SPB820P-WiFi 802.11b/g/n SMD Board

Data Sheet

SPB820P R2A
WiFi SMD Board

H&D Wireless

Revision History

Revision	Revision date	Description
PA1	2012-01-11	First Draft
PA2	2012-03-13	Revised after review
PA3	2012-11-16	Only castellated via version.
PA4	2013-01-22	Updated pin out
PA5	2013-09-13	Updated pin out and electrical data
PA6	2014-03-11	Updated Land pattern.
PB1	2014-11-21	Updated for revision R2A
PB2	2015-04-20	Updated product labels
B	2015-08-12	Release revision B

CONTENT

1 INTRODUCTION

1.1 Overview

SPB820P is a SMD module with the all the required components on a single module. It is a complete solution designed to function as a standalone communication module, serial cable replacement or as an easy to use WLAN addition with a minimal resource need, to an existing system.

SPB820P enables a cost efficient low power, high performance and feature rich client solution. It supports 802.11b, 802.11g and 802.11n. The SPB820P offloads the IP-stack and much of the WiFi-handling code from the host to drastically reduce memory footprint and MCU requirements for adding WiFi to a host system.

The oWL-Pico API is simple and easy to use but still gives full detailed controlled of the WLAN.

SPB820P features an Access Point mode ideal for configuration of Wireless LAN, IP, and other system parameters to be set by the user.

This data sheet pertains to hardware revision R2A and later of the SPB820P.

1.2 Key Features

- WLAN 802.11 b/g/n radio modem for 2.4GHz ISM band.
- Data Rates: 1, 2, 5.5, 6, 7.2, 9, 11, 12, 14.4, 18, 21.7, 24, 28.9, 36, 43.3, 48, 54, 57.8, 65 Mbps
- Modulation: QPSK, 16QAM, 64QAM DBPSK, DQPSK, CCK, OFDM with BPSK
- Open WEP, WPA/WPA2 encryption
- Operates in station or access point mode
- Integrated IPv4-stack
- Up to four simultaneous TCP, UDP and RAW sockets.
- Low power consumption
- Ultra low power down mode
- Simple configuration and control via oWL-Pico API.
- Single Supply Voltage 2.85 – 4.35 V
- Small footprint 20.9 x 26.6 mm with castellated pads.
- RoHS Compliant
- Integrated Chip antenna, U.FL connector or RF on pad versions available
- Evaluation kits available

2 HARDWARE ARCHITECTURE

2.1 Block Diagram

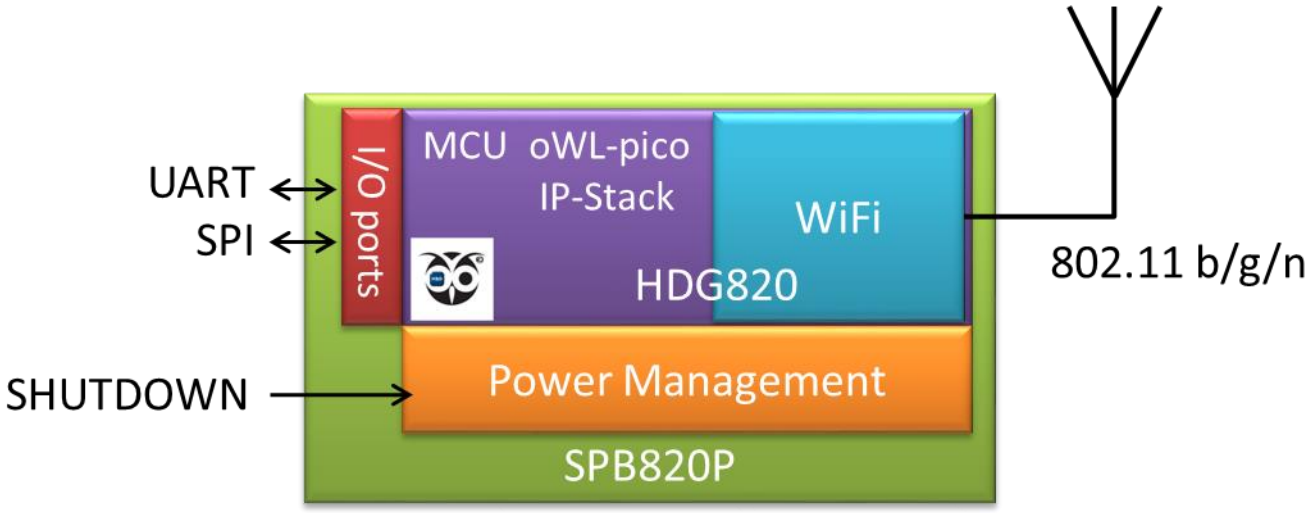


Figure 1 Block Diagram:

2.2 Order information

EXAMPLE: **SPB820P- B C E Q 1**

Product Family
SPB820

Firmware Programming
P= oWL-pico Server

Antenna Option
B=Integrated Chip Antenna
D= U.FL. RF connnector for external antenna
R= RF Pad

Operating Temperature
C= 0°C - 70°C
M= -20°C - 85°C (release pending)

Region
E= Europe and rest of the world (ETSI)
F= North America (FCC)

Package
Q= 24 pin SMD module, castellated via pads

Delivery Package
1= ESD bag
2= Tape & Reel
3= Tray

Table 2.1: Ordering Information

3 ELECTRICAL DATA

3.1 Absolute maximum ratings

Rating	Min	Max	Unit
Supply voltage	-0.3	4.55	V
Supply voltage I/O	-0.3	3.6V and VBAT + 0.3[1]	V
Input RF level		10	dBm
Storage temperature	-50	+125	°C

Table 3.1: Absolute maximum ratings. Exceeding any of the maximum ratings, even briefly lead to deterioration in performance or even destruction. Values indicates condition applied one at the time.

3.2 Electro Static Discharge (ESD)

SPB820P withstands ESD voltages up to 2000V HBM (Human Body Model) according to JESD22-A114 and up to 300 V CDV (Charged Device Model) according to JESD22-A115.

3.3 Recommended operating conditions

Symbol		Min	Typ.	Max	Unit
VCC	Supply Voltage	2.85	3.3	4.35	V
V_{IHN}	All pins	2.0		3.46	V
V_{IL}	All pins	-0.3		0.7	V
T_{OP}	Operating temperature SPB820P (industrial temperature range version)	-20	+25	+85	°C
	Operating temperature SPB820P (commercial temperature range version)	0[1)]		70	°C

Table 3.2: Recommended operating conditions

1) Note: can be extended to -20°C, see Application Note or contact H&D Wireless

3.4 Power Consumption

If no other conditions are stated does VDD=3.6V, T_{amb} = 25°C apply.

Mode	Conditions	Min	Typ.	Max	Unit
Peak current	All modes			300	mA
TX [802.11b]	CCK 11Mbps		205	230	mA
TX [802.11g]	OFDM 54 Mbps		165	200	mA
TX [802.11n]	OFDM 65 Mbps		140	170	mA

RX [802.11b]	Max sensitivity		53	59	mA
RX [802.11g]	Max sensitivity		56	64	mA
RX [802.11n]	Max sensitivity		56	64	mA
Power Save[1] DTIM1	Beacon Interval 100ms		2.7		mA
Power Save[1] DTIM3	Beacon Interval 300ms		1.3		mA
Sleep	Between Beacons		80		uA
Shutdown[2]	Held in shutdown		12		uA
Power down[3]	PWR_DWN high		0.1		uA

Table 3.3: Current consumption in different modes.

