1. Introduction

Espressif Systems' Smart Connectivity Platform (ESCP) of high performance wireless SOCs, for mobile platform designers, provides unsurpassed ability to embed Wi-Fi capabilities within other systems,at the lowest cost with the greatest functionality.

2. General Descriptions

The CDW-4982660-00 offers a complete and self-contained Wi-Fi networking solution, allowing it to either host the application or to offload all Wi-Fi networking functions from another application processor. When The CDW-4982660-00 hosts the application, and when it is the only application processor in the device, it is able to boot up directly from an external flash. It has integrated cache to improve the performance of the system in such applications, and to minimize the memory requirements.

Alternately, serving as a Wi-Fi adapter, wireless internet access can be added to any microcontroller-based design with simple connectivity through UART interface or the CPU AHB bridge interface.

The CDW-4982660-00 on-board processing and storage capabilities allow it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development up-front and minimal loading during runtime. With its high degree of on-chip integration, which includes the antenna switch balun, power management converters, it requires minimal external circuitry, and the entire solution, including front-end module, is designed to occupy minimal PCB area.

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.

3. Features

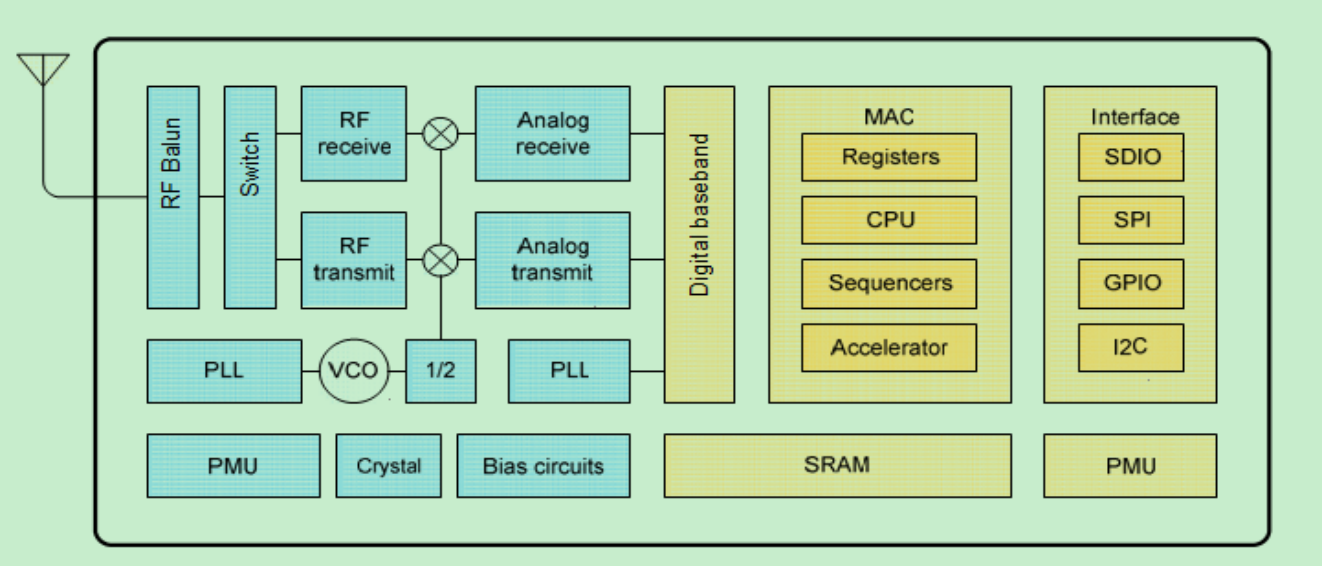
- 802.11 b/g/n protocol
- Wi-Fi Direct (P2P), soft-AP
- Integrated TCP/IP protocol stack
- Integrated TR switch, balun, LNA, power amplifier and matching network

- Integrated PLL, regulators, and power management units
- +18dBm output power in 802.11b mode
- Integrated temperature sensor
- Supports antenna diversity
- Power down leakage current of < 10uA
- Integrated low power 32-bit CPU could be used as application processor
- SDIO 2.0, SPI, UART
- STBC, 1×1 MIMO, 2×1 MIMO
- A-MPDU & A-MSDU aggregation & 0.4μs guard interval
- Wake up and transmit packets in < 2ms
- Standby power consumption of < 1.0mW (DTIM3)

4. Applications

- Smart power plugs
- Home automation
- Mesh network
- Industrial wireless control
- Baby monitors
- IP Cameras
- Sensor networks
- Wearable electronics
- Wi-Fi location-aware devices
- Security ID tags
- Wi-Fi position system beacons

