

Secure Socket iWiFi™

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Data Sheet

Ver. 1.60

ConnectOne™

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WARNING: THE SECURE SOCKET iWIFI IS AN RF MODULE INTENDED FOR EMBEDDING IN A HOST DEVICE. LOCAL RELEVANT RF REGULATIONS SUCH AS ALLOWED FREQUENCIES AND USAGE IN COMMERCIAL FLIGHTS MUST BE OBSERVED. SAFETY INSTRUCTIONS MUST BE INCLUDED IN THE MANUALS OF THE HOST DEVICE. CONNECT ONE ASSUMES NO LIABILITY FOR CUSTOMER FAILURE TO COMPLY WITH THESE PRECAUTIONS.

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Revision History

11-6250-16

Version	Date	Description
1.0	January 2008	Initial preliminary version
1.1	January 2008	Added certification details and some editing
1.2	February 2008	Added antenna ordering information
1.3	March 2008	Changed temperature range values
1.4	March 2008	Minor edits
1.5	March 2008	Updated power consumption values
1.60	February 2009	Miscellaneous

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1 Introduction

General Description

Secure Socket iWiFi™ is a secure serial-to-wireless LAN device server module that also acts as a bridge to connect serial devices to 802.11b/g wireless LANs. It includes the iChip™ CO2128 IP Communication Controller™ chip and Marvell 88W8686 WiFi chipset. It is packaged in RoHS-compliant compact form factor and uses an industry standard pin-out.

Secure Socket iWiFi offers much more than many other device servers on the market. It acts as a security gap between the application and the network; supports up to 10 simultaneous TCP/UDP sockets; two listening sockets; a web server with two websites; SMTP and POP3 clients; MIME attachments; FTP and Telnet clients, and SerialNET™ mode for serial-to-IP bridging.

Secure Socket iWiFi supports the SSL3/TLS1 protocol for secure sockets, HTTPS and FTPS, WEP, WPA and WPA2 WiFi encryption.

Secure Socket iWiFi minimizes the need to redesign the host device hardware. It easily inserts into headers on the host PCB and connects to an external antenna. Minimal or no software configuration is needed for Secure Socket iWiFi to access the wireless LAN.

Connect One's high-level AT+i™ API eliminates the need to add WiFi drivers, security and networking protocols and tasks to the host application. The AT+i SerialNET operating mode offers a true plug-and-play mode that eliminates any changes to the host application.

Secure Socket iWiFi firmware — the IP stack and Internet configuration parameters — are stored in an external flash memory. The module is power-efficient: the core operates at 1.2V, while I/Os operate at 3.3V. Power Save mode further reduces power consumption.

The II-EVB-361MW evaluation board provides an easy environment for testing the Secure Socket iWiFi prior to designing it into your product.

Hardware Description

- Size: 64.5x27.4x6.6mm (2.54x1.08x0.26")
- Core CPU: 32-bit RISC ARM7TDMI, low-leakage, 0.13 micron, running at 48MHz
- Operating Voltage: +3.3V+/-10%
- Operating Humidity: 90% maximum (non-condensing)
- Operating Temperature Range: -20° to 75°C (-4° to 167°F)
- Power Consumption:
Transmit – 260mA (typical)
Receive – 190mA (typical)
Power Save mode – 8mA
- Connector: U.FL ultra-miniature coax to antenna
- Host Interface: TTL serial interface
- RoHS-compliant; lead-free

Performance Specifications

- Host Data Rate: up to 3Mbps in serial mode
- Serial Data Format (AT+i mode):
Asynchronous character; binary; 8 data bits; no parity; 1 stop bit
- SerialNET mode: Asynchronous character; binary; 7 or 8 data bits; odd, even, or no parity; 1 stop bit
- Flow Control: Hardware (RTSH, CTSH) and software flow control.