Notes:

1) WLAN in power save mode listening to access point beacons.
2) SHUTDOWNB pin set to low level
3) PWR_DWN pin set to high level.

3.5 RF Performance

Conditions: VBAT= 3.6V, T_{amb}= 25°C Spectrum Mask and BER according to IEEE 802.11b/g/n specification.

Parameter	Conditions	Min	Typical	Max	Units
Frequency range	ETSI[1]	2412		2472	MHz
	FCC[1]	2412		2462	
Supported Channels	ETSI[1]	Ch.1 (2412 MHz)		Ch. 13 (2472 MHz)	
	FCC[1]	Ch.1 (2412 MHz		Ch. 11 (2462 MHz)	
RF impedance			50		ohm
Transmitter performance[2,3,4]					
Output power, avg.	CCK 1 Mbit/s	+15	+16	+17	dBm
Output power, avg.	CCK 11 Mbit/s	+15	+16	+17	dBm
Output power, avg.	OFDM 6 Mbit/s	+13	+14	+15	dBm
Output power, avg.	OFDM 54Mbit/s	+13	+14	+15	dBm
Output power , avg.	HT20 MSC0-6	+10	+11	+12	dBm
Receiver performance 11b/g, T_{amb} = 25°C					
Receiver sensitivity	DSSS 1Mbit/s		-94	-87	dBm
Receiver sensitivity	DSSS 2Mbit/s		-91	-85	dBm
Receiver sensitivity	CCK 5.5Mbit/s		-89	-84	dBm
Receiver sensitivity	CCK 11Mbit/s		-86	-81	dBm

Receiver sensitivity	BPSK 6Mbit/s		-89	-84	dBm
Receiver sensitivity	BPSK 9Mbit/s		-88	-83	dBm
Receiver sensitivity	QPSK 12Mbit/s		-86	-81	dBm
Receiver sensitivity	QPSK 18Mbit/s		-84	-79	dBm
Receiver sensitivity	16QAM 1/2 24Mbit/s		-82	-76	dBm
Receiver sensitivity	16QAM 3/4 36Mbit/s		-79	-72	dBm
Receiver sensitivity	64QAM 2/3 48Mbit/s		-74	-68	dBm
Receiver sensitivity	64QAM 3/4 54Mbit/s		-72	-67	dBm
Receiver performance 11n, T_{amb} = 25°C					
Receiver sensitivity	OFDM/BPSK 7.2Mbit/s		-90	-83	dBm
Receiver sensitivity	OFDM/BPSK 14.4Mbit/s		-88	-80	dBm
Receiver sensitivity	OFDM/BPSK 21.7Mbit/s		-86	-78	dBm
Receiver sensitivity	OFDM/16-QAM 28.9Mbit/s		-83	-75	dBm
Receiver sensitivity	OFDM/16-QAM 43.4Mbit/s		-79	-71	dBm
Receiver sensitivity	OFDM/64-QAM 57.8Mbit/s		-72	-67	dBm
Receiver sensitivity	OFDM/64-QAM 65Mbit/s		-70	-66	dBm

Table 3.4: RF performance.

1) SPB820P products sold for final use in North America has the Operations Region set to FCC in the OTP memory. This limits the use of frequencies to those allowed in FCC Part15.
2) TX output power is noted as average power. Peak power may be 2-5 dBm higher for DSSS modulation and 6-10 dBm for OFDM.
3) TX output power varies with temperature as shown in Figure 2

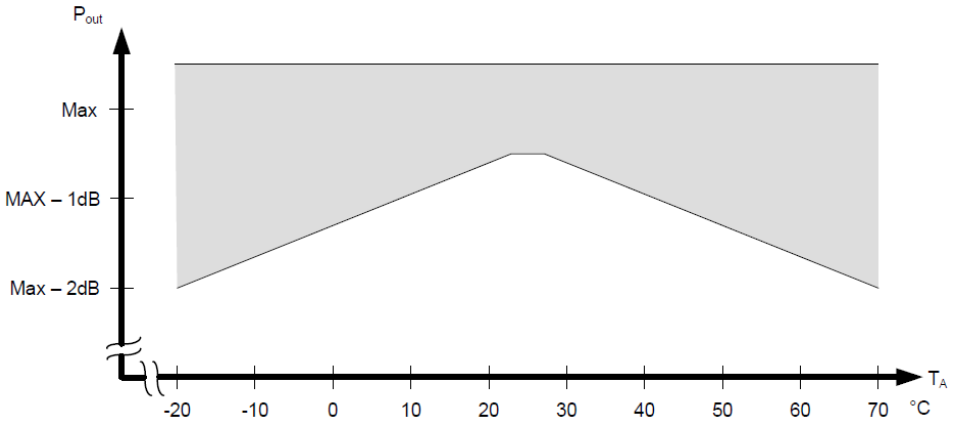


Figure 2: Pout vs ambient temperature

4) TX Output power varies with temperature as shown in Figure 3

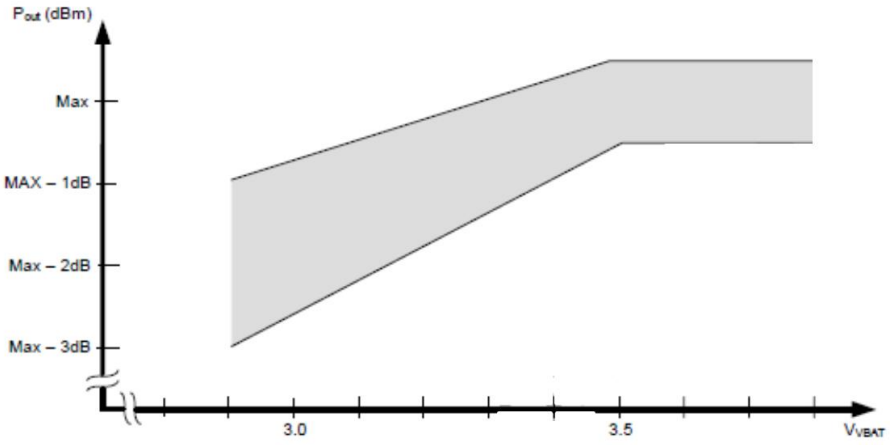


Figure 3: Output Power vs. VCC voltage

3.5.1 SPI timing characteristics

The SPI host interface timing is showed in Figure 3-4 and Table 3-5
Condition: VDDIO= 1.7 – 3.6 V, Tamb= 0 to +70°C

