dimensions, Marking and Terminal Configurations

4.1. Dimensions

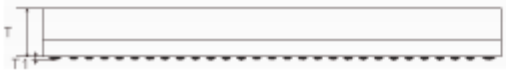
< Top View >



< Top View >



< Side View >



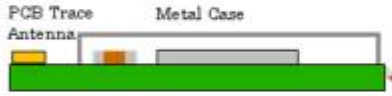
Mark	Dimensions	Mark	Dimensions	Mark	Dimensions
L	21.0 +/- 0.2	W	17.5 +/- 0.2	T	2.3 max.
a1	0.4 +/- 0.1	a2	0.4 +/- 0.1	b1	0.2 +/- 0.2
b2	0.2 +/- 0.2	c1	0.8 +/- 0.1	c2	0.8 +/- 0.1
e1	0.3 +/- 0.1	e2	0.3 +/- 0.1	e3	2.2 +/- 0.1
e4	1.6 +/- 0.1	e5	2.1 +/- 0.1	e6	3.1 +/- 0.1
e7	2.5 +/- 0.1	m1	0.8 +/- 0.1	m2	0.8 +/- 0.1
m3	0.7 +/- 0.1	m4	0.8 +/- 0.1		

(unit : mm)

Marking

Marking	Meaning
(A)	Pin 1 Marking
(B)	Murata Logo
(C)	Inspection Number
(D)	Module Type
(E)	Electric Imp Logo
(F)	2D code

Structure

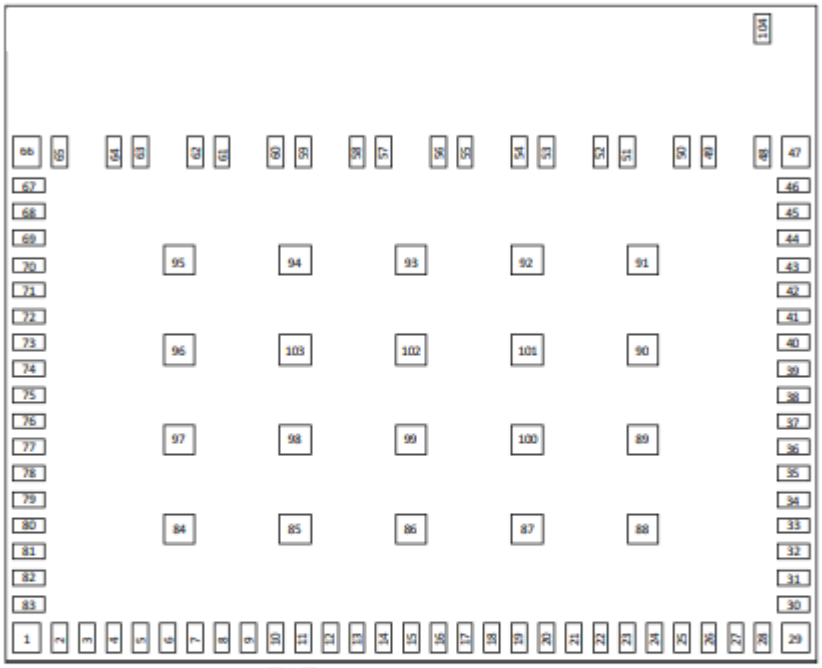


Mounting

The module is designed to be mounted on the edge of the board, with the antenna section hanging off in free space. The antenna is tuned for free space operation. Please see the design guide on Electric Imp dev center website at http://www.electricimp.com/docs for more information.

4.2. Terminal Configurations

Top view (through package)



No.	Name	Type	Description
1	GND	GND	
2	CLK_REQ	O	Asserts CLK_REQ when WLAN directs the host to turn on the reference clock. The CLK_REQ polarity is active-high.
3	NC	-	
4	NC	-	
5	pinM	I/O	GPIO, i2cNM SDA, PWM
6	pinN	I/O	GPIO, i2cNM SCL, PWM
7	pinP	I/O	GPIO, i2cQP SDA, PWM, IRQ
8	pinW	I/O	GPIO, uartBCAW CTS, ADC, IRQ & wake from deep sleep (active high)
9	GND	GND	
10	pinA	I/O	GPIO, uartBCAW RTS, spiAHSR MOSI, ADC, PWM
11	pinB	I/O	GPIO, uartBCAW TX, ADC, PWM, IRQ
12	pinC	I/O	GPIO, uartBCAW RX, ADC, IRQ
13	LPO_IN	I	Sleep Clock
14	pinD	I/O	GPIO, ADC, PWM, IRQ
15	pinE	I/O	GPIO, IRQ
16	pinK	I/O	GPIO, spiGJKL SCLK, ADC, PWM
17	pinL	I/O	GPIO, spiGJKL NSS, ADC, IRQ
18	GND	GND	
19	VDD_IO_MCU	PWR	MCU/WLAN VIO
20	GND	GND	
21	pinQ	I/O	GPIO, uartQ TX, i2cQP SCL, IRQ
22	pinR	I/O	GPIO, spiAHSR NSS, IRQ
23	pinS	I/O	GPIO, spiAHSR SCLK, IRQ
24	PSU_ENABLE	O	Active high when WiFi needs 2.7v+
25	pinF	I/O	GPIO, uartFGJH TX
26	pinG	I/O	GPIO, uartFGJH RX, spiGJKL MOSI
27	pinH	I/O	GPIO, uartFGJH CTS, uartHJ TX, spiAHSR MISO, IRQ
28	pinJ	I/O	GPIO, uartFGJH RTS, uartHJ RX, spiGJKL MISO, pulse counter
29	GND	GND	
30	LED_RED	O	Red LED drive
31	LED_GREEN	O	Green LED drive
32	OPTO_IN	I	Phototransistor input
33	OPTO_BIAS	O	Phototransistor supply
34	FLASH_MOSI	O	SPI flash connection
35	FLASH_SCLK	O	SPI flash connection
36	FLASH_CS_L	O	SPI flash connection
37	FLASH_MISO	I	SPI flash connection
38	NC	-	
39	nRESET	I	MCU reset, internally pulled up
40	VSSA/VREF-	GND	Must be connected to GND
41	OSC32_OUT	O	32kHz xtal connection

42	OSC32_IN	I	32kHz xtal connection (ground if no xtal fitted)
43	GND	GND	
44	VBAT_MCU	PWR	MCU VBAT input
45	VDDA_MCU	PWR	MCU VDDA input
46	VDD_WLAN	PWR	WLAN VBAT input
47 -70	GND	GND	
71 -74	NC	-	
75 -76	GND	GND	
77 -83	NC	-	
84 -103	GND	GND	
104	NC	NC	Note this pad should not be touching any PCB

4.3. Pin Mux table

Pin	uart BCAW	uart FGJH	uart HJ	uart Q	i2c NM	i2c QP	spi AHSR	spi GJKL	ADC	PWM	Pulse count	State change
pinA	RTS						MOSI		Yes	Yes		
pinB	TX								Yes	Yes		Yes
pinC	RX								Yes			Yes
pinD									Yes	Yes		Yes
pinE												Yes
pinF		TX										
pinG		RX						MOSI				
pinH		CTS	TX				MISO					Yes
pinJ		RTS	RX					MISO			Yes	
pinK								SCLK	Yes	Yes		
pinL								NSS	Yes			Yes
pinM					SDA					Yes		
pinN					SCL					Yes		
pinP						SDA				Yes		Yes
pinQ				TX		SCL						Yes
pinR							NSS					Yes
pinS							SCLK					Yes
pinW	CTS								Yes			Yes