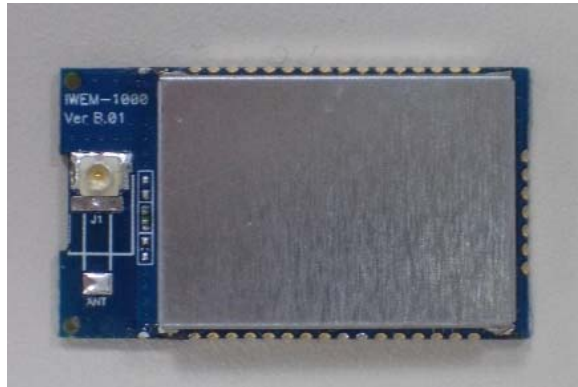

iWEM-1000 Ultra Low Power Consumption WiFi Module

Link your embedded system to WiFi networks through a simple UART interface with zero software driver and minimum power consumption



INTRODUCTION

iWEM-1000 is a complete Wi-Fi and networking solution and includes a 32-bit CPU, operating system, network stack, crypto accelerator, power management subsystem, real-time clock and a versatile sensor interface, allowing it to serve as a light weight networking client or, with custom software, as a standalone host.

Enabling WiFi Connectivity with Minimum Software Hardware Resources

The iWEM-1000 manages all networking functions. The Atech's standard thin-client application running on iWEM-1000 handles all networking tasks such as network scan, join network, establish TCP/IP connection and send/receive data. Since all networking functions are managed by the iWEM-1000, wireless Internet connectivity can be added to a system with an 8- or 16-bit application processor of limited hardware resources through iWEM-1000 via UART interface. The only hardware requirement for the host system to add WiFi connectivity is a simple 3-wire UART interface.

The software integration is simple for iWEM-1000. iWEM-1000 connects to the configured WiFi network automatically when it turns on. The host controller can send and receive data through UART to IP network if the WiFi network is available. The configuration of iWEM-1000 can be changed through simple ASCII UART command interface with minimum software resource. This eliminates the need to port complicated WiFi network drivers to the host application processor and results in fastest time to market and reduced development costs.

Application-Specific iWEM-1000 hosted system

Alternatively, since the iWEM-1000 is user-programmable, a hosted architecture can be chosen if the user application can be fit into the software space of iWEM-1000. In a hosted architecture, the iWEM-1000 is the only processor in the device to minimize the hardware, resulting in the lowest total solution cost. The user programs are stored in the flash memory on iWEM-1000 and running on iWEM-1000 with available processing power. The iWEM-1000 is programmed using the G2 Software Development Kit to perform user-specific functions. Atech software team is available to build the custom software for specific applications.

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Ultra Low-Power Consumption

The iWEM-1000 has been designed from inception to maximize battery life and achieves ultra low-power consumption. The power conservation architecture operates in two modes: an active mode and a sleep mode. The active mode consumes 30-200mA depending on TX data density. The sleep mode consumes less 0.5mA. The user can maximize the battery life by keeping the iWEM-1000 in sleep mode most of time and only waking it up when needed.

The host processor can issue a sleep command to put iWEM-1000 into sleep mode for minimum power consumption. When in sleep mode, the real-time clock and sensor interface remain active. The host processor sends a wake up signal to Sensor-0 line to wake up the iWEM-1000 from sleep. The iWEM-1000 can wake, and join a network using WPA2-PSK in under in 35msec. This allows it to stay asleep until required, but wake and join a network without any noticeable user delay.