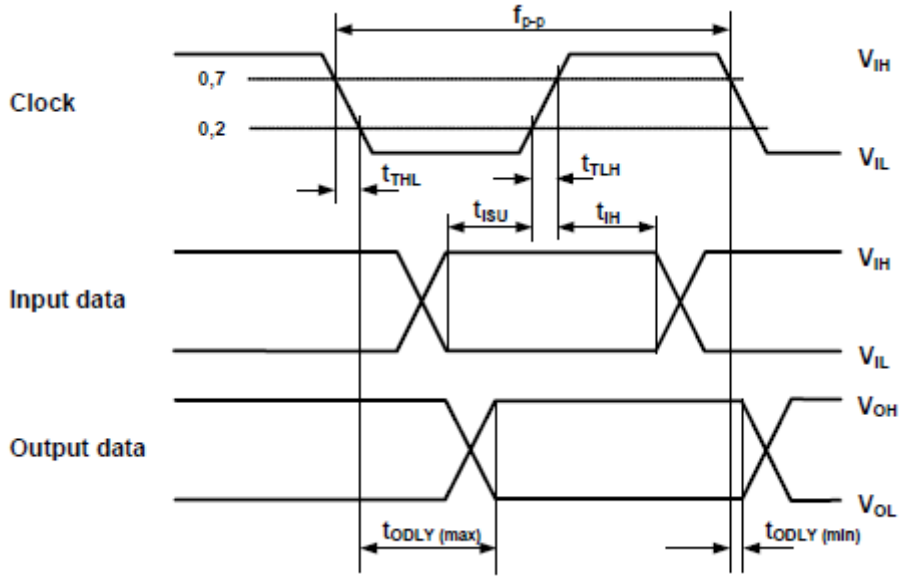


Figure 3-4: SPI timing diagram (default mode

Parameter	Symbol	Min	Max	ns	Comments
Input set-up time	tISU	5		ns	
Input hold time	tIH	5		ns	
Clock fall time	tTHL		10	ns	
Clock rise time	tTLH		10	ns	
Output delay time	tODLY	0	14	ns	
Clock Frequency			25	MHz	

Table 3-5: SPI timing parameter values

3.5.2 Digital input/output pad (I/O)

The digital I/O pads are of type none inverting three-state driver/receiver. The I/O pin functional schematic is shown in Figure 3-5. It includes an input buffer and an output buffer with enable/disable control inputs. It also includes a hold-function. When an I/O is neither driven by the internal nor by an external circuitry, the hold function holds the latest state of the I/O. This is the case for example when Shutdown is active.

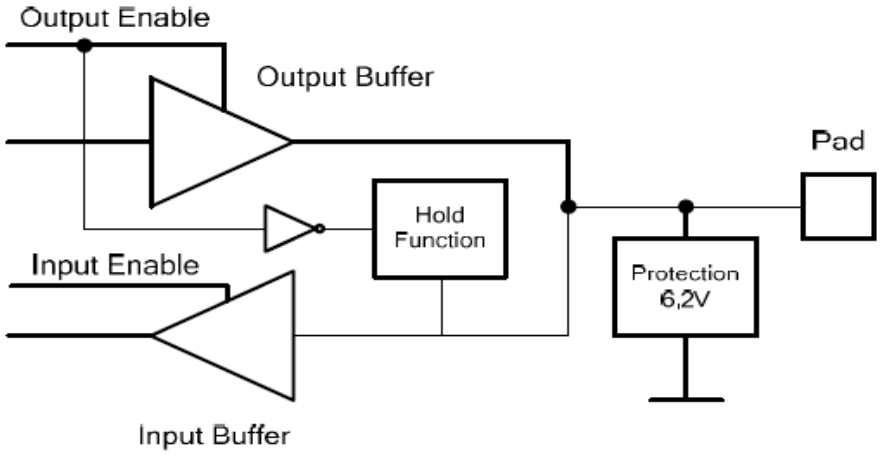


Figure 3-5: Function schematics of the I/O input pad configuration.

Parameter	Symbol	Min	Typ	Max	Units	Comments
Input low voltage	vIL	-0.3		0.3*V_{IO}	V	
Input high voltage	vIH	0.625*V_{IO}		V_{IO}+0.3	V	
Input leakage current	iIL	-1		1	µA	
Output low voltage	vOL			0.4	V	I_{out}<1mA
Output high voltage	vOH	V_{IO}-0.4			V	I_{out}>-1mA
Input pin capacitance	cIP		5.5		pF	
VDDIO, VDD_SDIO	vIO	1.7		3.6	V	

Table 3-6: I/O pin DC characteristics.

3.5.3 Protection of digital pins

All digital pins are protected against over-voltage with a “snap-back” circuit connected between the pad and GND. The “snap-back” voltage is 6.2 V and the holding voltage is 6 V. This provides a satisfying protection against over voltages and ESD. Also there is a diode included to protect against reversed voltages.

4 PIN CONFIGURATIONS

4.1 Pin Configuration SPB820P

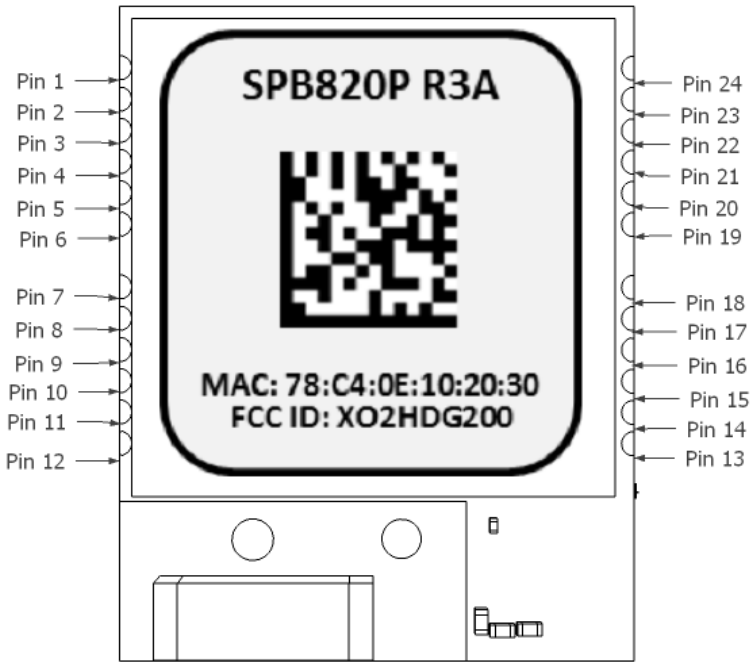


Figure 4.1: Package pin out, top view

4.2 Pin assignments

Pin	Function	Type	Description
1	VDD	S	Supply pin 3.3V
2	JTAG_TMS	I/O	Production Test interface, Do Not Connect
3	JTAG_TCK	I	Production Test interface, Do Not Connect
4	SPI_MOSI	I	SPI Host interface Input
5	SPI_CLK	I	SPI Host interface Input
6	UARTb_SPI WAKE_UP	I	Pin Sensed at boot to select UART or SPI Host Interface After boot use to wake up the SPB820P from sleep mode
7	JTAG_TDI	NC	Production Test interface, Do Not Connect
8	JTAG_TDO	NC	Production Test interface, Do Not Connect

9	UART_RX/SPI_MISO	I/O	UART Host interface Receive SPI Host Interface Output
10	UART_TX/SPI_CS	O	UART Host Interface Transmit SPI Host Interface Chip Select
11	UART_CTS/SPI_INT	I	UART Host Interface CTS SPI Host Interface Interrupt
12	UART_RTS	O	UART Host Interface RTS
13	GND	S	Ground
14	RF_PAD	Input	RF Signal (only for –R version)
15	GND	S	Ground
16	LED1	Output	LED1 Indicates WLAN association[1]
17	GPIO2	NC	GPIO pin, function defined by FW can be left unconnected
18	HOST_ATT	Output	Wake Host From SPB820P
19	GPIO3	NC	GPIO pin, function defined by FW can be left unconnected
20	GPIO4	NC	GPIO pin, function defined by FW can be left unconnected
21	GPIO1	NC	GPIO pin, function defined by FW can be left unconnected
22	SHUTDOWNb	Input	Module Reset Signal, Internal Pull up, not required to be connected.
23	GPIO6	Input	GPIO pin, function defined by FW can be left unconnected
24	PWR_OFF	Input	Active high powers down the SPB820P, Internal Pull Down

Table 4.1: Pin Description for SPB820P R2A

1: Depends on firmware.