5. Block Diagram



6. General Specification

Category	Parameter	Value
Wi-Fi	Standard	802.11 b/g/n
	Frequency	2412-2462MHz
	Tx Power	802.11 b： 18dBm
		802.11 g ： 14dBm
		802.11 n ： 14dBm
	Rx Sensitivity	802.11 b ： (11Mbps) -86dbm
		802.11 g ： (54Mbps) -72dbm
		802.11 n ： (MCS7) -69dbm
	Antenna	PCB Trace External I-PEX Connector
Hardware	Data Interface	UART/I2C/ GPIO/PWM/SPI

	Operating Voltage	3.0~3.6V
	Peak Current	Max.600mA
	Operating	-20 ℃ – 70 ℃
	Storage	-40 ℃ – 85 ℃
	Size	18.6x13x2.2mm
	External Interface	N/A
Software	Wi-Fi Mode	station/softAP/SoftAP+station
	Security	WPA/WPA2
	Encryption	WEP/TKIP/AES
	Firmware Upgrade	UART Flash Download
		Via Cloud Server
	SW Development	Supports Cloud Server Development / SDK for custom
	Network Protocols	IPv4，TCP/UDP/HTTP/FTP
	User Config	AT Instruction Set(loud Server Android/ios App

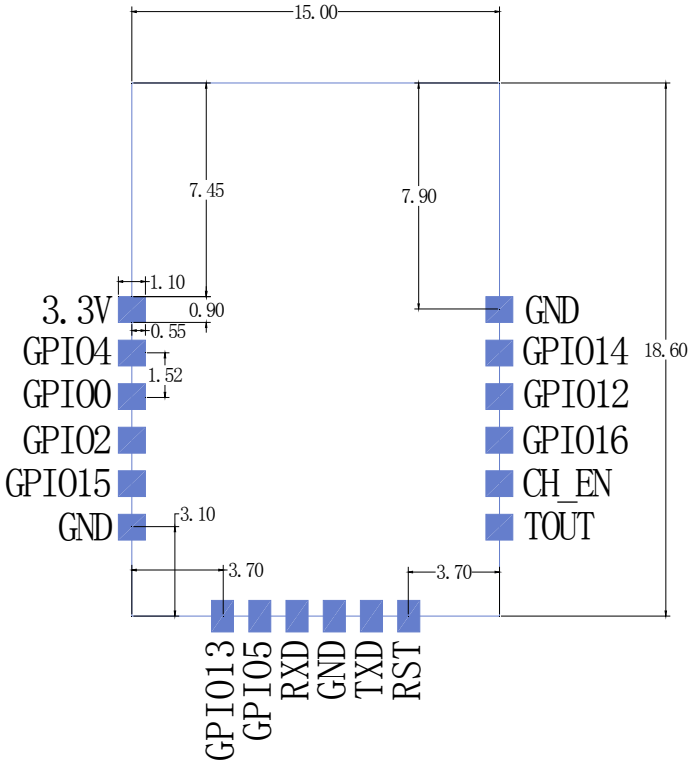
7. Current Consumption

Mode	Min	Typ	Max	Unit
Transmit 802.11b, CCK 11Mbps, P_{OUT}=+17dBm		175		mA
Transmit 802.11g, OFDM 54Mbps, P_{OUT} =+15dBm		145		mA
Transmit 802.11n, MCS7, P_{OUT}=+13dBm		125		mA
Receive 802.11b, packet length=1024 byte, -80dBm		55		mA
Receive 802.11g, packet length=1024 byte, -70dBm		56		mA
Receive 802.11n, packet length=1024 byte, -65dBm		56		mA
Modem-Sleep		15		mA
Light-Sleep		0.9		mA
Deep-Sleep		10		uA
Off		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 Wi-Fi Modem circuit while maintaining a Wi-Fi 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 Wi-Fi switch. Without data transmission, the Wi-Fi 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 Wi-Fi 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.