Internet Protocols

ARP, ICMP, IP, UDP, TCP, DHCP, DNS, NTP, SMTP, POP3, MIME, HTTP, FTP and Telnet

Security Protocols

SSL3/TLS1, HTTPS, FTPS, RSA, AES-128/256, 3DES, RC-4, SHA-1, MD-5, WEP, WPA and WPA2

Protocols Accelerated in HW

AES, 3DES and SHA

Application Program Interface

- Connect One's AT+i protocol
- SerialNET mode for transparent serial data-to-Internet bridging

Wireless Specifications

- Standards Supported: IEEE 802.11b, IEEE 802.11g
- Frequency: Europe – 2.412-2.472GHz
 USA – 2.412-2.462GHz
- Channels: Europe – 13
 USA – 11 channels

Recommended Antenna and Cable

- iW-ANT2-BL Antenna: 2.4GHz, 2.0dBi, 50Ω, omni-directional, 1/4 wavelength dipole configuration, VSWR≤2.0, height - 82.5mm, weight – 6.3 grams
- iW-CAB-150 Pigtail Antenna Cable

Warranty

One year

Certifications

- CE, FCC
- Radio: FCC part 15, subpart C; EN 301 489 (EMC Directive 89/336/EEC)
- EMC: FCC part 15, subpart B; EN 300 328 (R&TTE Directive 1999/5/EC)
- Safety: EN 60950-1:2004

Installation Requirements

The Secure Socket iWiFi must be installed within a full-enclosure device that is safety certified.

2 Features

Security

- Acts as a security gap between the host application and the network
- One secure SSL3/TLS1 socket
- Provides WEP, WPA and WPA2 wireless LAN security
- Supports multiple Certificate Authorities and both client-side and server-side authentication
- Secure FTP and HTTP clients (over SSL3)
- Includes a true hardware random number generator
- AES, 3DES and SHA accelerated in hardware

Protocols

- Up to 10 simultaneous TCP/UDP sockets and two listening sockets
- HTTP client
- HTTP web server with two on-chip websites: configuration site and application site
- FTP and Telnet clients
- DHCP client and server
- Sending and receiving textual email and binary email with MIME attachments

Additional Features

- Non-volatile, on-chip operational parameter database
- Supports infrastructure and ad-hoc wireless LAN networks
- SerialNet mode for serial-to-IP bridging (port server mode)
- Local firmware update
- Remote configuration and firmware update over the Internet
- Retrieval of time data from a Network Time Server

Note: For a detailed description of all available features, see the *AT+i Programmer's Manual*.

3 Pin Description

The Secure Socket iWiFi module includes the iChip CO2128 IP communication controller and the Marvell 88W8686 802.11b/g WiFi chipset mounted on a socket form-factor module.

