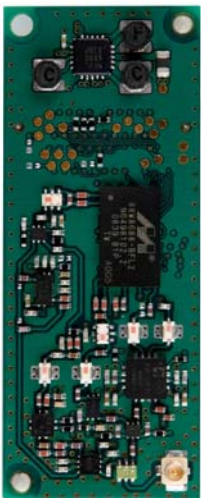




## Universal embedded WLAN solution for OEM customers

### WiBear - Industrial universal WLAN front end modules (IEEE 802.11a/b/g)



The lesswire industrial universal WiBear WLAN module is a reliable, automotive grade WLAN front end module. The module is developed for use in industrial temperature range from -40°C to +85°C.

The WiBear WLAN modules feature two key benefits:

- Two WiBear-versions are available for the communication in the 2.4GHz (WiBear/2.4GHz) and in both 2.4 + 5 GHz (WiBear/5GHz) frequency bands. The WiBear/5GHz module allows to use additional 19 channels in the 5 GHz band outside the 2.4 GHz band, which often is crowded by other 2.4 GHz devices.
- Offers the simultaneous use of two different leading wireless standards, the IEEE 802.11a/b,g WLAN and a full featured Bluetooth IEEE802.15.1 Class 2 transceiver.

The WiBear WLAN module may be integrated in two ways into customer solutions:

- Deploy the processor of the existing design as host controller: The WLAN module is connected to the customer processor by SDIO or G-SPI interfaces. The WLAN stack will run on processor of the existing design.
- Add the WiBear WLAN module together with a host controller to an existing design. As an example, the host controller may be a based on ARM9 core.

The host controller selection can consider additional needed interfaces like Ethernet, USB, CAN, or UART.

The WiBear WLAN module is designed amongst others for industrial solutions in order to connect with already existing WLAN networks on shop floor. Furthermore, an embedded Linux-based Web Server reference application is available to easily implement user-interfaces for WLAN module configuration.

The universal WLAN module saves time and reduces costs. OEM customers can concentrate on their core competence while adopting this easy to use WLAN module that can enable many wireless applications. For larger quantity orders lesswire can also provide module design-ins. Driver porting to other operating systems can be offered by lesswire.

#### WLAN

- IEEE802.11b Output power: typ. +18 dBm  
Sensitivity: @ 1Mbps typ. -98 dBm  
Sensitivity: @11Mbps typ. -89dBm
- IEEE802.11g Output power: typ. +15 dBm  
Sensitivity: @ 6Mbps typ. -91dBm  
Sensitivity: @12Mbps typ. -89dBm  
Sensitivity: @54Mbps typ. -74dBm
- IEEE802.11a Output power: typ. +15dBm  
Sensitivity: @ 6Mbps typ. - 90dBm  
Sensitivity: @12Mbps typ. - 88dBm  
Sensitivity: @54Mbps typ. - 73dBm

#### Bluetooth

- IEEE802.15.1 Output power: typ. +8dBm

**Operating Temperature** -40°C to + 85°C  
**Storage Temperature** -50°C to + 125°C

#### Host Interface Connector 60 PIN Hirose DF12

- SDIO
- G-SPI
- Audio
- Bluetooth coexistence
- JTAG
- UART
- LED

#### Driver Support

- Linux 2.6.x
- Windows CE, Windows XP/Vista

#### Bluetooth support

- Bluetooth 2.1 and Enhanced Data Rate (EDR) operation
- Bluetooth stacks that support UART HCI protocol





## Functions (continuation)

### RF properties achieved by

- integrated additional PA 2.4GHz / 5GHz
- integrated additional LNA 2.4GHz / 5GHz

### WLAN/Bluetooth coexistence feature

- Hardware based coexistence support by 2-wire, 3-wire, or 4-wire interfaces

### Firmware option for Micro Access Point operation

- Support for up to 8 WLAN stations

### Antenna

- U.FL Hirose coaxial connector

### Operation

- Individual application

### User interface

- LEDs can be configured for showing operational status
- Embedded Linux based Web Server reference application as configuration interface