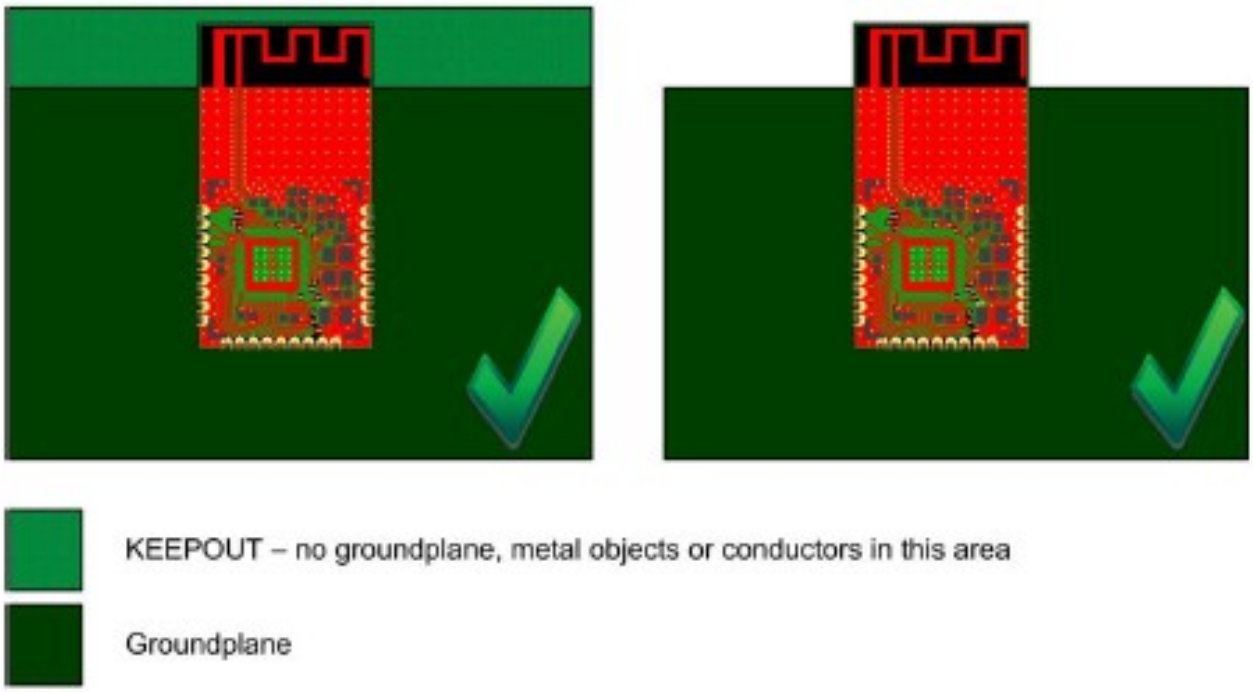
8. Dimension & Pin Assignments

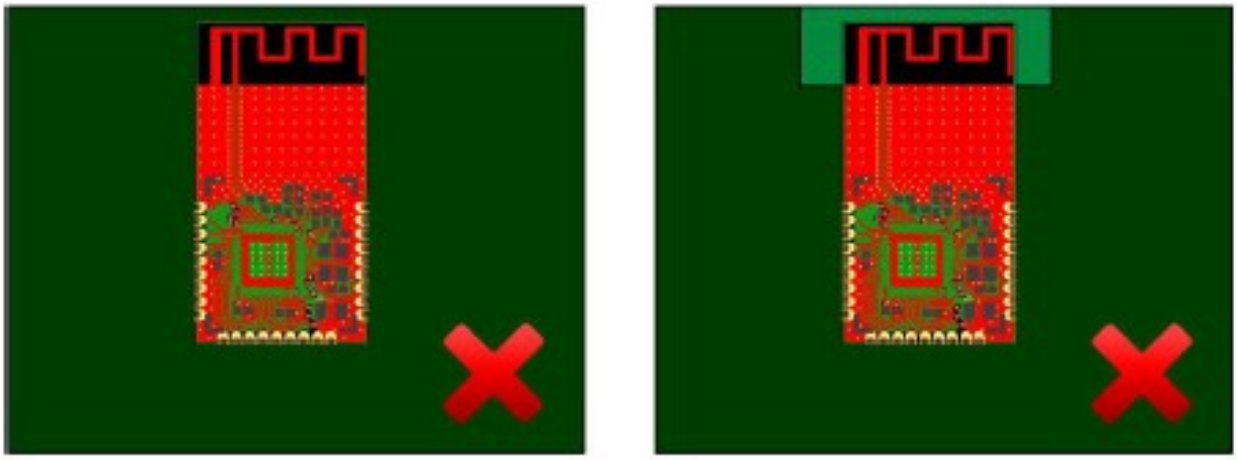
mm



NO	Na	Description
1	3.3V	Power supply . 3.3V is required
2	GPIO4	GPIO4
3	GPIO0	GPIO0 , SPI_CS2
4	GPIO2	GPIO2 , I2C_SDA
5	GPIO15	GPIO15 , HSPI_CS
6	GND	Ground connections
7	GPIO13	GPIO13 , HSPI_D
8	GPIO5	GPIO5
9	RXD	UART_RX , GPIO3
10	GND	Ground connections
11	TXD	UART_TX , GPIO1 , SPI_CS1
12	RST	External reset, active low
13	TOUT	10 bit ADC
14	CHIP_EN	Chip enable, Active h
15	GPIO16	Deep-Sleep Wake , GPIO16
16	GPIO12	GPIO12 , HSPI_Q
17	GPIO14	GPIO14 , I2C_SCL , HSPI_CLK
18	GND	Ground connections