3.1 Pin Assignments

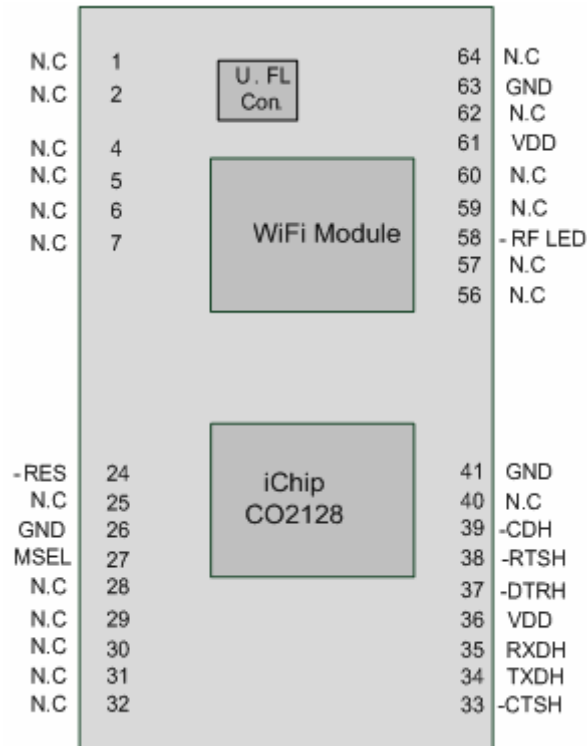


Figure 3-1: Pin-out for Secure Socket iWiFi

3.2 Pin Functional Description

3.2.1 Miscellaneous Signals

Signal	Type	Pin No.	Description
MSEL	Input with internal pull-up resistor	27	Mode Select: When this pin is held LOW during power-up for at least 3 seconds, the boot ROM application ignores the firmware that is burnt on the external flash memory and waits for an application to be loaded via one of the enabled interfaces. This mode is used for firmware update.
-RES	I	24	RESET: When -RES is LOW, Secure Socket iWiFi immediately terminates its present activity and clears its internal logic. -RES must be held LOW for at least 1ms after power reaches 90%.
GND	P	26, 41, 63	Ground: iChip ground signal
VDD	P	36, 61	Power Supply: This pin supplies 3.3V+/-0.3V
NC	---	1, 2, 4-7, 25, 28-32, 40, 56, 57, 59, 60, 62, 64	NC (Not Connected) pins

Table 3-1: Miscellaneous Signals

3.2.2 Host Serial Interface Signals

Signal	Type	Pin No.	Description
TXDH	O	34	Transmit Data Host: This pin supplies asynchronous serial transmit data to the host.
RXDH	I	35	Receive Data Host: This pin supplies asynchronous serial receive data from the host. When not used, this pin must be connected to VDD.
-CTSH	I	33	Clear-to-Send Host: -CTSH is active only when host hardware flow control is enabled. When -CTSH is LOW, flow control is enabled for the host serial port, i.e., iChip can transmit to the host. When -CTSH is HIGH, the iChip transmitter holds its data in the serial port transmit register. -CTSH is sampled only at the beginning of a frame transmission. If -CTSH is raised while a character frame is being transmitted, that frame will be completed. Connect -CTSH to -RTSH when not in use.
-RTSH	O	38	Ready-to-Send Host: -RTSH is active only when host hardware flow control is enabled. When -RTSH is LOW, flow control is enabled for the host serial port, i.e., the host can transmit to iChip. When -RTSH is HIGH, iChip indicates that its receiver is busy and cannot receive data from host. Connect -RTSH to -CTSH when not in use.
-DTRH	O	37	Undefined
-CDH	O	39	Undefined

Table 3-2: Host Serial Interface Signals

3.2.3 LED Indicator and RF Connector

Signal	Type	Pin No.	Description
-RF_LED	Output with serial 330Ω resistor	58	-RF_LED status Blinking: AP scanning ON (Low): Link
RF Connector		---	U.FL ultra-miniature coaxial antenna connectors for diversity receive at 2.4GHz. Use pigtail to connect to a standard antenna.

Table 3-3: LED Indicator and RF Connector

4 Electrical Specifications

4.1 Absolute Maximum Ratings

Parameter	Rating
Voltage at any pin with respect to ground	-0.3V to +3.6V
Operating temperature	-20°C to 75°C (-4°F to 167°F)
Storage temperature	-65°C to 125°C (-85°F to 257°F)

Table 4-1: Absolute Maximum Ratings

4.2 DC Operating Characteristics

Parameter	Min	Typical	Max	Units
VDD	3.0	3.3	3.6	Volts
High-level Input	2.0		VDD I/O+0.3	Volts
Low-level Input	-0.3		0.8	Volts
High-level Output @2mA	VDD I/O-0.4			Volts
High-level Output @0mA	VDD I/O-0.2			Volts
Low-level Output @2mA			0.4	Volts
Low-level Output @0mA			0.2	Volts
Input leakage current			10	μA
Power supply current from VDD (Transmit Mode)		260	280	mA
Power supply current from VDD (Receive Mode)		190	210	mA
Power supply current from VDD (Power Save Mode)		8*		mA
Input Capacitance			5.3	pF
Radio Frequency Range (subject to local regulation)	2.412		2.484	MHz

Table 4-2: DC Operating Characteristics

(*) **Note:** Power supply current as measured in firmware version i2128d722B05.