5 APPLICATION INFORMATION

5.1 Power Supply

SPB820P should be powered by a single supply voltage on the supply on VDD, pin 1. The SPB820P generates all required voltages on board.

5.2 SHUTDOWN

The SHUTDOWNb pin shall be set high during normal operation. Pulling the SHUTDOWNb pin low, sets the HDG820 in reset mode. This turns OFF most parts of the circuit and minimizes the current consumption. All I/O interface pins are set to predefined states (high, low or high-z) when in Shutdown mode. For minimum power consumption turn external 1.5 V, OFF while the SHUTDOWNb pin is low.

To end reset mode set SHUTDOWNb pin high wait for the HDG820 to signal that it is ready with a low pulse on HOST_ATT, or wait t_{READY} for it to respond on the host interface.

On SPB820P SHUTDOWNb has an internal delay circuit that will pull SHUTDOWNb high, 100 ms after voltage is applied on VDD or PWR_DWN is released. If not used by the host the pin can be left unconnected.

5.3 Power down

By raising the PWR_DWN signal high the supply voltage to the SPB820P is switch off by the on board PMOS FET transistor and the current consumption is brought to a minimum.

5.4 Power save

Power save is an energy saving mode where HDG820 is only listening at regular intervals for the beacons transmitted from an access point and is set in sleep mode in between. During this sleep mode, FW is kept in RAM but all not needed functions are turned off. Since the receive time is very short compared to the listening interval the average current consumption is reduced significantly.
The timing of the listening interval is based on the internal 32 kHz clock.

5.5 Initialization

At power on and after reset the SPB820P will load firmware and calibrate the radio. During these 5s the upgrade mode can be entered by the host or a serial port terminal. The UARTb_SPI signal will be sampled at the end of the initialization period.

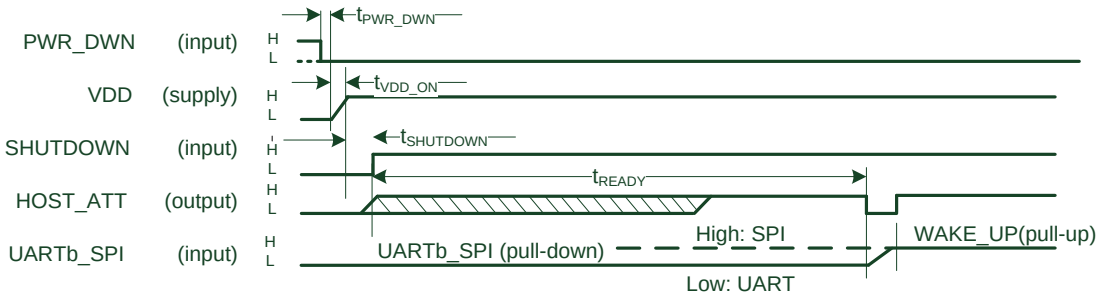


Figure 6; Initialization timing

Parameter	Symbol	Min	Typ	Max	Unit	Comment
VDD rise time	t_{VDD_ON}	2			µs	
PWR_DWN release to VDD high	t_{PWR_DWN}		150		µs	
SHUTDOWNb release delay	$t_{SHUTDOWN}$	1	100*		ms	Internal RC link delay
IO supply ramp time	$t_{VDD\_LDO\_IO}$		360		µs	
Digital 1.5V supply ramp time	t_{VDD_DCDC}		150		µs	
SHUTDOWNb release to host alert	t_{READY}		4		s	

Table 7: Initialization timing

5.6 Selecting UART or SPI as host interface

By setting UARTb_SPI low or high during the initialization the type of host interface can be selected.
If UARTb_SPI is set low UART will be selected as host interface
If UARTb_SPI is set high SPI will be selected as host interface.
Note that the UARTb_SPI is sampled every time the SPB820P initializes, at power on and after PWR_DWN or SHUTDOWNB signals are released.
After initialization the UARTb_SPI pin switch function to WAKE_UP.

5.7 UART host interface

If UARTb_SPI is low during initialization of the SPB820P the UART1_TX and UART1_RX will become the host interface of the SPB820P

To communicate with the SPB820P an UART interface is used. The signals “UART1_RTS” and “UART1_CTS” are only active when hardware flow control is enabled by commands from the host.

The SPB820P supports baud rates from 9600 baud up to 4 000 000 baud on the UART interface.

5.8 SPI host interface

If UARTb_SPI is high during initialization of the SPB820P will use the SPI bus in slave mode as host interface.
The SPI interface support a maximum clock rate of 25MHz

Note: SPI host interface is only supported for oWL-pico Server FW release 2.2 and higher.

5.9 Interrupt Signals

5.9.1 WAKE_UP

After initialization the UARTb_SPI signal assumes the function of WAKE_UP.
Active low input signal, allows the host to wake up the SPB820P from Power Save, if not utilized it can be left unconnected as the signal has an internal pull up resistor.

5.9.2 HOST_ATT

Active low output signal. Allows the host to go into low power mode and be woken by the SPB820P when data is received on the WLAN.
HOST_ATT signals with a low pulse when the HDG820 is ready after power on.

5.10 RF interface

The SPB820P-Bxx has a high performance chip antenna as the primary RF interface.

The SPB820P-Dxx has a U.FL connector as RF interface. Use Hirose U.FL receptacle or comparable for connection.

The SPB820P-Rxx has a pad 14 as RF interface.

5.11 Firmware Upgrade

The firmware in SPB820P can be upgraded either via the serial port or over the air. Upgrade over the serial port has to be initiated by the host or via serial port terminal during start up. Upgrade over the air is initialized by the host via oWL-pico command. Always check the compatibility of the FW version and HW version of your device before attempting an upgrade. Upgrades will not overwrite data stored in the OTP memory.

The SPB820P is an 802.11 compliant WLAN device functional within the ISM band on 2.4GHz using BPSK, QPSK, 16-QAM and 64-QAM modulations with a calibrated fixed value for maximum transmission output power. These properties are an integral part of the device and cannot be modified or customized by change of firmware or other alterations.

5.12 OTP Data

MAC address, calibration data and region of intended use, is permanently stored in One Time Programmable register during production and cannot be altered by any command or re-programming. A firmware upgrade will not affect OTP data.

5.13 General application information

5.13.1 Design directions

The design using the SPB820P must be performed according to good RF design considerations. Keep the area under the antenna free from all metal including signal or ground wires.