9. Optimal PCB placement of the module



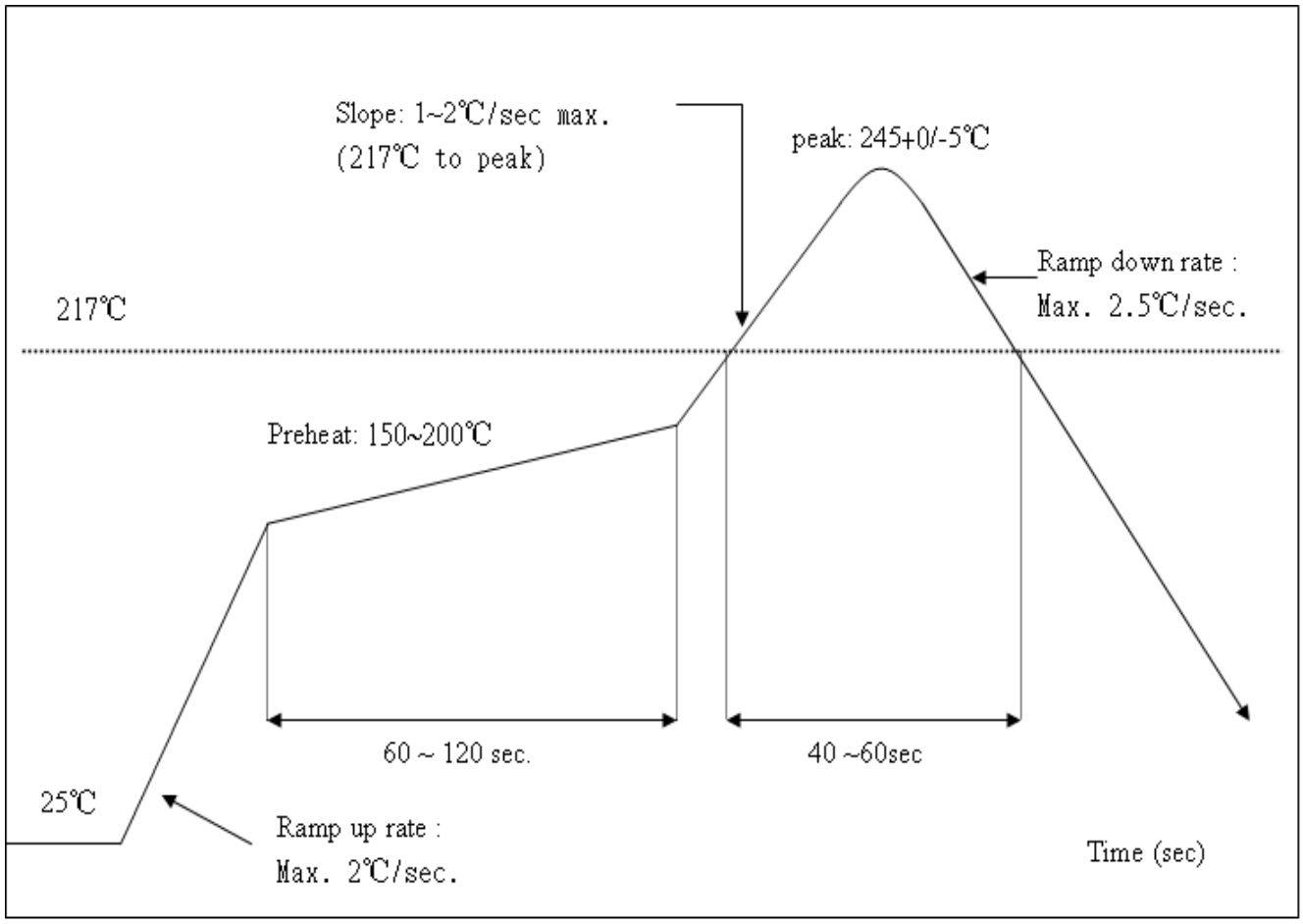


10. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <250°C

Number of Times : ≤2 times



ESD CAUTION

The CDW-4982660-00 is ESD (electrostatic discharge) sensitive device and may be damaged with ESD or spike voltage. Although CDW-4982660-00 is with built-in ESD protection circuitry, please handle with care to avoid the permanent malfunction or the performance degradation.

FCC Caution: Any changes or modifications not expressly
approved by the party responsible for compliance could void the user's
authority to operate this 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.
This device and its antenna(s) must not be co-located or operating in conjunction
with any other antenna or transmitter.
15.105 Information to the user.
(b) For a Class B digital device or peripheral, the instructions furnished the
user shall include the following or similar statement, placed in a prominent
location in the text of the manual:
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.

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 and your bo dy.

Radiation Exposure Statement:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
The module should not be installed and operated simultaneously with other radios except additional RF exposure was evaluated for simultaneously transmission.
The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination.
The firmware setting is not accessible by the end user.
The final end product must be labelled in a visible area with the following:
“Contains Transmitter Module **ROW-CDW4982660**”