BENEFITS

- **Low product integration and development costs**
- **Simple or no host processor**
- **Zero software driver effort**
- **Super fast boot up and connect time < 3 seconds**
- **No calibration costs or expensive test equipment required**
- **Reduced design complexity results in faster time to market**
- **No RF design experience is needed**
- **No concern about management of network stack**
- **Low-power design enables alkaline battery-powered Wi-Fi devices**

APPLICATIONS

- **Industrial and Home Automation**
- **Wireless Sensing/Control, Wireless Smart Meter**
- **Cable replacement**
- **Asset Tracking**
- **Health and Fitness Monitoring**
- **MCU interface connectivity**
- **Security**
- **Battery operated devices**
- **Smart Power Grid**
- **“Green industry”**

HARDWARE FEATURES

- **Wi-Fi, 802.11b/g PHY/MAC at up to 54Mbps**
- **Flexible antenna choice: Chip, 2.9mm wire, UFL and SMA**
- **3 wires to interface with your favorite microcontroller by using UART**
- **General sensor interface for monitoring push buttons, audio signals, temperature, motion, and acceleration**
- **11 GPIOs (GPIO 2-9, and 12-14) for general purpose use**

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- **Direct battery operation. On-chip power regulators and power management circuits**

SOFTWARE FEATURES

- **Pre-installed Atech Thin-Client application firmware provides complete networking functionality**
- **Infrastructure and Ad-Hoc mode support**
- **WiFi Security: Open, WEP-40, WEP-128, WPA-PSK, WPA2-PSK**
- **TCP/IP, DHCP, UDP, DNS, ARP, ICMP**
- **Simple ASCII Command Set to configure the module**
- **Over the air TFTP firmware upgrade**
- **Sleep mode support**
- **Multiple application image support**

SPECIFICATIONS

WLAN	
IEEE Standard	802.11b/g
Operation Mode	Infrastructure Client, Ad-Hoc
802.11b/g Channels	1-14
RF Modulation	DSSS(CCK-11, CCK-5.5, DQPSK-2, DBPSK-1), OFDM
Security	Open, WEP40, WEP128, WPA-PSK, WPA2-PSK
802.11b/g Data Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 12, 24, 36, 54 Mbps
802.11 Tx RF Power	+12 dBm for 802.11g +14 dBm for 802.11b
802.11 Rx Sensitivity	-89dB
Protocol Support	
Network Protocol	TCP/IP, DHCP, UDP, DNS, ARP, ICMP
Interface	
Antenna	Chip antenna or antenna connector
Antenna Connector	UFL or SMA RF connector

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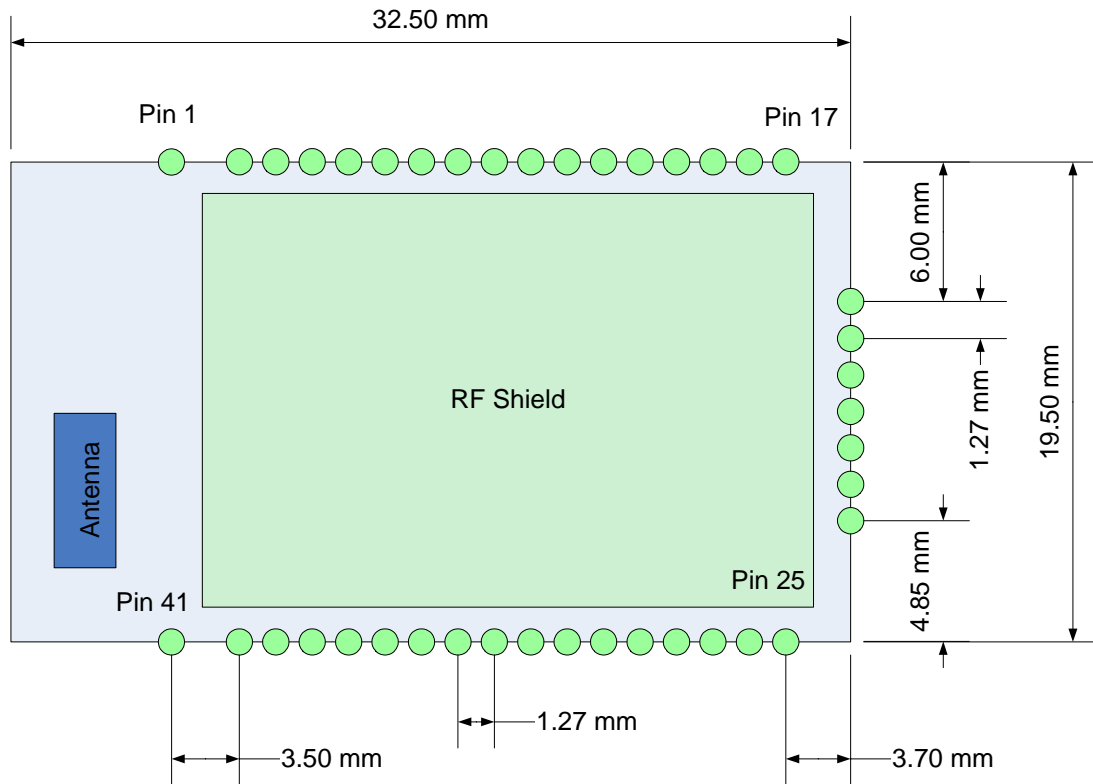
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Digital IO	11 GPIOs
Sensor Interface	Precision ADC For audio sampling, temperature, acceleration, flow, pressure, and battery status
System Status	GPIO 12 for TCP connection GPIO 13 for WiFi AP association
Console / Data Port	UART, 2400 to 115200baud Escape Characters “+++” to get in console mode
Environmental & Safety	
Operating Temperature	-30° to 85°C
Storage Temperature	-40° to 85°C
Humidity	0 to 95%, non-condensing
EMI & Safety	CE / FCC Class A
Power	
Operating Voltage	2.0 – 3.3VDC or 3.0 – 3.7 VDC; User configurable
Current consumption	30-200mA operating; 0.5mA sleeping
Physical Characteristics	
Package	Stamp type SMT
Weight	5g
Dimensions	32mm x 19.5mm x 2.5mm