5.14 Typical Application

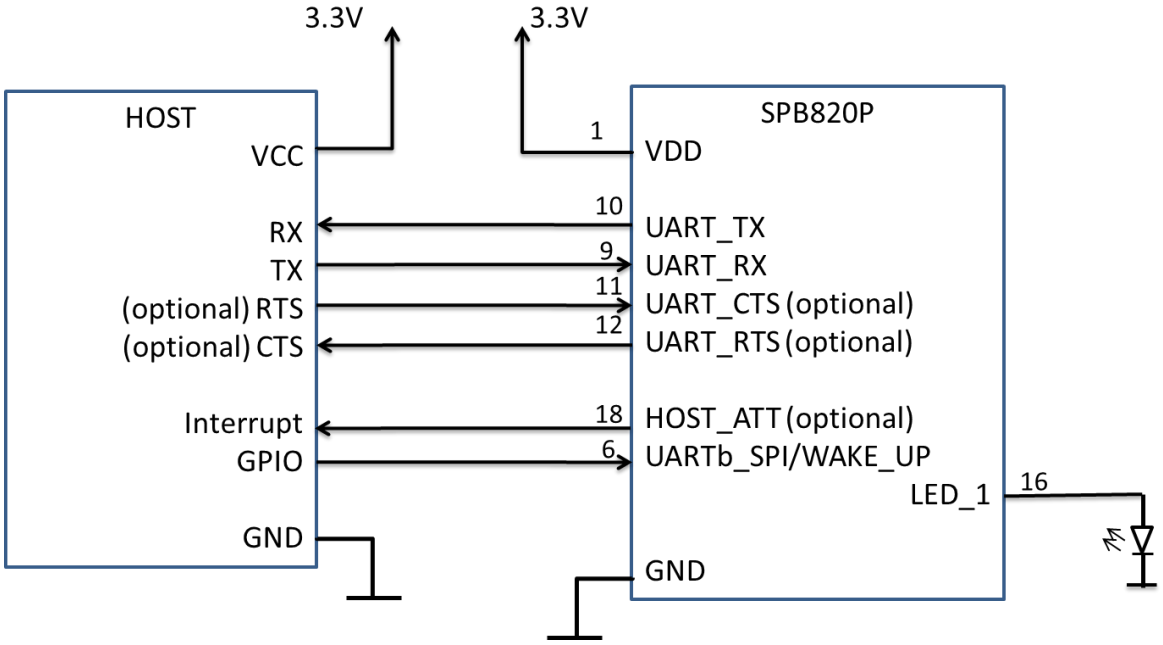


Figure 7: Typical application connection with UART host interface

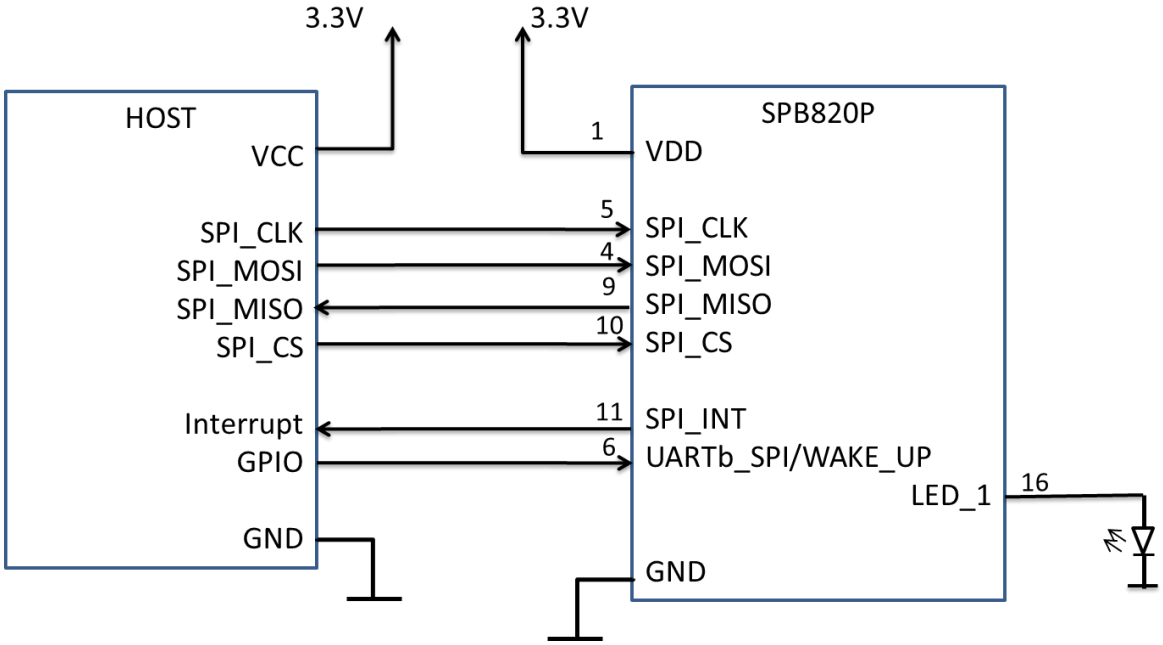


Figure 8: Typical application connection with SPI host interface

5.15 oWL – Pico API

The HDG820/SPB820P utilizes the oWL-pico API for communication from and to the host processor. This gives the host control over the WLAN interface and the possibility to set up up to 4 simultaneous TCP, RCP or RAW sockets. All IP and WLAN protocols are offloaded from the host. See Figure 9