### Configuration/Programming

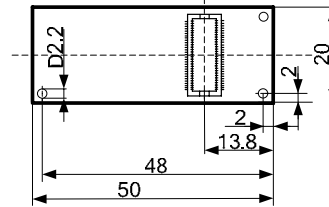
- Configuration over WLAN or wired interfaces based on the host controller
- External FW storage on host or separate SPI-Flash
- Fast FW download at power-on
- FW update over JTAG

### Digital interfaces to host controller

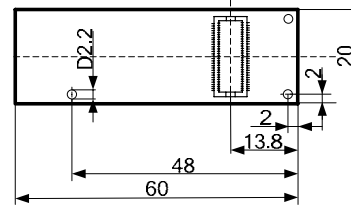
- 4bit SDIO host controller interface to WLAN module (default)
- G-SPI in slave mode: Synchronous communication with communication processor,
- Reference design with AT91SAM9262, 10 Mbps Ethernet, CAN, USB, and Linux 2.6.26 including BSP and drivers available

## Profile view with connector

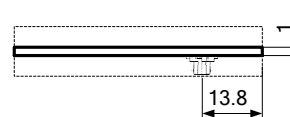
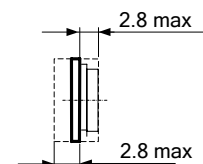
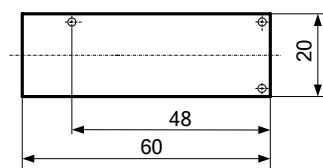
Bottom view AN00K60055 (external antenna)



Bottom view AN00K59744 (onboard antenna)



Top view AN00K59744 (onboard antenna)



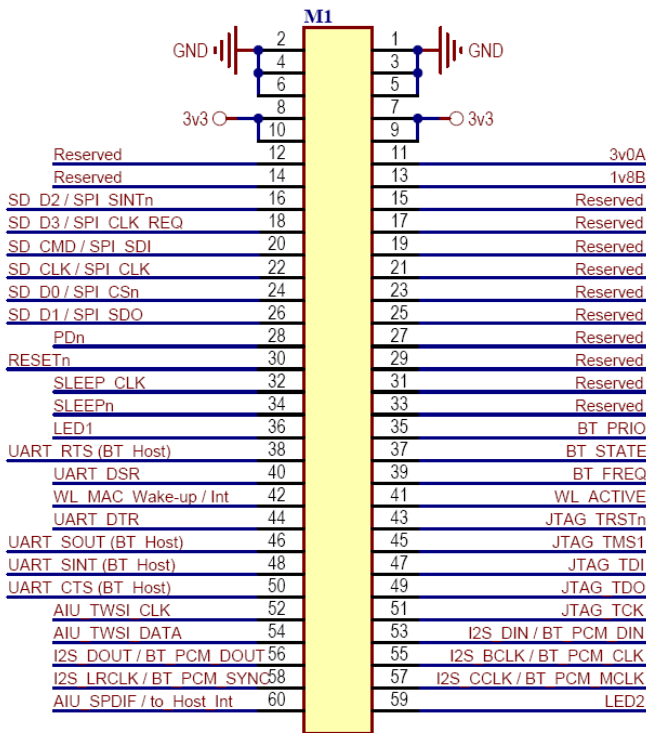
## Technical data

WLAN standards:	IEEE 802.11a, b, g IEEE 802.11i, e, j, h, s
Data transfer rate:	IEEE 802.11b: 11, 5.5, 2, 1 Mbps IEEE802.11a/g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps
Frequency range:	2.4 – 2.497 GHz (ISM Band) 5.150 – 5.805 GHz (UNII Bands)
ETSI support in 5 GHz band:	Transmit Power Control (TPC) Dynamic Frequency Selection (DFS)
Protocols:	Implements Ethernet NIC
Host interfaces:	SDIO (default), G-SPI alternatively
Antenna:	U.FL Hirose coaxial connector Alternatively: Onboard antenna
Mounting technology:	60 pin Hirose DF12 connector protected by three bolt connections
Management:	According to IEEE802.11