4.3 Tx Specifications

Item	Condition		Min	Typ	Max	Unit
Transmit Power Levels	11b			15		dBm
	11g			15		dBm
Transmit Spectrum Mask	11b	Fc+/-11MHz		40		dBc
		Fc+/-22MHz		60		dBc
	11g	Fc+/-11MHz		30		dBc
		Fc+/-20MHz		40		dBc
		Fc+/-30MHz		50		dBc
Transmit Center Frequency Tolerance	Temperature=25°C			-	+/-10	ppm

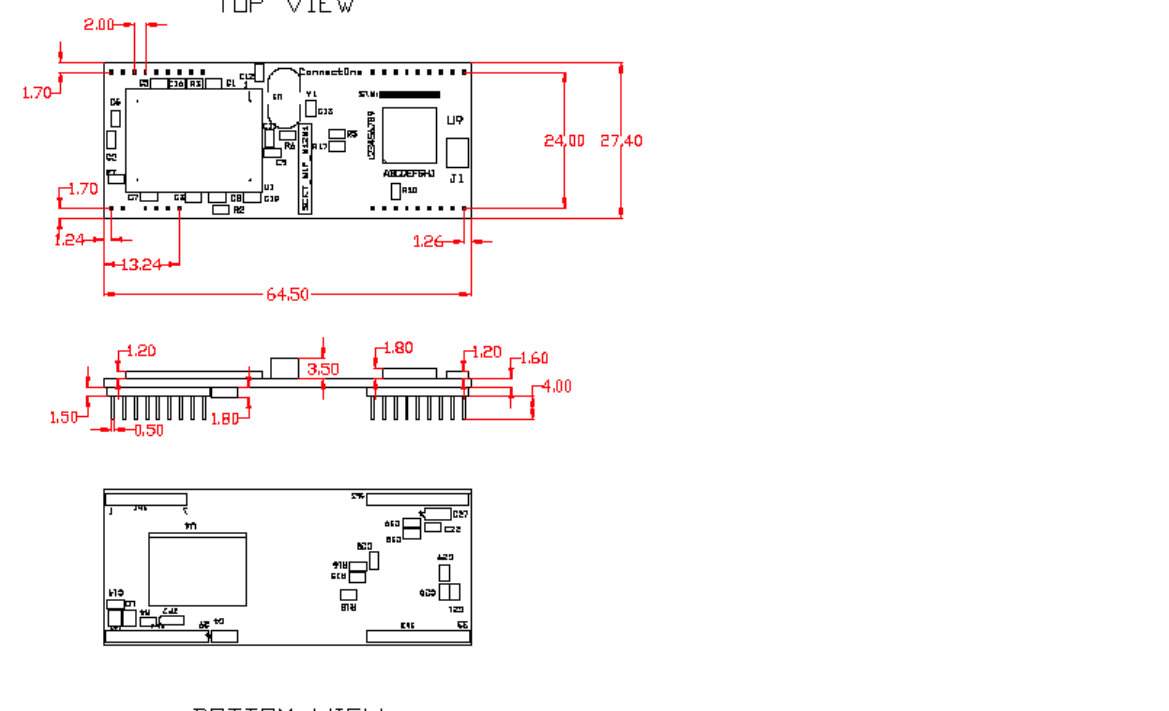
Table 4-3: Tx Specifications

4.4 Rx Specifications

Item	Condition		Min	Typ	Max	Unit
Receiver Minimum Input Level Sensitivity	Data Rate=11Mbps, PER<8%			-88		dBm
	Data Rate=54Mbps, PER<10%			-74		dBm
Adjacent Channel Rejection	802.11b Data Rate=11Mbps, PER<8%			48		dBc
Desired channel is 3dB above sensitivity	802.11g Data Rate=54Mbps, PER<10%			15		dBc

Table 4-4: Rx Specifications

$PER(\%) = (\text{Number of all packets} - \text{Number of received packets}) / (\text{Number of all packets} \times 100)$



6 Evaluation Board

The II-EVB-361MW evaluation board enables you to evaluate the Secure Socket iWiFi without changing anything in your current development environment. Using a simple Windows-based application on a PC, you can issue AT+i commands to the iChip CO2128 and get responses.