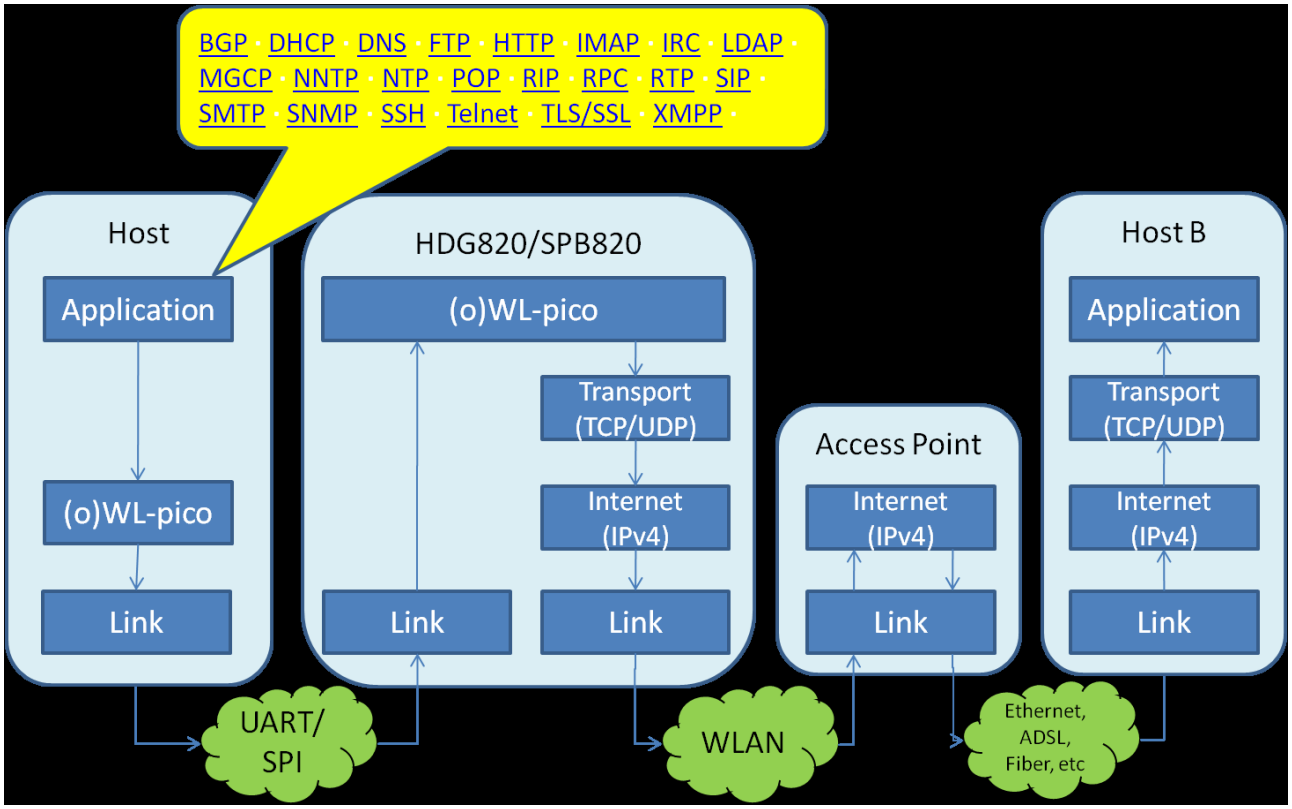


Figure 9: oWL-pico API

Please refer to http://pico.hd-wireless.se for more information in the oWL-pico API and reference designs.

5.16 Soldering of the module

The SPB820P is a surface mount PCB module. If the modules has been exposed to air or are delivered in non-hermetically sealed packages it is recommended to bake the modules before soldering. To lower the moisture content bake the packages for 192 hours at 40–45°C and <5%RH, or 24 hours at 120–130°C, depending on the maximum temperature rating of the packaging. The recommended solder profile is pictured in Figure 5.6

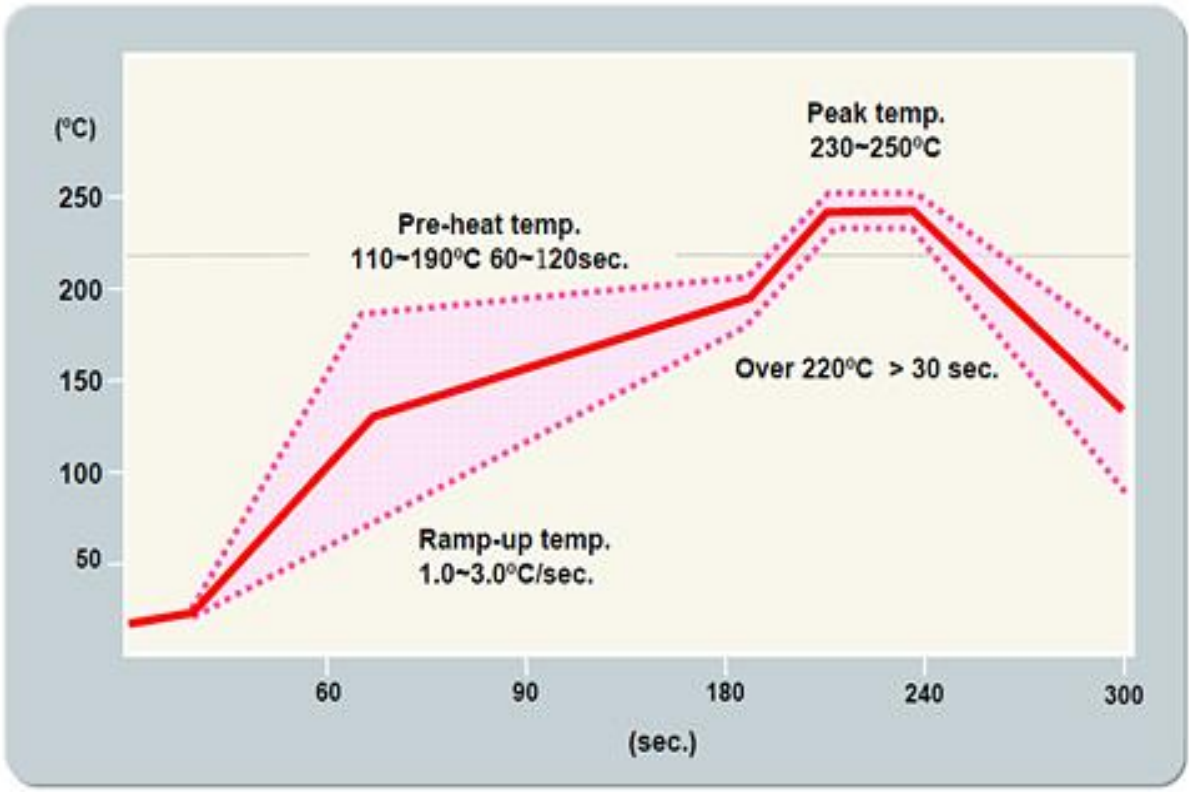


Figure 5.6: Reflow Temperture Profile.

Type	Rising Zone	Preheat Zone	Reflow Zone	Peak Zone	Cooldown Zone	Comment
PSR	125ºC-Peak No	110-190ºC 60-120 s	>220ºC >30 s	230-250ºC	Peak-125ºC No	

5.16.1 Environmental statement

The SPB820P is designed and manufactured to comply with the RoHS and Green directives.