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Mechanical Dimension



PIN DEFINITIONS

Pin	Name	Description	Pin Type	Default Configuration
1	GND	Ground. Must be connected for proper antenna performance		
2	SENSOR-3	Sensor interface, Analog input to module	Analog, 1.2V tolerant	
3	SENSOR-2	Sensor interface, Analog input to module	Analog, 1.2V tolerant	
4	SENSOR-1	Sensor interface, Analog input to module	Analog, 1.2V tolerant	
5	SENSOR-0	Wakeup from external condition		
6	SENSE-PWR	Voltage output from module to power external sensors, 3.3V	Analog 3.3V	
7	GPIO-7	GPIO	24mA drive, 3.3V tolerant	
8	GPIO-8	GPIO	24mA drive, 3.3V tolerant	
9	GPIO-2	GPIO	24mA drive, 3.3V tolerant	
10	GPIO-3	GPIO	24mA drive, 3.3V tolerant	
11	GPIO-4	GPIO	24mA drive, 3.3V tolerant	
12	GPIO-5	GPIO	24mA drive, 3.3V tolerant	
13	GPIO-9	GPIO	8mA drive, 3.3V tolerant	
14	SPI-CS	SPI Chip Select		No connect

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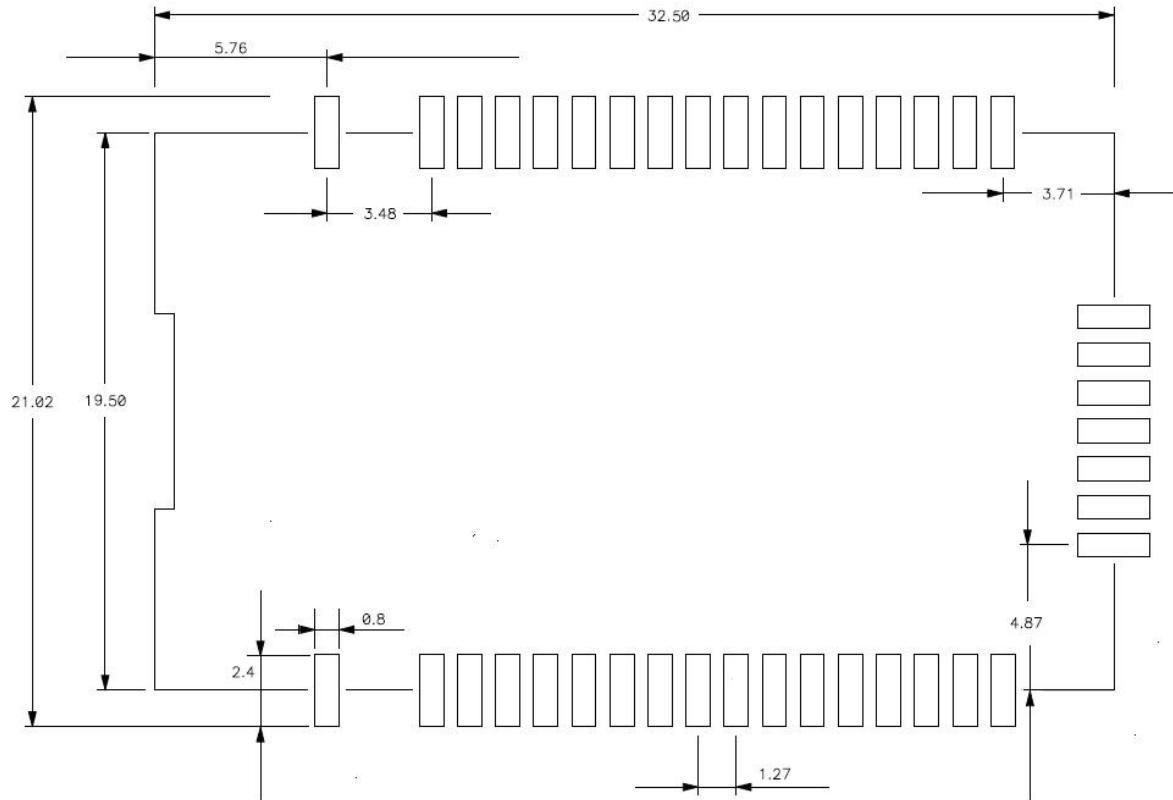
15	SPI-MOSI	SPI master data out		No connect
16	SPI-MISO	SPI master data in		No connect
17	SPI-CLK	SPI clock		No connect
18	GND1	Ground		
19	GPIO-6	GPIO	24mA drive, 3.3V tolerant	
20	GPIO-14	GPIO	8mA drive, 3.3V tolerant	
21	DMA-RX	Debug port		No connect
22	DMA-TX	Debug port *(apply 100K pull-down if ultra low sleep power required)		HIGH Z
23	FORCE_AWAKE	Force the module to wakeup, input to module, 31us min pulse		