AT+i commands are used to configure parameter values into iChip's flash memory and activate Internet tasks such as email send, sockets, FTP sessions, configuration, and more.

A full description of AT+i commands can be found in the *AT+i Programmer's Manual* on Connect One's website at <http://www.connectone.com>.

To help you evaluate the Secure Socket iWiFi, Connect One supplies the iChip Config Utility. This is a Windows-based application that contains intuitive dialog boxes to fully configure iChip CO2128. It doesn't require any knowledge of AT+i commands. It also contains local firmware update functionality. The iChip Config Utility allows you to perform specific Internet communication tasks such as sending and receiving emails, activating iChip's websites, entering SerialNET mode, and more. The latest iChip Config Utility version and user manual can be found on Connect One's website under the Support section.

7 Ordering Information

Part Number	Description
iW-SM2128MW-US	Secure Socket iWiFi module, for USA
iW-SM2128MW-EU	Secure Socket iWiFi module, for Europe
iW-SM2128MW-JP	Secure Socket iWiFi module, for Japan
II-EVB-361MW-US-0 II-EVB-361MW-US-110	Evaluation board for Secure Socket iWiFi module, for USA, without power supply/110V
II-EVB-361MW-EU-0 II-EVB-361MW-EU-0/220	Evaluation board for Secure Socket iWiFi module, for Europe, without power supply/220V
II-EVB-361MW-JP-0 II-EVB-361MW-JP-110	Evaluation board for Secure Socket iWiFi module, for Japan, without power supply/110V
iW-ANT2-BL	2.4GHz WiFi antenna, 2.0dBi, 50Ω, omni-directional, 1/4 wavelength dipole configuration, VSWR≤2.0, height - 82.5mm, weight – 6.3 grams
iW-CAB-150	Pigtail antenna cable

8 Internet Protocol Compliance

Secure Socket iWiFi complies with the Internet standards listed in the following table.

RFC 768	User datagram protocol (UDP)
RFC 791	Internet protocol (IP)
RFC 792	ICMP – Internet control message protocol
RFC 793	Transmission control protocol (TCP)
RFC 821	Simple mail transfer protocol (SMTP)
RFC 822	Standard for the format of ARPA Internet text messages
RFC 826	Ethernet address resolution protocol (ARP)
RFC 959	File transfer protocol (FTP)
RFC 854	TELNET protocol specification
RFC 857	Telnet ECHO option
RFC 858	Telnet suppress go-ahead option
RFC 1034	Domain names (DNS) - concepts and facilities
RFC 1035	Domain names (DNS) - implementation and specification
RFC 1073	Telnet window size option
RFC 1091	Telnet terminal type option
RFC 1321	MD5 message digest algorithm
RFC 1939	Post office protocol - version 3 (POP3)
RFC 1957	Some observations on the implementations of the post office protocol (POP3)
RFC 2030	Simple network time protocol (SNTP)
RFC 2045	Multipurpose Internet mail extensions (MIME) part one: internet message body format
RFC 2046	MIME part two: media types
RFC 2047	MIME part three: message header extensions for non-ASCII text
RFC 2048	MIME part four: registration procedures
RFC 2049	MIME part five: conformance criteria and examples
RFC 2068	Hypertext transfer protocol HTTP/1.1
RFC 2131	Dynamic host configuration protocol (DHCP)
RFC 2132	DHCP options (only relevant parts)
RFC 2228	FTP security extensions
RFC 2246	The TLS protocol version 1.0

Table 8-1: Internet Protocol Compliance