6 PACKAGE SPECIFICATIONS

6.1 Mechanical outline of the SPB820P-xxQ module

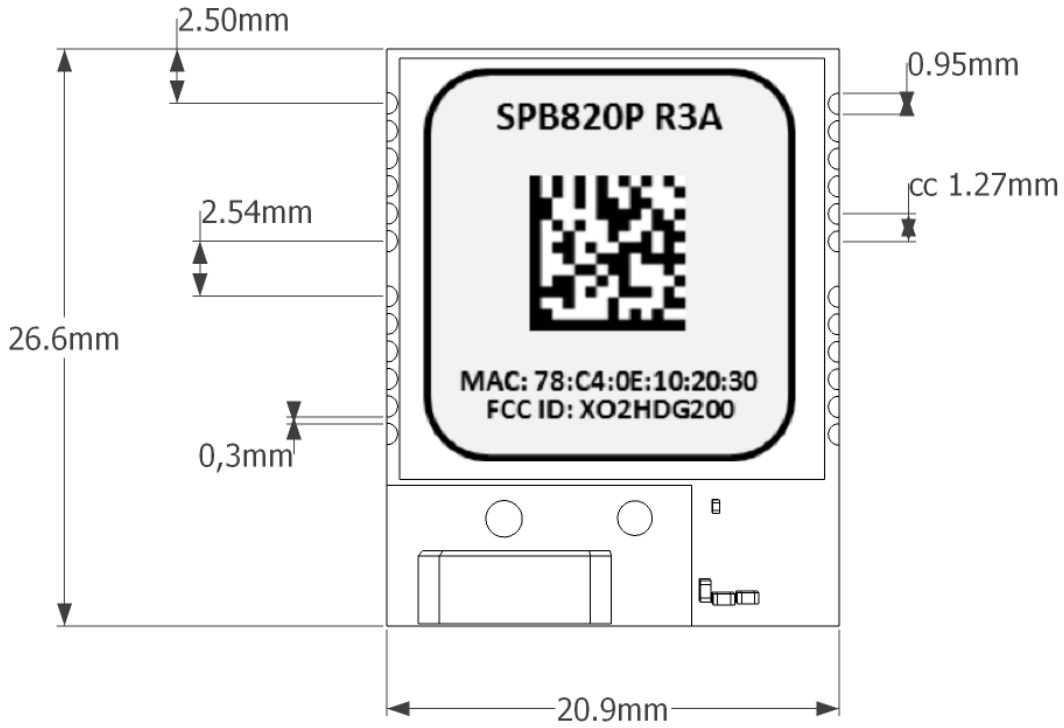


Figure 10: Top view

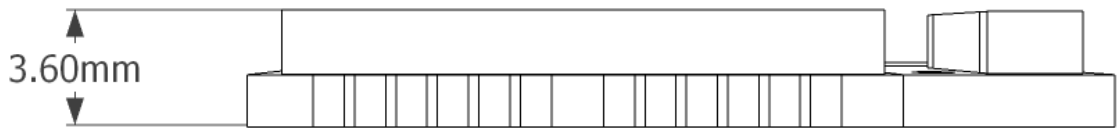


Figure 11: Side View

6.2 Mounting information

6.2.1 Recommended land pattern on the PCB for SPB820P-xxQ

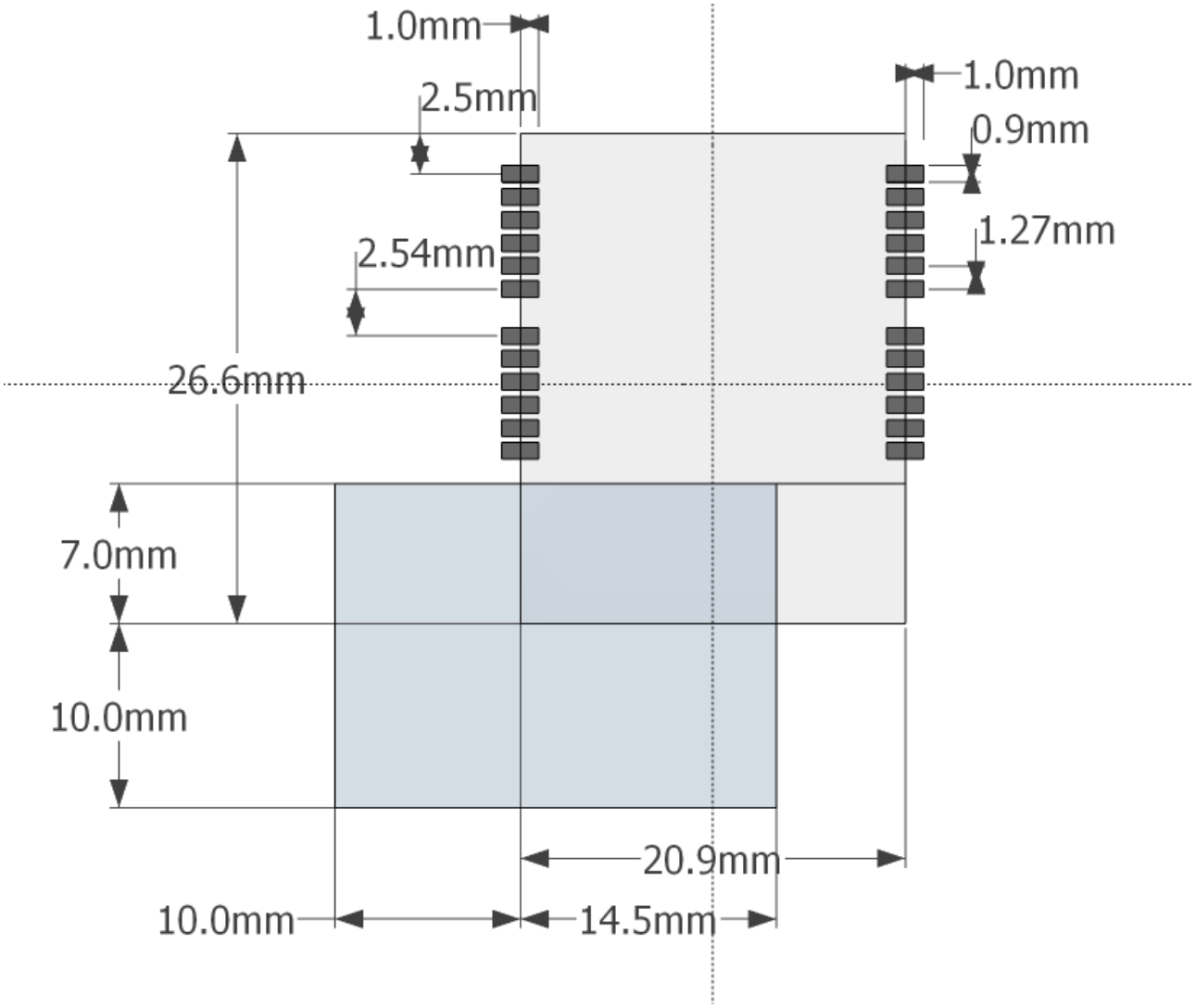


Figure 12: SPB820P-xxQ land pattern

Place no via holes or exposed metal under the module.

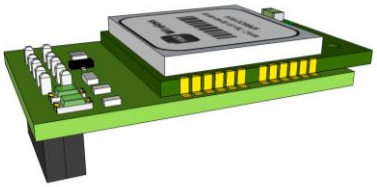
For the SPB820P-B with chip antenna an area around the module should be kept free of metal in all layers of the PCB, see Figure 12.

6.3 Markings on the SPB820P

The label on the EMC Shield is imprinted with the FCC ID and serial number.

7 Evaluation Kit

The Evaluation kit has the main signals of the SPB820P conveniently available on a 10 position header socket. The LED indicator signal is connected to an onboard LED. As the PWR_DWN signal has an onboard pull down resistor that will keep it low (active) it can be left unconnected. To power down the SPB820P the PWR_DWN signal has to be set high.