LEDs:	Optional, operation status. Set by Firmware
Modulation:	OFDM, DSSS/CCK
Operating temperature:	-40° to 85° Celsius (5 GHz: limited temperature range)
Power supply:	3.2 – 5.5V (typ. 3.3)
Supply current:	3.3V/350mA (max), 3.3V/300mA (avg)
Firmware:	At system power-on firmware is downloaded from host. Optionally the firmware is stored in on-board SPI EEPROM and updated by JTAG interface.
Security encryption:	WEP 64/128 Bit-Key, WPA (TKIP, AES), WPA2
Dimensions (LxB):	Onboard antenna: 60mm x 20mm External antenna: 50mm x 20mm
Scope of delivery:	Embedded WLAN module



## 60 PIN Host Interface Connector on Motherboard Side



LED		
PIN	Signal	Description
36	LED1	LED function set by firmware
59	LED2	LED function set by firmware

JTAG		
PIN	Signal	Description
43	JTAG_TRSTn	TRSTn
45	JTAG_TMS1	TMS_SYS
47	JTAG_TDI	TDI
49	JTAG_TDO	TDO
51	JTAG_TCK	TCK

Not Bluetooth related UART Signals		
PIN	Signal	Description
40	UART_DSR	UART_DSR_Input
44	UART_DTR	UART_DTR_Output / Wi-Fi Sleep Config

Power Supply		
PIN	Signal	Description
1-6	GND	Ground
7-10	VCC	Module power supply 3.3V
11	3V0A	Reference voltage output 3.0V
13	1V8B	Reference voltage output 1.8V

SDIO / G-SPI Interface		
PIN	Signal	Description
16	SD_D2 / SPI_SINTn	SPI_SINTn / SD_DAT[2]
18	SD_D3 / SPI_CLK_REQ	SPI_CLK_REQ / SD_DAT[3]
20	SD_CMD / SPI_SDI	SPI_SDI / SD_CMD
22	SD_CLK / SPI_CLK	SPI_CLK / SD_CLK
24	SD_D0 / SPI_CSn	SPI_CSn / SD_DAT[0]
26	SD_D1 / SPI_SDO	SPI_SDO / SD_DAT[1]

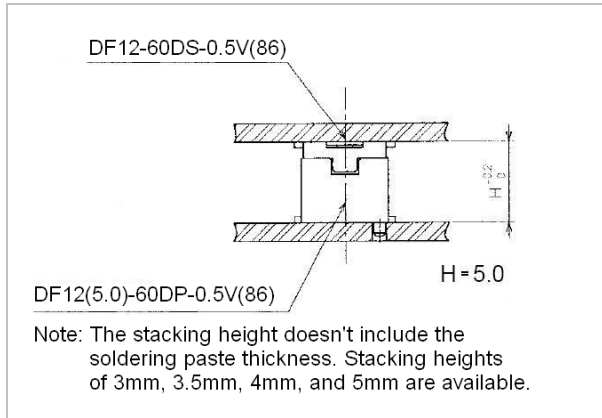
Bluetooth Coexistence		
PIN	Signal	Description
35	BT_PRIORITY	BT_PRIORITY
37	BT_STATE	BT_STATE
39	BT_FREQ	BT_FREQ
41	WL_ACTIVE	WL_ACTIVE

Control		
PIN	Signal	Description
28	PDn	Power Down
30	RESETn	Module reset
32	SLEEP_CLK	Input for external sleep clock
34	SLEEPn	SLEEPn Output
42	WL_MAC_Wake-up	WLAN_MAC_Wake-up_Input / Interrupt_Input