24	SUPERCAP	Balance center pin voltage on stacked super capacitors	Analog 3.3V	No connect
25	GND	Ground		
26	VDD-BATT	Battery input, 2.0-3.3V with boost regulator in use, 3.0-3.7V otherwise		
27	VDD-IN	3.3 to 3.7 voltage, do not connect when boost regulator is in use		
28	3.3V-REG-IN	Boost regulator control input, connect to 3.3V-REG-OUT to enable		GND to disable
29	3.3V-REG-OUT	Boost regulator control output, connect to 3.3V-REG-IN to enable		No connect
30	UART-TX	TX from the module	8mA drive, 3.3V tolerant	
31	UART-RX	RX to the module	8mA drive, 3.3V tolerant	
32	GPIO-12	UART CTS flow control	8mA drive, 3.3V tolerant	
33	GPIO-13	UART RTS flow control	8mA drive, 3.3V tolerant	
34	EPC-ANT-B	EPC port, RFID antenna B		No connect
35	EPC-ANT-A	EPC port, RFID antenna A		No connect
36	RESET	Module reset, Active Low, reference to VDD-BATT, 160 usec pulse		Pull up
37	SENSOR-7	Sensor interface, Analog input to module	Analog, 1.2V tolerant	No connect
38	SENSOR-6	Sensor interface, Analog input to module	Analog, 1.2V tolerant	No connect
39	SENSOR-5	Sensor interface, Analog input to module	Analog, 1.2V tolerant	No connect
40	SENSOR-4	Sensor interface, Analog input to module	Analog, 1.2V tolerant	No connect
41	GND	Ground. Must be connected for proper antenna performance		

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Suggested Layout Footprint



The measurement unit is mm.