7.1 Pin out for the EVK (SPB820PE)

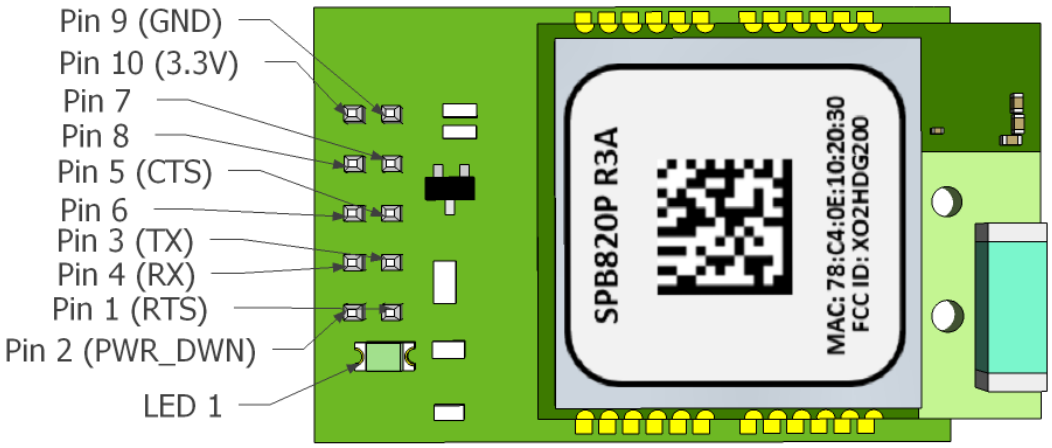
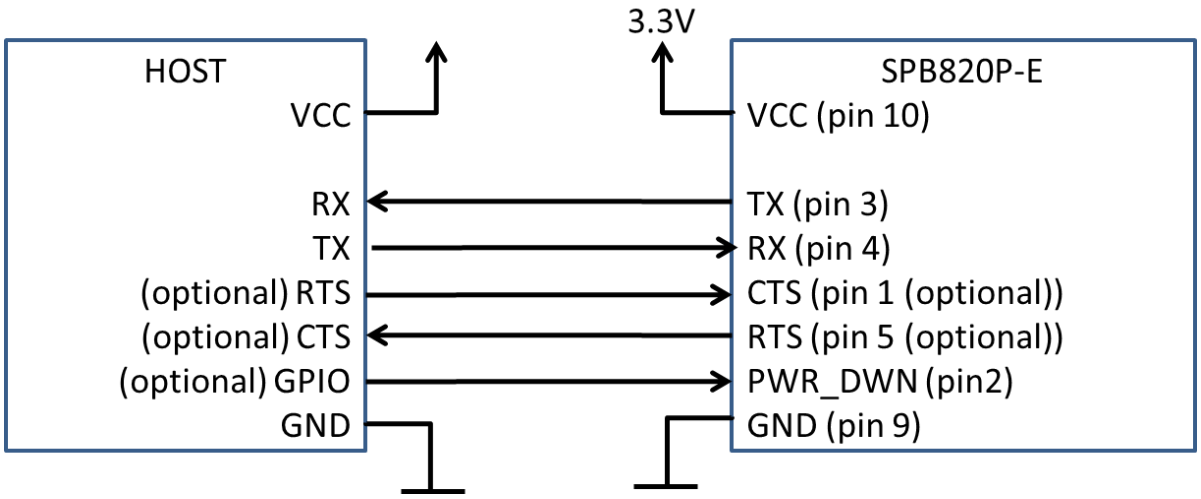


Figure 13: SPB820P EVK pins top view

Header Pin	Pin Function	SPB820P-xxP Pad	Comment
1	UART_RTS	12	Optional
2	PWR_DWN	24	Internal pull down can be left unconnected
3	UART_TX	10	To host RX
4	UART_RX	9	To host TX
5	UART_CTS	11	Optional
6	HOST_ATT	18	Optional Host attention to wake up the host from sleep.
7	WAKE_UP	23	Optional to wake up SPB820P from sleep.
8	NC		Do not connect
9	Ground	13, 15	
10	Supply 3.3V	1	

Table 7.1: SPB820P Evaluation Kit pin out

To connect to a host MCU in UART mode follow the block diagram below:



8 STANDARDS COMPLIANCE

8.1 IEEE/IETF

Standard	Notes
802.11b	Rates: 1, 2, 5.5, 11 Mbps
802.11d	International (country-to-country) roaming extensions
802.11g	Rates: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
802.11i	Enhanced security
802.11j	Extensions for Japan
802.11n	Rates: 7.2, 14.4, 21.7, 28.9, 43.3, 57.8, 65

Table 8.1: Applicable IEEE standards

8.2 WiFi Alliance

Specification	Notes
WiFi 802.11n STA	
WPS2.0	

Table 8.2: Applicable WiFi Alliance standards

8.1 Regulatory

Country	Approval authority	Regulatory	Frequency band
USA	FCC	FCC ID: XO2HDG200	2.412 GHz -2.462 GHz
Canada	IC	RSS: TBA	2.412 GHz -2.462 GHz
Europe	National	ETSI	2.412 GHz -2.4835 GHz

Table 8.3: Regulatory standards

8.1.1 FCC (United States of America)

This equipment complies with Part 15 of the FCC rules and regulations.
To fulfill FCC Certification requirements, an OEM manufacturer must comply with the following regulations:

The modular transmitter is labeled with its own FCC ID number, and, if the FCC ID is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following:

Example of label required for OEM product containing SPB820P module

Contains FCCID: X02HDG200
The enclosed device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (i) this device may not cause harmful interference and (ii) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: Only antennas approved may be used with SPB820 module. The SPB820 Module may be integrated with custom design antennas which OEM installer must authorize following the FCC 15.201 requirements

IMPORTANT: This equipment 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 15.19).

The internal / external antenna(s) used for this mobile transmitter must provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

This device is approved as a mobile device with respect to RF exposure compliance, and may only be marketed to OEM installers. Use in portable exposure conditions (FCC 2.1093) requires separate equipment authorization.

IMPORTANT: Modifications not expressly approved by this company could void the user's authority to operate this equipment (FCC section 15.21).

IMPORTANT: The finished product is required to comply with all applicable FCC equipment authorizations regulations, requirements and equipment functions not associated with the transmitter module portion. Compliance for unintentional radiators (Part 15 Subpart B “Unintentional Radiators”), such as digital devices, computer peripherals, radio receivers, etc. has to be demonstrated.

8.1.2 IC (Canada)

Equipment is subject to certification under the applicable RSSs, shall be permanently labeled on each item, or as an inseparable combination. The label must contain the following information for full compliance:

Certification Number:	**IC: TBA**
Manufacturer’s Name, Trade Name or Brand Name	**H&D Wireless AB**
Model Name:	**HDG200**

IMPORTANT: This equipment for which a certificate has been issued is not considered certified if it is not properly labeled. The information on the Canadian label can be combined with the manufacturer's other labeling requirements

IMPORTANT: 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.

IMPORTANT: To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

IMPORTANT: The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population. Consult Safety Code 6, obtainable from Health Canada's website www.hc-sc.gc.ca/rpb.

8.1.3 ETSI (Europe)

The SPB820P module has been certified for use in European union countries according to ETSI EN 300 328 (Electromagnetic compatibility and Radio spectrum matters for equipment operating in the 2,4 GHz ISM band using spread spectrum modulation techniques). This standard is harmonized within the European Union and covering essential requirements under article 3.2 of the R&TTE-directive.

If the SPB820P module are incorporated into a product, the manufacturer must ensure compliance of the final end-user product to the European harmonized EMC and low voltage/safety standards. A declaration of conformity must be issued for the product including compliance references to these standards. Underlying the declaration of conformity a technical construction file (TCF), including all relevant test reports and technical documentation, must be issued and kept on file as described in Annex II of the R&TTE-directive.

Furthermore, the manufacturer must maintain a copy of the SPB820P module documentation and ensure the final product does not exceed the specified power ratings, antenna specifications, and/or installation requirements as specified in the user manual. If any of these specifications are exceeded in the final product, a complete re-test must be made in order to comply with all relevant standards as basis for CE-marking. A submission to notified body must be used only if deviations from standards have been found or if non-harmonized standards have been used.

9 Related Documents

oWL-pico Doxygen information in oWL-pico Software Framework

1543-SPB820P (o)WL-pico API, user manual

1453-SPB820P Power Management Application Note

Wiki at http://pico.hd-wireless.se

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