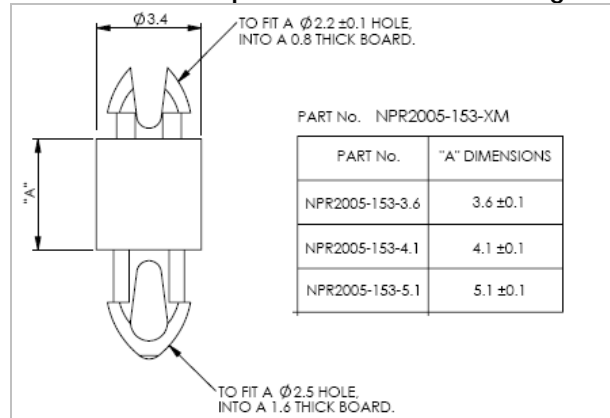
Bluetooth UART (max. up to 4000000 baud)		
PIN	Signal	Description
38	UART_RTS	UART_RTS_Output/ CON[15](Boot Config)
46	UART_SOUT	UART_SOUT_Output
48	UART_SINT	UART_SINT_Input
50	UART_CTS	UART_CTS_Input

Audio Interface Unit / Inter IC Sound / Two-Wire		
PIN	Signal	Description
52	GPIO_9	AIU_TWSI_CLK / GPIO_9
54	GPIO_10	AIU_TWSI_DATA / GPIO_10
60	GPIO_16	AIU_SPDIF / SoC_to_Host_Interrupt if AIU is disabled
53	GPIO_11	I2S_DIN / BT_PCM_DIN
55	GPIO_13	I2S_BCLK / BT_PCM_CLK
56	GPIO_12	I2S_DOUT / BT_PCM_DOUT
57	GPIO_15	I2S_CCLK / BT_PCM_MCLK
58	GPIO_14	I2S_LRCLK / BT_PCM_SYNC

### 60 PIN Host Interface Connector

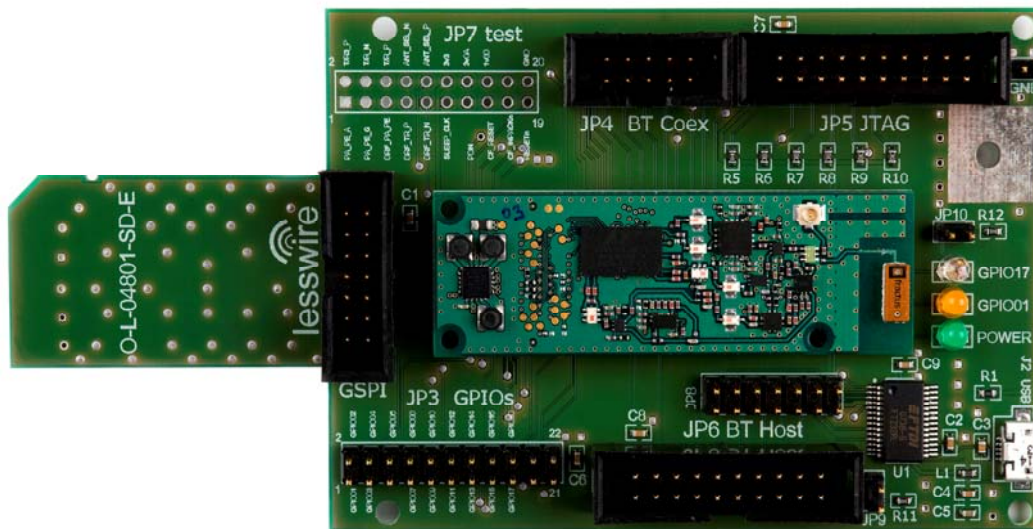


### Recommended spacers for board mounting



### SDIO Development Board

The SDIO Development Board may be used to evaluate WiBear WLAN Module or to develop applications on a preferred target platform. The target platform should be equipped by a standard SD card reader supporting SDIO in 4bit SD data transfer mode.



SDIO Development Board equipped with WiBear WLAN module AN00K59744-I with onboard antenna.

#### Part numbers:

- AN00K59744 WiBear-I /2.4GHz
- AN00K59744 WiBear-I /5 GHz
- AN00K60055 WiBear-E /2.4GHz
- AN00K60055 WiBear-E /5GHz
- AN00K72295 SDIO Development Board